

County of Albany

Harold L. Joyce
Albany County Office Building
112 State Street - Albany, NY 12207



Meeting Agenda

Tuesday, May 27, 2025

5:00 PM

**Harold L. Joyce Albany County Office Building
Cahill Room - First Floor**

Public Works Committee

PREVIOUS BUSINESS:

1. APPROVING PREVIOUS MEETING MINUTES

CURRENT BUSINESS:

2. AUTHORIZING AN AGREEMENT WITH INDUSTRIAL FURNACE COMPANY, INC. REGARDING PREVENTATIVE MAINTENANCE SERVICES FOR THE WATER PURIFICATION DISTRICT'S HEARTH SLUDGE INCINERATORS
3. AUTHORIZING AN AGREEMENT WITH WINN CONSTRUCTION SERVICES, INC REGARDING THE CR2 (COLE HILL RD.) OVER FOX CREEK BRIDGE REPLACEMENT PROJECT
4. AUTHORIZING AN AGREEMENT WITH THE CAPITAL REGION TRANSPORTATION COUNCIL REGARDING THE ACTIVE TRANSPORTATION TECHNICAL ASSISTANCE STUDY IN SUPPORT OF THE COMPLETE STREETS STUDY
5. AUTHORIZING AN AGREEMENT WITH THE NEW YORK STATE UNIFIED COURT SYSTEM REGARDING CUSTODIAL SERVICES, REPAIR SERVICES AND PREVENTATIVE MAINTENANCE FOR THE ALBANY COUNTY COURT HOUSE, THE JUDICIAL CENTER, AND THE FAMILY COURT FACILITIES
6. AUTHORIZING AN AGREEMENT WITH AOW CONSTRUCTION, LLC REGARDING GENERAL CONTRACTING SERVICES FOR THE SHAKER PLACE CAFÉ CONSTRUCTION PROJECT
7. AUTHORIZING AN AGREEMENT WITH COLLETT MECHANICAL, INC. REGARDING MECHANICAL CONSTRUCTION SERVICES FOR THE SHAKER PLACE CAFÉ CONSTRUCTION PROJECT

County of Albany

*Harold L. Joyce
Albany County Office Building
112 State Street - Albany, NY 12207*



Meeting Minutes

Tuesday, April 29, 2025

5:00 PM

**Harold L. Joyce Albany County Office Building
Cahill Room - First Floor**

Public Works Committee

PREVIOUS BUSINESS:

Present: Bill L. Ricard, David B. Mayo, Mickey Cleary, Andrew Joyce, William Reinhardt, Paul J. Burgdorf and Jennifer A. Whalen

Excused: Samuel I. Fein and Christopher H. Smith

1. APPROVING PREVIOUS MEETING MINUTES

A motion was made that the previous meeting minutes be approved. The motion carried by a unanimous vote.

CURRENT BUSINESS:**2. AUTHORIZING AN AGREEMENT WITH DIRECT ENERGY BUSINESS, LLC REGARDING THE PURCHASE OF ELECTRICITY FOR VARIOUS COUNTY FACILITIES**

A motion was made to move the proposal forward with a positive recommendation. The motion carried by a unanimous vote.

3. AUTHORIZING AN AGREEMENT WITH MOORE FIRE EXTINGUISHER CO., LLC REGARDING FIRE EXTINGUISHER AND FIRE SUPPRESSION SYSTEMS INSPECTION AND MAINTENANCE SERVICES FOR VARIOUS COUNTY FACILITIES

A motion was made to move the proposal forward with a positive recommendation. The motion carried by a unanimous vote.

4. AUTHORIZING AN AGREEMENT WITH GDI SERVICES, INC. REGARDING COMMON AREA CLEANING FOR THE MVP ARENA

A motion was made to move the proposal forward with a positive recommendation. The motion carried by a unanimous vote.

5. AUTHORIZING THE RENEWAL OF A LEASE AGREEMENT WITH SARATOGA EAGLE SALES AND SERVICE, INC. REGARDING SUITE NO. 19 AT THE MVP ARENA

A motion was made to move the proposal forward with a positive recommendation. The motion carried by a unanimous vote.

6. AUTHORIZING THE RENEWAL OF A LEASE AGREEMENT WITH PAMAL BROADCASTING, LTD REGARDING SUITE NO. 4 AT THE MVP ARENA

A motion was made to move the proposal forward with a positive recommendation. The motion carried by a unanimous vote.

7. AUTHORIZING AN AGREEMENT WITH THE TOWN OF GUILDERLAND REGARDING THE USE OF DATA CENTER SPACE AND FIBER CONNECTIVITY LOCATED AT 112 STATE STREET

A motion was made to move the proposal forward with a positive recommendation. The motion carried by a unanimous vote.

8. AUTHORIZING AN AGREEMENT WITH THE CITY OF ALBANY REGARDING THE USE OF DATA CENTER SPACE AND FIBER CONNECTIVITY LOCATED AT 112 STATE STREET

A motion was made to move the proposal forward with a positive recommendation. The motion carried by a unanimous vote.

9. AUTHORIZING AN AGREEMENT WITH THE NEW YORK STATE OFFICE OF INFORMATION TECHNOLOGY SERVICES AND THE NEW YORK STATE DIVISION OF HOMELAND SECURITY AND EMERGENCY SERVICES REGARDING CYBER INFORMATION SHARING AND COLLABORATION

A motion was made to move the proposal forward with a positive recommendation. The motion carried by a unanimous vote. A. Joyce abstained.

10. AUTHORIZING AN AGREEMENT WITH CDW GOVERNMENT, LLC REGARDING THE ARCTIC WOLF MANAGED DETECTION AND RESPONSE CYBER SECURITY SOFTWARE

A motion was made to move the proposal forward with a positive recommendation. The motion carried by a unanimous vote. A. Joyce abstained.

11. AUTHORIZING AN AGREEMENT WITH CALLANAN INDUSTRIES, INC. REGARDING THE HAULING AND PLACING OF ASPHALT CONCRETE FOR VARIOUS COUNTY ROADS

A motion was made to move the proposal forward with a positive recommendation. The motion carried by a unanimous vote.

12. AUTHORIZING AN AGREEMENT WITH ALL STATES CONSTRUCTION & DEMOLITION, LLC D/B/A GORMAN BROTHERS REGARDING JOINT AND CRACK SEALING FOR VARIOUS COUNTY ROADS

A motion was made to move the proposal forward with a positive recommendation. The motion carried by a unanimous vote.

13. AUTHORIZING AGREEMENTS WITH ROBERT H. FINKE & SONS INC. AND CLARK EQUIPMENT, INC. REGARDING THE PURCHASE OF A BOBCAT COMPACT TRACK LOADER

A motion was made to move the proposal forward with a positive recommendation. The motion carried by a unanimous vote.

14. AUTHORIZING AN AGREEMENT WITH COLLIERS ENGINEERING & DESIGN, ARCHITECTURE, LANDSCAPE ARCHITECTURE, SURVEYING, CT P.C. REGARDING DESIGN, RIGHT-OF-WAY INCIDENTALS, AND ACQUISITION AND CONSTRUCTION INSPECTION SERVICES FOR THE CR 301 (TARRYTOWN ROAD) OVER ONESQUETHAW CREEK CULVERT REPLACEMENT PROJECT IN THE TOWN OF NEW SCOTLAND

A motion was made to move the proposal forward with a positive recommendation. The motion carried by a unanimous vote.

15. AUTHORIZING AN AGREEMENT WITH THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION REGARDING DESIGN, RIGHT-OF-WAY INCIDENTALS, AND ACQUISITIONS AND CONSTRUCTION INSPECTION SERVICES FOR THE CR 301 (TARRYTOWN ROAD) OVER ONESQUETHAW CREEK CULVERT REPLACEMENT PROJECT IN THE TOWN OF NEW SCOTLAND

A motion was made to move the proposal forward with a positive recommendation. The motion carried by a unanimous vote.

16. AUTHORIZING AN AGREEMENT WITH TRACEY ROAD EQUIPMENT, INC. REGARDING THE PURCHASE OF A SWEEPER TRUCK

A motion was made to move the proposal forward with a positive recommendation. The motion carried by a unanimous vote.

17. AUTHORIZING AN AGREEMENT WITH THE NEW YORK POWER AUTHORITY REGARDING ROUTINE AND NON-ROUTINE MAINTENANCE FOR COUNTY STREETLIGHTS

A motion was made to move the proposal forward with a positive recommendation. The motion carried by a unanimous vote.

18. AUTHORIZING AN AGREEMENT WITH HUDSON VALLEY WIRELESS, LLC REGARDING WI-FI AND NETWORK BANDWIDTH UPGRADES AT THE MVP ARENA

A motion was made to move the proposal forward with a positive recommendation. The motion carried by a unanimous vote.



DANIEL P. MCCOY
COUNTY EXECUTIVE

COUNTY OF ALBANY
WATER PURIFICATION DISTRICT
1 CANAL ROAD, SOUTH
ALBANY, NEW YORK 12204

REMITTANCE: 112 STATE ST., BASEMENT, ALBANY, NY 12207
PHONE: (518) 447-1611 FAX: (518) 433-0369
www.albanycountyny.gov

COMMISSION
DENNIS RIGOSU
CHAIRMAN

NICHOLAS W. FOGLIA
MAGGIE ALIX
CHARLES G. CARLUCCIO
GARRY NATHAN

ANGELO GAUDIO, P.E.
EXECUTIVE DIRECTOR

April 30, 2025

Hon. Joanne Cunningham
Chairwoman
Albany County Legislature
112 State Street – Suite 710
Albany, New York 12207

**Re: RFB 2025-056 Preventative Maintenance Services Multiple Hearth Incinerator
Contract Authorization with Industrial Furnace Company Inc. (IFCO)**

Dear Chairwoman Cunningham,

The Albany County Water Purification District (District), is requesting a contract authorization with Industrial Furnace Company Inc., (IFCO) for preventive maintenance services of the District's multiple hearth sludge incinerators.

IFCO was the sole responsible bidder for the above referenced RFB. The contract will be for a five (5) year term with a total not to exceed amount of \$ 1,000,000.00. The District's recommendation memo, Purchasing Department's concurrence memo are bid tabulation are enclosed.

If you have any questions or concerns you may reach me at (518) 447-1617.

Sincerely,

Angelo Gaudio, P.E.
Executive Director

Enc: Recommendation Memo
Concurrence Memo
Bid tabulation

cc: Hon. Dennis A. Feeney, Majority Leader
Hon. Frank Mauriello, Minority Leader
Rebekah Kennedy, Majority Counsel
James Curran, Minority Counsel



County of Albany

Harold L. Joyce
Albany County Office
Building
112 State Street - Albany,
NY 12207

Legislation Text

File #: TMP-6582, Version: 1

REQUEST FOR LEGISLATIVE ACTION

Description (e.g., Contract Authorization for Information Services):

Contract authorization with Industrial Furnace Company Inc., for preventive maintenance services to the District's multiple hearth incinerators.

Date: 5/1/2025

Department: WPD

Attending Meeting: Angelo Gaudio

Submitted By: Angelo Gaudio

Title: Executive Director

Phone: 518-447-1624

Purpose of Request: Contract Authorization Enter text.

CONTRACT TERMS/CONDITIONS:

Party Names and Addresses:

Industrial Furnance Company Inc. (IFCO)
40 Humboldt St. Rochester, NY 14609

Term: (Start/end date or duration) 5 years from date of contract issuance

Amount/Raise Schedule/Fee: \$1,000,000 (estimated \$200k per year)

BUDGET INFORMATION:

Is there a Fiscal Impact: Yes ☒ No ☐

Anticipated in Budget: Yes ☒ No ☐

Spreadsheet attached: Yes ☐ No ☒

Source of Funding - (Percentages)

Federal: Enter text. County: 100%

State: Enter text. Local: Enter text.

County Budget Accounts:

Revenue Account and Line: Enter text.

Revenue Amount: Enter text.

Appropriation Account and Line: G98130.44070

Appropriation Amount: \$1,000,000 total. (Estimated \$200,000 per year)

ADDITIONAL INFORMATION:

Mandated Program/Service: Yes ☐ No ☒

If Mandated, Cite Authority: Enter text.

Request for Bids / Proposals:

Competitive Bidding Exempt: Yes ☐ No ☒

of Response(s): 1

of MWBE: Enter text.

of Veteran Business: Enter text.

Bond Resolution No.: Enter text.

Apprenticeship Program Yes ☐ No ☒

Previous requests for Identical or Similar Action:

Resolution/Law Number and Date: NA

DESCRIPTION OF REQUEST: (state briefly why legislative action is requested)

Preventative maintenance contract will provide needed service to ensure continued operation of the District's sewage sludge incinerators and emission systems. Contract will also include services for staff training and engineering support.



DANIEL P. McCOY
COUNTY EXECUTIVE

COUNTY OF ALBANY
DEPARTMENT OF GENERAL SERVICES
PURCHASING DIVISION
112 STATE STREET, ROOM 1000
ALBANY, NEW YORK 12207-2021
(518) 447-7140 - FAX (518) 447-5588

DAVID M. LATINA
COMMISSIONER OF GENERAL SERVICES

PAMELA O NEILL
PURCHASING AGENT

MEMORANDUM

TO: Angelo Gaudio, Executive Director
Water Purification District

FROM: Pamela O Neill *Pamela*
Purchasing Agent

DATE: May 1, 2025

RE: RFB-2025-056, Preventative Maintenance of Multiple Hearth Incinerators

I am in receipt of your recommendation to award the aforementioned to Industrial Furnace Company, Inc. in the amount of \$1,000,000.00.

As Industrial Furnace Company, Inc. is the lowest responsible and responsive bidder, I concur with your recommendation.

Please obtain the necessary contract approval of the County Legislature, so that we may issue a Notice of Award.



DANIEL P. MCCOY
COUNTY EXECUTIVE

COUNTY OF ALBANY
WATER PURIFICATION DISTRICT
1 CANAL ROAD, SOUTH
ALBANY, NEW YORK 12204
REMITTANCE: 112 STATE ST., BASEMENT, ALBANY, NY 12207
PHONE: (518) 447-1611 FAX: (518) 433-0369
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COMMISSION
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NICHOLAS W. FOGLIA
MAGGIE ALIX
CHARLES G. CARLUCCIO
GARRY NATHAN

ANGELO GAUDIO, P.E.
EXECUTIVE DIRECTOR

MEMORANDUM

To: Pamela O'Neill, Purchasing Agent

From: Angelo Gaudio, Executive Director *AG*

Subject: RFB-2025-056 Preventative Maintenance of Multiple Hearth Incinerators
Industrial Furnace Company, Inc. (IFCO)

Date: April 30, 2025

The Water Purification District completed its review of the bidder(s) that responded to the above referenced RFB and recommends award to the lowest responsible bidder, Industrial Furnace Company, Inc., for preventative maintenance services of the District's multiple hearth incinerators.

The contract term is for five (5) years. The estimated contract amount for the five year term is \$1,000,000.00.

Please return your notice of concurrence so I may submit this contract request for legislative approval.

Should you have any questions regarding this recommendation I may be reached at 447-1611.

RFB # 2025-056

Vendor:	Industrial Furnace Co.
Item Description- Year One	Unit Price (\$ in Figures)
Hourly Rate for Masonry Labor	\$131.00
Hourly Rate for General Labor	\$127.00
Hourly Rate for Millwright/Welder	\$134.00
Hourly Rate Engineering Support	\$275.00
Daily Rate for Staff Training	\$2,000.00
Hearth Replacement (Each Hearth)	\$182,000.00
Hearth	\$182,000.00
Deslagging and Cleaning (Each Incinerator)	\$7,900.00
Wet Scrubber Inspection (Each Scrubber)	\$6,500.00
Burner Calibration (Each Incinerator)	\$4,000.00
Material Markup on Incinerator Components	22%
Material Markup on Scrubber Components	22%

Vendor:	<u>Industrial Furnace Co.</u>
Item Description- Year Two	Unit Price (\$ in Figures)
Hourly Rate for Masonry Labor	\$139.00
Hourly Rate for General Labor	\$135.00
Hourly Rate for Millwright/Welder	\$142.00
Hourly Rate Engineering Support	\$285.00
Daily Rate for Staff Training	\$2,100.00
Hearth Replacement (Each Hearth)	\$189,000.00
Deslagging and Cleaning (Each Incinerator)	\$8,375.00
Wet Scrubber Inspection (Each Scrubber)	\$9,825.00
Burner Calibration (Each Incinerator)	\$4,200.00
Material Markup on Incinerator Components	22%
Material Markup on Scrubber Components	22%

Vendor:	<u>Industrial Furnace Co.</u>
Item Description- Year Three	Unit Price (\$ in Figures)
Hourly Rate for Masonry Labor	\$147.00
Hourly Rate for General Labor	\$143.00
Hourly Rate for Millwright/Welder	\$151.00
Hourly Rate Engineering Support	\$290.00
Daily Rate for Staff Training	\$2,200.00
Hearth Replacement (Each Hearth)	\$194,600.00
Deslagging and Cleaning (Each Incinerator)	\$8,878.00
Wet Scrubber Inspection (Each Scrubber)	\$10,315.00
Burner Calibration (Each Incinerator)	\$4,400.00
Material Markup on Incinerator Components	22%
Material Markup on Scrubber Components	22%

Vendor:	<u>Industrial Furnace Co.</u>
Item Description- Year Four	Unit Price (\$ in Figures)
Hourly Rate for Masonry Labor	\$156.00
Hourly Rate for General Labor	\$152.00
Hourly Rate for Millwright/Welder	\$160.00
Hourly Rate Engineering Support	\$300.00
Daily Rate for Staff Training	\$2,300.00
Hearth Replacement (Each Hearth)	\$200,400.00
Deslagging and Cleaning (Each Incinerator)	\$9,410.00
Wet Scrubber Inspection (Each Scrubber)	\$10,935.00
Burner Calibration (Each Incinerator)	\$4,620.00
Material Markup on Incinerator Components	22%
Material Markup on Scrubber Components	22%

Vendor:	<u>Industrial Furnace Co.</u>
Item Description- Year Five	Unit Price (\$ in Figures)
Hourly Rate for Masonry Labor	\$165.00
Hourly Rate for General Labor	\$161.00
Hourly Rate for Millwright/Welder	\$170.00
Hourly Rate Engineering Support	\$310.00
Daily Rate for Staff Training	\$2,400.00
Hearth Replacement (Each Hearth)	\$206,400.00
Deslagging and Cleaning (Each Incinerator)	\$9,900.00
Wet Scrubber Inspection (Each Scrubber)	\$11,480.00
Burner Calibration (Each Incinerator)	\$4,850.00
Material Markup on Incinerator Components	22%
Material Markup on Scrubber Components	22%



DANIEL P. MCCOY
COUNTY EXECUTIVE

COUNTY OF ALBANY
DEPARTMENT OF PUBLIC WORKS
449 NEW SALEM ROAD

VOORHEESVILLE, NEW YORK 12186-4826
(518) 765-2055 - FAX (518) 447-7047
www.albanycountyny.gov

LISA M. RAMUNDO
COMMISSIONER

MICHAEL MCCLAUGHLIN
DEPUTY COUNTY EXECUTIVE

SCOTT D. DUNCAN
DEPUTY COMMISSIONER

April 24, 2025

Hon. Joanne Cunningham, Chairwoman
Albany County Legislature
112 State Street, Rm. 710
Albany, NY 12207

Dear Chairwoman Cunningham:

The Department of Public Works is requesting the Legislature's approval to enter into an agreement with Winn Construction for the CR2 (Cole Hill Rd.) over Fox Creek (BIN 3300860) Bridge Replacement Project.

This project includes removing the existing box culverts and replacing them with a single precast three-sided concrete box structure with cast-in-place concrete footings and wingwalls. Minor approach work is also included.

This project was originally put out to bid in October of 2024 (BID #2024-127). The County Purchasing Agent received six (6) bids for this project. The contract was awarded to the low bidder, Prime Highway Contractors, LLC. Prime Highway dissolved prior to signing the contract with the County, therefore the project was rebid.

The County Purchasing Agent received five (5) bids (BID #2025-061). Our hired consulting engineer from Creighton Manning reviewed the bids. Diversified Wireless, Inc. submitted the lowest bid of \$1,523,823.19. Their bid documentation, however, was found to be incomplete. It was missing the Required Apprenticeship Training Documentation. Additionally, the bidder did not demonstrate significant experience with similar projects for cost and type of work. Bidders were to document five (5) or more years in the business of providing bridge work experience similar in size and scope to this project, which was not provided.

Winn Construction Services Inc. was the second lowest bidder, in an amount of \$1,542,139.00. They provided the required bid documentation, examples of relevant experience and ability to deliver the project. Winn Construction Services Inc. was found to be the lowest, qualified, experienced and responsible bidder. I recommend awarding the contract to Winn Construction Services Inc. in an amount not to exceed \$1,542,139.00.

If there are any questions or further information is needed, please feel free to contact my office.

Sincerely,
Lisa M. Ramundo
Commissioner

cc: Hon. Dennis Feeney, Majority Leader

Hon. Frank Mauriello, Minority Leader
Rebekah Kennedy, Majority Counsel
James Curran, Minority Counsel



County of Albany

Harold L. Joyce
Albany County Office
Building
112 State Street - Albany,
NY 12207

Legislation Text

File #: TMP-6543, Version: 1

REQUEST FOR LEGISLATIVE ACTION

Description (e.g., Contract Authorization for Information Services):

Authorizing an Agreement with Winn Construction for construction of the County Route 2 (Cole Hill Road) over Fox Creek Bridge Replacement Project

Date: 4/24/25
Department: Public Works
Attending Meeting: Lisa M. Ramundo, Commissioner
Submitted By: Rosa Maria Tirino
Title: Director of Operations
Phone: 518-655-7919

Purpose of Request: Contract Authorization Enter text.

CONTRACT TERMS/CONDITIONS:

Party Names and Addresses:

Winn Construction, 74 Hudson River Rd., Waterford, NY 12188

Term: (Start/end date or duration) 05/01/25-12/31/26
Amount/Raise Schedule/Fee: \$1,542,139.00

BUDGET INFORMATION:

Is there a Fiscal Impact: Yes ☒ No ☐
Anticipated in Budget: Yes ☒ No ☐
Spreadsheet attached: Yes ☐ No ☒

Source of Funding - (Percentages)

Federal: Enter text. County: 100%
State: Enter text. Local: Enter text.

County Budget Accounts:

Revenue Account and Line: Enter text.
Revenue Amount: Enter text.
Appropriation Account and Line: HHYB
Appropriation Amount: \$1,542,139.00

ADDITIONAL INFORMATION:

Mandated Program/Service: Yes ☐ No ☒
If Mandated, Cite Authority: Enter text.

Request for Bids / Proposals:

Competitive Bidding Exempt: Yes ☐ No ☒

of Response(s): 5

of MWBE: 0

of Veteran Business: 0

Bond Resolution No.: Enter text.

Apprenticeship Program Yes ☒ No ☐

Previous requests for Identical or Similar Action:

Resolution/Law Number and Date: Enter text.

DESCRIPTION OF REQUEST: (state briefly why legislative action is requested)

The Department of Public Works is requesting the Legislature's approval to enter into an agreement with Winn Construction for the CR2 (Cole Hill Rd.) over Fox Creek (BIN 3300860) Bridge Replacement Project.



DANIEL P. McCOY
COUNTY EXECUTIVE

COUNTY OF ALBANY
DEPARTMENT OF GENERAL SERVICES
PURCHASING DIVISION
112 STATE STREET, ROOM 1000
ALBANY, NEW YORK 12207-2021
(518) 447-7140 - FAX (518) 447-5588

DAVID M. LATINA
COMMISSIONER OF GENERAL SERVICES

PAMELA O NEILL
PURCHASING AGENT

MEMORANDUM

TO: Lisa M. Ramundo
Commissioner

FROM: Pamela O Neill *Pamela*
Purchasing Agent

DATE: April 21, 2025

RE: RFB# 2025-061
CR2 (Cole Hill Rd.) Over Fox Creek (BIN 3300860)
Bridge Replacement Project

I am in receipt of your recommendation to award the aforementioned to Winn Construction Services Inc. in the amount not to exceed \$1,542,139.00.

As Winn Construction Services Inc. is the lowest responsible and responsive bidder, I concur with your recommendation.

Please obtain the necessary contract approval of the County Legislature, so that we may issue a Notice of Award.



DANIEL P. McCOY
COUNTY EXECUTIVE

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(518) 765-2055 - FAX (518) 447-7047
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LISA M. RAMUNDO, PE
COMMISSIONER

RECOMMENDATION NOTICE

TO: Pamela O'Neil Purchasing Agent

FROM: Lisa M. Ramundo, Commissioner

DATE: April 21, 2025

RE: RFB# 2025-061
CR2 (Cole Hill Rd.) Over Fox Creek (BIN 3300860)
Bridge Replacement Project

The Department of Public Works (DPW) recommends awarding the project to Winn Construction, based on the recommendation of our design consultant and the firm's demonstrated experience and qualifications in executing numerous bridge and bridge-related projects.

The lowest bid, submitted by Diversified Wireless Inc., did not have required paperwork for Apprenticeship Training program and did not sufficiently demonstrate relevant experience with comparable project scope, cost, and type of work.

The total contract amount is not to exceed \$1,542,139.00.

Please let me know if you have any questions.

MEMORANDUM



Date: April 21, 2025

To: Lisa M. Ramundo
Department of Public Works Commissioner
Albany County

From: Angelo Trichilo, PE
Project Manager
Creighton Manning Engineering, LLP

Project: Project No. 23-C583 (Bid #2025-061)
CR2 (Cole Hill Road) over Fox Creek Bridge Replacement Project
Town of East Berne, Albany County

Re: Recommendation for Award

The subject project was let for construction on April 10, 2025, with five (5) bids received and opened at the Albany County Purchasing Office, 112 State Street, Room 820, Albany, NY at 11:00 AM. The engineer's estimate for the project was **\$1,798,000.00** and the following bids were received and reviewed:

Bidders in Rank Order:

Rank	Bidder Name	Total Bid as Received	Total Bid as Checked
1	Diversified Wireless Inc.	\$1,523,823.19	\$1,523,823.19
2	Winn Construction Services Inc.	\$1,542,139.00	\$1,542,139.00
3	Wm. J Keller & Sons	\$1,578,527.00	\$1,545,444.00
4	Rifenburg Construction, Inc.	\$1,664,115.00	\$1,664,115.00
5	James H. Maloy, Inc	\$1,894,000.00	\$1,894,000.00

The bid was reviewed and checked, and all computations were verified by Angelo Trichilo, Project Manager, Creighton Manning Engineering, LLP on April 14, 2025. As discussed in section 15 of the Project Manual, bids were evaluated, as a minimum, according to the following criteria:

- Lowest total bid cost and projected timetable for completion of services and/or delivery of goods described herein
- Completeness of the bid
- Bidder's demonstrated capabilities and professional qualifications [see section 7.4]
7.4 All bidders must document five (5) or more years in the business of providing bridge work experience similar in size and scope to this project.

The lowest bid of \$1,523,823.19 as submitted by Diversified Wireless Inc. was reviewed and found to have two line-item multiplication errors in the bid tabulation (items 555.09 and 568.70), but the bid total matched correctly with the unit prices bid (criteria a). The bid documentation was found to be incomplete, missing the Required Apprenticeship Training Documentation (criteria b). Additionally, the bidder did not demonstrate significant experience with similar projects for cost and type of work. As stated above, bidders were to document five (5) or more years in the business of providing bridge work experience similar in size and scope to this project, which was not provided. Question 3 of the Bidders Qualification Questionnaire also offers

MEMORANDUM

bidders an opportunity to list example projects they have done of a similar nature to this project, specifically calling out "bridge rehabilitation" work. Of the 5 example projects provided by the bidder for this question, none were bridge projects. Creighton Manning contacted 3 of the references with information listed for these projects to gain additional information. Although all references spoke positively of the bidder's construction experience and with construction access and site civil related work, none discussed any prior bridge experience with the bidder. Lastly, question 4 also discusses projects the bidder is currently working on, and none of those projects provided discuss bridge experience either. Therefore, the bidder has not demonstrated the capabilities and professional qualifications required to complete this project (criteria c).

Based on the bid documents submitted by Diversified Wireless, Creighton Manning recommends that Diversified Wireless is not the lowest, qualified, experienced, and responsible bidder.

The second lowest bid of \$1,542,139.00 as submitted by Winn Construction Services, Inc. was reviewed and found to be accurate regarding bid tabulation (criteria a). The bid documentation was found to be incomplete, missing the Required Apprenticeship Training Documentation (criteria b). Winn Construction Services, Inc. was contacted and provided the missing Apprenticeship Training Documentation in a timely manner to complete their bid, and their qualifications are satisfactorily demonstrated. The bidder demonstrated numerous bridge and bridge-related project experiences and qualifications, including projects within Albany County, with contacts, costs, dates, and locations of every project (criteria c).

Based upon the foregoing, the lowest, qualified, experienced, and responsible bidder was determined to be **Winn Construction Services Inc.** with a total bid of **\$1,542,139.00**.

Based upon the foregoing bid results, I, acting on behalf of Creighton Manning Engineering, LLP, recommend Albany County:

- (X) Award the contract to the lowest responsible bidder **Winn Construction Services Inc.** for the total bid amount of **\$1,542,139.00**.
- () Reject all bids

Dated : 2025-04-21

Signature : Angelo Trichilo
Angelo Trichilo, PE



DANIEL P. McCOY
COUNTY EXECUTIVE

COUNTY OF ALBANY
DEPARTMENT OF GENERAL SERVICES
PURCHASING DIVISION
112 STATE STREET, ROOM 1000
ALBANY, NEW YORK 12207-2021
(518) 447-7140 - FAX (518) 447-5588

DAVID M. LATINA
COMMISSIONER OF GENERAL SERVICES
PAMELA O NEILL
PURCHASING AGENT

MEMORANDUM

TO: Lisa Ramundo, Commissioner
Department of Public Works

FROM:

DATE: April 10, 2025

RE: Request for Bids # 2025-061
Project # 23-C583 CR2 (Cole Hill Road) over Fox Creek Bridge Replacement Project

Enclosed please find the tabulation of bids received for your RFB #2025-061, Project # 23-C583 CR2 (Cole Hill Road) over Fox Creek Bridge Replacement Project. Five (5) were received from Winn Construction, Rifenburg Construction, Wm Keller, Diversified Wireless and James Maloy. Please review and return your recommendation for award to the Purchasing Agent.

Official award notification will occur only when your department and purchasing agree on the vendor selection. This selection process should include the department head or, at minimum, the department head should be aware of the vendor selection.

Please do not forward to approving bodies or notify vendors until the above has been completed.

Please contact me if you require any additional information, or if I can be of further assistance.

enc.

RFB-2025-061,CR2 (Cole Hill Road) over Fox Creek Structure Replacement Project

April 10, 2025 @ 11:00 AM

Bidder	Winn Construction	Rifenburg Construction	Wm J Keller	Diversified Wireless	James Maloy	
Lump Sum Bid	\$1,542,139.00	\$1,664,115.00	\$1,578,527.00	\$1,523,823.19	\$1,894,000.00	

COUNTY OF ALBANY

BID FORM

BID IDENTIFICATION:

Title: CR2 (Cole Hill Road) over Fox Creek Bridge Replacement Project
 Bid Number: 2025-061

THIS BID IS SUBMITTED TO:

Pamela O Neill, Purchasing Agent
 Albany County Department of General Services
 Purchasing Division
 112 State Street, Room 1000
 Albany, NY 12207

1. The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into a Contract with the owner in the form included in the Contract Documents to complete all Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with the Contract Documents.
2. BIDDER accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the Disposition of Bid Security. This Bid may remain open for ninety (90) days after the day of Bid opening. BIDDER will sign the Contract and submit the Contract Security and other documents required by the Contract Documents within fifteen days after the date of OWNER'S Notice of Award.
3. In submitting this Bid, BIDDER represents, as more fully set forth in this Contract, that:

- (a) BIDDER has examined copies of all the Contract Documents and of the following addenda: (If none, so state)

Date	Number
4/4/25	1
4/7/25	2
4/8/25	3

(receipt of all of which is hereby acknowledged) and also copies of the Notice to Bidders and the Instructions to Bidders;

- (b) BIDDER has examined the site and locality where the Work is to be performed, the legal requirements (federal, state and local laws, ordinances, rules and regulations) and the conditions affecting cost, progress or performance of the Work and has made such independent investigations as BIDDER deems necessary;

- (c) This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; BIDDER has not directly or indirectly induced or solicited any other BIDDER to submit a false or sham Bid; BIDDER has not solicited or induced any person, firm or a corporation to refrain from bidding; and BIDDER has not sought by collusion to obtain for himself any advantage over any other Bidder or over the owner.

4. BIDDER will complete the Work for the following prices(s): (Attach Bid Proposal)
5. BIDDER agrees to commence the Work within the number of calendar days or by the specific date indicated in the Contract. BIDDER agrees that the Work will be completed within the number of Calendar days or by the specific date indicated in the contract.
6. The following documents are attached to and made a condition of this Bid:
 - (a) Non-Collusive Bidding Certificate (Page NC-1 & NC-2)
 - (b) Acknowledgment by Bidder (Page AB-1)
 - (c) Vendor Responsibility Questionnaire (Pages VRQ-1 to VRQ-4)
 - (d) Iranian Energy Divestment Certification (Page IEDC-1)
 - (e) MS-4-1 Certification Statement RE: Stormwater Discharges (Page MS4-1)
 - (f) Bidder Qualification Questionnaire (Pages BQQ-1 thru BQQ-3)
 - (g) Non Interruption of Work Agreement (NWA-1)
 - (h) Required Apprenticeship Training Program Documentation (refer to RFB Section 27)
 - (i) Required bid security in the form of Bid Bond (Pages BB-1 thru BB-4), or a certified check and a letter from a bonding company indicating their intent to furnish the bonds required under the contract (Offer of Surety pages OS-1)
 - (j) Certified copy of Resolution of Board of Directors (if bidder is a corporation) (Page CCR-1).
 - (k) Schedule of MBE/WBE participation (Pages MBE-1 & MBE-2).

7. Communication concerning this Bid shall be addressed to:

Dustin Winn

Winn Constaction Sevrices, Inc.

74 Hudson River Rd., Waterford, NY 12188

Phone: 607-316-2973

8. Terms used in this Bid have the meanings assigned to them in the Contract and General Provisions.

COUNTY OF ALBANY

BID FORM

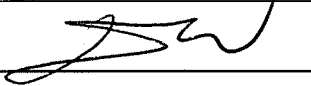
BID IDENTIFICATION:

Title: CR2 (Cole Hill Road) over Fox Creek Bridge Replacement Project
 Bid Number: 2025-061

COMPANY: Winn Construction Services, Inc.
 ADDRESS: 74 Hudson River Rd.
 CITY, STATE, ZIP: Waterford, NY 12188
 TEL. NO.: 518-238-2210
 FAX NO.: 518-238-2211
 FEDERAL TAX ID NO.: 46-2428144

CERTIFICATE OF REGISTRATION NUMBER
(ARTICLE 8 PUBLIC WORK CONTRACTOR REGISTRY)

24-64BP4-CR

REPRESENTATIVE: Dustin Winn
 E-MAIL: d.winn@Winn-Construction.com
 SIGNATURE AND TITLE  President

DATE 4/10/25

Brought Forward \$ _____

ITEM NUMBER	ITEM DESCRIPTION	QTY	UNIT	UNIT PRICE IN WORDS	UNIT PRICE (NUMERALS)	TOTAL (NUMERALS)
201.06	CLEARING AND GRUBBING	1	LS	ten thousand 00/100	\$ 10,000.00	\$ 10,000.00
202.19	REMOVAL OF SUBSTRUCTURES	395	CY	one hundred 00/100	\$ 100.00	\$ 39,500.00
203.02	UNCLASSIFIED EXCAVATION AND DISPOSAL	673	CY	thirty 00/100	\$ 30.00	\$ 20,190.00
203.03	EMBANKMENT IN PLACE	627	CY	thirty three 00/100	\$ 33.00	\$ 20,691.00
203.21	SELECT STRUCTURE FILL	481	CY	twenty 00/100	\$ 70.00	\$ 33,620.00

Page Total \$ _____
Carry Forward \$ _____

REVISED BID SCHEDULE BF- 5

Brought Forward \$ _____

ITEM NUMBER	ITEM DESCRIPTION	QTY	UNIT	UNIT PRICE IN WORDS	UNIT PRICE (NUMERALS)		TOTAL (NUMERALS)
206.01	STRUCTURE EXCAVATION	1693	CY	<i>twenty five</i> 00/100	Dollars Cents	\$ 25 00	\$ 42,325 00
206.0201	TRENCH AND CULVERT EXCAVATION	134	CY	<i>forty</i> 00/100	Dollars Cents	\$ 40 00	\$ 5,360 00
207.26	PREFABRICATED COMPOSITE STRUCTURAL DRAIN	160	SY	<i>fourteen</i> 00/100	Dollars Cents	\$ 14 00	\$ 2,240 00
209.13	SILT FENCE-TEMPORARY	809	LF	<i>six</i> 00/100	Dollars Cents	\$ 6 00	\$ 4,854 00
209.1501	TURBIDITY CURTAIN - TEMPORARY	273	LF	<i>twenty seven</i> 00/100	Dollars Cents	\$ 27 00	\$ 7,371 00

Page Total \$ _____
Carry Forward \$ _____

BID SCHEDULE BF- 6

Brought Forward \$ _____.

ITEM NUMBER	ITEM DESCRIPTION	QTY	UNIT	UNIT PRICE IN WORDS		UNIT PRICE (NUMERALS)	TOTAL (NUMERALS)
304.12	SUBBASE COURSE, TYPE 2	500	CY	seventy two 00/100	Dollars Cents	\$ 72 00	\$ 36,000 00
404.018901	TRUING & LEVELING F9, WMA, 80 SERIES COMPACTION	30	TON	three hundred 00/100	Dollars Cents	\$ 300 00	\$ 9,000 00
404.128301	12.5 F3 TOP COURSE WMA, 80 SERIES COMPACTION	110	TON	one hundred fifty 00/100	Dollars Cents	\$ 150 00	\$ 16,500 00
404.198901	19 F9 BINDER COURSE WMA, 80 SERIES COMPACTION	184	TON	one hundred forty five 00/100	Dollars Cents	\$ 145 00	\$ 26,680 00
404.378901	37.5 F9 BASE COURSE WMA, 80 SERIES COMPACTION	294	TON	one hundred forty 00/100	Dollars Cents	\$ 140 00	\$ 41,160 00

Page Total \$ _____
Carry Forward \$ _____

BID SCHEDULE BF- 7

Brought Forward \$ _____

ITEM NUMBER	ITEM DESCRIPTION	QTY	UNIT	UNIT PRICE IN WORDS	UNIT PRICE (NUMERALS)		TOTAL (NUMERALS)
407.0103	STRAIGHT TACK COAT	179	GAL	<i>eighteen</i> <i>00/100</i>	Dollars	\$ <i>18</i> <i>00</i>	\$ <i>3222</i> <i>00</i>
418.7603	ASPHALT PAVEMENT JOINT ADHESIVE	461	LF	<i>five</i> <i>00/100</i>	Dollars	\$ <i>5</i> <i>00</i>	\$ <i>2305</i> <i>00</i>
551.111400TZ	STEEL PIPE PILES - NPS 14"	1932	LF	<i>twenty five</i> <i>00/100</i>	Dollars	\$ <i>25</i> <i>00</i>	\$ <i>48300</i> <i>00</i>
551.13	FURNISHING EQUIPMENT FOR DRIVING PILES	1	LS	<i>two hundred thirty thousand</i> <i>00/100</i>	Dollars	\$ <i>230,000</i> <i>00</i>	\$ <i>230,000</i> <i>00</i>
551.14	DYNAMIC PILE TESTING	2	EACH	<i>six thousand five hundred</i> <i>00/100</i>	Dollars	\$ <i>6500</i> <i>00</i>	\$ <i>13,000</i> <i>00</i>

Page Total \$ _____
Carry Forward \$ _____

BID SCHEDULE BF- 8

Brought Forward \$ _____

ITEM NUMBER	ITEM DESCRIPTION	QTY	UNIT	UNIT PRICE IN WORDS	UNIT PRICE (NUMERALS)		TOTAL (NUMERALS)
553.010001	COFFERDAMS (TYPE 1)	1	EACH	thirty thousand 00/100	Dollars	\$ 30,000 00	\$ 30,000 00
553.010002	COFFERDAMS (TYPE 1)	1	EACH	thirty thousand 00/100	Dollars	\$ 30,000 00	\$ 30,000 00
553.030001	TEMPORARY WATERWAY DIVERSION STRUCTURE	1	EACH	twenty thousand 00/100	Dollars	\$ 20,000 00	\$ 20,000 00
555.08	FOOTING CONCRETE, CLASS HP	120	CY	eight hundred 00/100	Dollars	\$ 800 00	\$ 96,000 00
555.09	CONCRETE FOR STRUCTURES, CLASS HP	50	CY	one thousand eight hundred 00/100	Dollars	\$ 1,800 00	\$ 90,000 00

Page Total \$ _____
Carry Forward \$ _____

BID SCHEDULE BF- 9

Brought Forward \$ _____

ITEM NUMBER	ITEM DESCRIPTION	QTY	UNIT	UNIT PRICE IN WORDS		UNIT PRICE (NUMERALS)	TOTAL (NUMERALS)
556.0201	UNCOATED BAR REINFORCEMENT FOR CONCRETE STRUCTURES	14858	LB	two 00/100	Dollars Cents	\$ 2 00	\$ 29,716 00
556.0202	EPOXY-COATED BAR REINFORCEMENT FOR STRUCTURES	2783	LB	three 00/100	Dollars Cents	\$ 3 00	\$ 8,349 00
559.02	PROTECTIVE SEALING OF NEW STRUCTURAL CONCRETE	223	SF	one 00/100	Dollars Cents	\$ 1 00	\$ 223 00
562.0101	REINFORCED CONCRETE SPAN UNITS	153	SY	two thousand one hundred 00/100	Dollars Cents	\$ 2100 00	\$ 3,21,300 00
568.51	STEEL BRIDGE RAILING (FOUR RAIL)	86	LF	three hundred 00/100	Dollars Cents	\$ 300 00	\$ 25,800 00

Page Total \$ _____
 Carry Forward \$ _____

Brought Forward \$ _____

ITEM NUMBER	ITEM DESCRIPTION	QTY	UNIT	UNIT PRICE IN WORDS	UNIT PRICE (NUMERALS)		TOTAL (NUMERALS)
568.70	TRANSITION BRIDGE RAILING	128	LF	two hundred 00/100	Dollars	\$ 200 00	\$ 25,600 00
					Cents		
595.50000018	SHEET-APPLIED WATERPROOFING MEMBRANE	2790	SF	five 00/100	Dollars	\$ 5 00	\$ 13,950 00
					Cents		
606.10	BOX BEAM GUIDE RAILING	192	LF	fifty 00/100	Dollars	\$ 60 00	\$ 11,520 00
					Cents		
606.120201	BOX BEAM GUIDE RAILING END ASSEMBLY, TYPE IIA	4	EACH	two thousand five hundred 00/100	Dollars	\$ 2,500 00	\$ 10,000 00
					Cents		
606.73000015	REMOVE AND DISPOSE OF BOX BEAM GUIDE RAIL AND MEDIANBARRIER AND STORE POSTS	416	LF	six 00/100	Dollars	\$ 6 00	\$ 2,496 00
					Cents		

Page Total \$ _____
Carry Forward \$ _____

BID SCHEDULE BF- 11

Brought Forward \$ _____

ITEM NUMBER	ITEM DESCRIPTION	QTY	UNIT	UNIT PRICE IN WORDS		UNIT PRICE (NUMERALS)	TOTAL (NUMERALS)
608.020102	HOT MIX ASPHALT (HMA) SIDEWALKS, DRIVEWAYS AND BICYCLE PATHS, AND VEGETATION CONTROL STRIPS	33	TON	three hundred 00/100	Dollars Cents	\$ 300 00	\$ 9900 00
610.1605	TURF ESTABLISHMENT PERFORMANCE	975	SY	seventeen 00/100	Dollars Cents	\$ 17 00	\$ 16,575 00
613.04000001	STOCKPILING AND PLACING EXISTING STREAM BED MATERIALS	66	CY	fifty 00/100	Dollars Cents	\$ 50 00	\$ 3300 00
614.0701	PRE-EXISTING STUMP REMOVAL UP TO 24 INCH DIAMETER AT 6INCHES ABOVE GRADE	1	EACH	five hundred 00/100	Dollars Cents	\$ 500 00	\$ 500 00
615.01010108	MATERIAL FOR STREAM BED ESTABLISHMENT	66	CY	ninety 00/100	Dollars Cents	\$ 90 00	\$ 5940 00

Page Total \$ _____
Carry Forward \$ _____

BID SCHEDULE BF- 12

Brought Forward \$ _____

ITEM NUMBER	ITEM DESCRIPTION	QTY	UNIT	UNIT PRICE IN WORDS	UNIT PRICE (NUMERALS)	TOTAL (NUMERALS)
619.01	BASIC WORK ZONE TRAFFIC CONTROL	1	LS	twelve thousand five hundred 00/100	\$12,500.00	\$12,500.00
619.04	TYPE III CONSTRUCTION BARRICADE	14	EACH	two hundred 00/100	\$200.00	\$2,800.00
619.1711	TEMPORARY POSITIVE BARRIER - CATEGORY 1 (PINNING PROHIBITED)	52	LF	seventy 00/100	\$70.00	\$3,640.00
620.05	STONE FILLING (HEAVY)	380	CY	one hundred 00/100	\$100.00	\$38,000.00
620.0801	BEDDING MATERIAL, TYPE I	65	CY	one hundred twenty 00/100	\$120.00	\$7,800.00

Page Total \$ _____
Carry Forward \$ _____

BID SCHEDULE BF- 13

Brought Forward \$ _____

ITEM NUMBER	ITEM DESCRIPTION	QTY	UNIT	UNIT PRICE IN WORDS	UNIT PRICE (NUMERALS)	TOTAL (NUMERALS)
625.01	SURVEY OPERATIONS	1	LS	<i>fifteen thousand</i> <i>00/100</i>	\$ <i>15,000.00</i>	\$ <i>15,000.00</i>
627.50140008	CUTTING PAVEMENT	63	LF	<i>six</i> <i>00/100</i>	\$ <i>6.00</i>	\$ <i>378.00</i>
637.11	ENGINEER'S FIELD OFFICE - TYPE 1	6	MNTH	<i>two thousand eight hundred</i> <i>00/100</i>	\$ <i>2,800.00</i>	\$ <i>16,800.00</i>
640.10	WHITE PAINT REFLECTORIZED PAVEMENT STRIPES - 15 MILS	798	LF	<i>one</i> <i>50/100</i>	\$ <i>1.50</i>	\$ <i>1,197.00</i>
640.11	YELLOW PAINT REFLECTORIZED PAVEMENT STRIPES - 15 MILS	798	LF	<i>one</i> <i>50/100</i>	\$ <i>1.50</i>	\$ <i>1,197.00</i>

Page Total \$ _____
 Carry Forward \$ _____

BID SCHEDULE BF- 14

Brought Forward \$ _____

ITEM NUMBER	ITEM DESCRIPTION	QTY	UNIT	UNIT PRICE IN WORDS	UNIT PRICE (NUMERALS)	TOTAL (NUMERALS)
646.22	DELINEATOR, SNOWPLOWING MARKER, SUPPLEMENTARY SNOWPLOWING MARKER PANELS	6	EACH	<u>ten</u> 00/100	\$ <u>10</u> 00	\$ <u>60</u> 00
646.32	STEEL POST, 2.0 LB/FT	4	EACH	<u>twenty</u> 00/100	\$ <u>70</u> 00	\$ <u>280</u> 00

Page Total \$ _____
Carry Forward \$ _____

Brought Forward \$ _____

ITEM NUMBER	ITEM DESCRIPTION	QTY	UNIT	UNIT PRICE IN WORDS	UNIT PRICE (NUMERALS)	TOTAL (NUMERALS)
697.03	FIELD CHANGE PAYMENT	76650	DC	<u>FIXED PRICE SPECIFICATION</u>	\$ 1.00	76650
				Dollars		
				Cents		
698.04	ASPHALT PRICE ADJUSTMENT	1300	DC	<u>FIXED PRICE SPECIFICATION</u>	\$ 1.00	1,300.00
				Dollars		
				Cents		
698.05	FUEL PRICE ADJUSTMENT	900	DC	<u>FIXED PRICE SPECIFICATION</u>	\$ 1.00	900.00
				Dollars		
				Cents		
698.06	STEEL/IRON PRICE ADJUSTMENT	100	DC	<u>FIXED PRICE SPECIFICATION</u>	\$ 1.00	100.00
				Dollars		
				Cents		
				<i>one million five hundred forty two thousand one hundred thirty nine</i>	\$ 1542,139.00	\$ 1542,139.00
				<u>00/100</u>		
				Dollars		
				Cents		
				SUBTOTAL BASE BID		

Page Total \$ _____
Carry Forward \$ _____

REVISED BID SCHEDULE BF- 16

Brought Forward \$ _____

ITEM NUMBER	ITEM DESCRIPTION	QTY	UNIT	UNIT PRICE IN WORDS		UNIT PRICE (NUMERALS)	TOTAL (NUMERALS)
699.040001	MOBILIZATION SHALL BE INCLUDED IN VARIOUS ITEMS IN THE CONTRACT		NEC	ZERO	Dollars	\$ 0.0	\$ 0.0
TOTAL BASE BID				one million four hundred forty two thousand one hundred thirty nine	Dollars	\$1542/39	\$1542/39
				00/100	Cents		00

SUBMITTED ON April 10th 2024

Firm: Winn Construction Services, Inc.
By: DW (Signature)
Dustin Winn (Printed)
Title: President

Page Total \$ _____
Carry Forward \$ _____

SECTION 00481

STATEMENT OF SURETY'S INTENT

To: County of Albany, Department of Public Works, 449 New Salem Rd, Voorheesville, NY 12186We have reviewed the Bid of Winn Construction Services, Inc
(Contractor)of 74 Hudson River Rd, Waterford, NY 12188
(Address)for Project NO. 23-C583 - County Road 2 (Cole Hill Road) over Fox Creek Bridge Replacement. Albany County
Remove existing box culverts, partial demolition of existing footing mat, adjusting the existing stream profile,
restore the existing ditch line, stream reconstruction, install cast in place concrete footings on pipe piles, install
3 sided precast concrete structure

(Project)

Bids for which will be received on 04/10/2025
(Bid Opening Date)

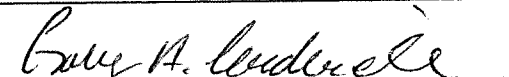
and wish to advise that should this Bid of the Contractor be accepted and the Contract awarded to him, it is our present intention to become surety on the Performance Bond and Labor and Materials Payment Bond required by the Contract.

Any arrangement for the bonds required by the Contract is a matter between the Contractor and ourselves, and we assume no liability to you or third parties if for any reason we do not execute the requisite bonds.

We are duly authorized to transact business in the State of New York, and we appear on the U.S. Treasury Department's most current list (Circular 570 as amended).

Attest: 
Salvatore Cardinale - Witness

ENDURANCE ASSURANCE CORPORATION


Surety's Authorized Signature(s)

Attach Power of Attorney

Gary A. Cardinale, Attorney in Fact

(Corporate seal if any. If no seal, write
"No Seal" across this place and sign.)

END OF SECTION

ACKNOWLEDGMENT OF SURETY

STATE OF New York)
) SS.:
 COUNTY OF Erie)

On the 10th day of April in the year 2025, before me, the undersigned, personally appeared Gary A Cardinale, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he/she executed the same in his/her capacity, and that by his/her signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

Lisa M. Reese

Notary Public

LISA M REESE
 NOTARY PUBLIC, STATE OF NEW YORK
 Registration No. 01RE0014975
 Qualified in Erie County
 Commission Expires October 26, 2027

ENDURANCE AMERICAN INSURANCE COMPANY

Balance Sheet - Statutory - Basis

December 31, 2024

Assets:

Bonds	\$	553,198,732
Common stocks		355,173,210
Cash and cash equivalents		155,748,454
Other invested assets		918,697
Total cash and invested assets		<u>1,065,039,093</u>

Agents' balances or uncollected premiums		85,133,530
Reinsurance recoverable on loss and loss adjustment expense payments		549,007
Funds held by or deposited with reinsured companies		76,970,387
Investment income due and accrued		4,039,135
Net deferred tax asset		5,478,465
Receivables from parent, subsidiaries and affiliates		36,774,781
Total admitted assets	\$	<u>1,273,984,398</u>

Liabilities:

Reinsurance payable on paid loss and loss adjustment expenses	\$	549,007
Other expenses		177,549
Ceded reinsurance premiums payable		91,637,936
Current federal and foreign income taxes		2,403,471
Amounts withheld or retained by company for account of others		181,891
Remittances and items not allocated		(511)
Payable to parent, subsidiaries and affiliates		36,774,781
Total liabilities		<u>131,724,124</u>

Capital and surplus:

Common capital stock		6,000,000
Gross paid in and contributed surplus		1,130,153,297
Unassigned funds (surplus)		6,106,977
Total capital and surplus		<u>1,142,260,274</u>

Total liabilities and capital and surplus	\$	<u>1,273,984,398</u>
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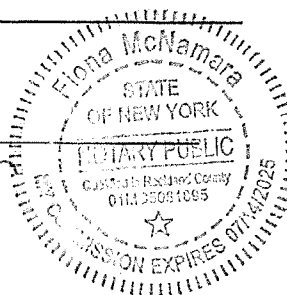
I, Hana Entela, Treasurer of Endurance American Insurance Company (the "Company") do hereby certify that to the best of my knowledge and belief, the foregoing is a full and true Statutory Statement of Admitted Assets, Liabilities, Capital and Surplus of the Company as of December 31, 2024 prepared in conformity with accounting practices prescribed or permitted by the State of Delaware Department of Insurance. The foregoing statement should not be taken as a complete statement of financial condition of the Company. Such a statement is available upon request at the Company's office located at 4 Manhattanville Road, Purchase, NY 10577.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the seal of the Company at Purchase, New York.

Hana Entela

Subscribed and sworn to before me this 25th day of March, 2025
State of New York, County of Westchester

Fiona McNamara



KNOW ALL BY THESE PRESENTS, that **Endurance Assurance Corporation**, a Delaware corporation ("EAC"), **Endurance American Insurance Company**, a Delaware corporation ("EAIC"), **Lexon Insurance Company**, a Texas corporation ("LIC"), and/or **Bond Safeguard Insurance Company**, a South Dakota corporation ("BSIC"), each, a "Company" and collectively, "**Sompo International**," do hereby constitute and appoint: **Gary A. Cardinale, Joseph V. Cardinale, Salvatore Cardinale** as true and lawful Attorney(s)-in-Fact to make, execute, seal, and deliver for, and on its behalf as surety or co-surety: bonds and undertakings given for any and all purposes, also to execute and deliver on its behalf as aforesaid renewals, extensions, agreements, waivers, consents or stipulations relating to such bonds or undertakings provided, however, that no single bond or undertaking so made, executed and delivered shall obligate the Company for any portion of the penal sum thereof in excess of the sum of **One Hundred Million Dollars (\$100,000,000.00)**.

Such bonds and undertakings for said purposes, when duly executed by said attorney(s)-in-fact, shall be binding upon the Company as fully and to the same extent as if signed by the President of the Company under its corporate seal attested by its Corporate Secretary.

This appointment is made under and by authority of certain resolutions adopted by the board of directors of each Company by unanimous written consent effective the 30th day of March, 2023 for BSIC and LIC and the 1st day of May, 2023 for EAC and EAIC, a copy of which appears below under the heading entitled "Certificate".

This Power of Attorney is signed and sealed by facsimile under and by authority of the following resolution adopted by the board of directors of each Company by unanimous written consent effective the 30th day of March, 2023 for BSIC and LIC and the 17th day of May, 2023 for EAC and EAIC and said resolution has not since been revoked, amended or repealed:

RESOLVED, that the signature of an individual named above and the seal of the Company may be affixed to any such power of attorney or any certificate relating thereto by facsimile, and any such power of attorney or certificate bearing such facsimile signature or seal shall be valid and binding upon the Company in the future with respect to any bond or undertaking to which it is attached.

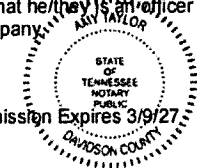
IN WITNESS WHEREOF, each Company has caused this instrument to be signed by the following officers, and its corporate seal to be affixed this 25th day of May, 2023.

Endurance Assurance Corporation By: <i>Richard M Appel</i> Richard Appel, SVP & Senior Counsel 	Endurance American Insurance Company By: <i>Richard M Appel</i> Richard Appel, SVP & Senior Counsel 	Lexon Insurance Company By: <i>Richard M Appel</i> Richard Appel, SVP & Senior Counsel 	Bond Safeguard Insurance Company By: <i>Richard M Appel</i> Richard Appel, SVP & Senior Counsel 
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ACKNOWLEDGEMENT

On this 25th day of May, 2023, before me, personally came the above signatories known to me, who being duly sworn, did depose and say that he/she is an officer of each of the Companies; and that he executed said instrument on behalf of each Company by authority of his office under the by-laws of each Company.

By: *Amy Taylor*
Amy Taylor, Notary Public - My Commission Expires 3/9/27



CERTIFICATE

I, the undersigned Officer of each Company, DO HEREBY CERTIFY that:

1. That the original power of attorney of which the foregoing is a copy was duly executed on behalf of each Company and has not since been revoked, amended or modified; that the undersigned has compared the foregoing copy thereof with the original power of attorney, and that the same is a true and correct copy of the original power of attorney and of the whole thereof;
2. The following are resolutions which were adopted by the board of directors of each Company by unanimous written consent effective 30th day of March, 2023 for BSIC and LIC and the 17th day of May, 2023 for EAC and EAIC and said resolutions have not since been revoked, amended or modified:

"RESOLVED, that each of the individuals named below is authorized to make, execute, seal and deliver for and on behalf of the Company any and all bonds, undertakings or obligations in surety or co-surety with others: **RICHARD M. APPEL, MATTHEW E. CURRAN, MARGARET HYLAND, SHARON L. SIMS, CHRISTOPHER L. SPARRO,**

and be it further

RESOLVED, that each of the individuals named above is authorized to appoint attorneys-in-fact for the purpose of making, executing, sealing and delivering bonds, undertakings or obligations in surety or co-surety for and on behalf of the Company."

3. The undersigned further certifies that the above resolutions are true and correct copies of the resolutions as so recorded and of the whole thereof.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the corporate seal this 10th day of April, 20 25.

By: *Daniel S. Lurie*
Daniel S. Lurie, Secretary

NOTICE: U. S. TREASURY DEPARTMENT'S OFFICE OF FOREIGN ASSETS CONTROL (OFAC)

No coverage is provided by this Notice nor can it be construed to replace any provisions of any surety bond or other surety coverage provided. This Notice provides information concerning possible impact on your surety coverage due to directives issued by OFAC. **Please read this Notice carefully.**

The Office of Foreign Assets Control (OFAC) administers and enforces sanctions policy, based on Presidential declarations of "national emergency". OFAC has identified and listed numerous foreign agents, front organizations, terrorists, terrorist organizations, and narcotics traffickers as "Specially Designated Nationals and Blocked Persons". This list can be located on the United States Treasury's website - <https://www.treasury.gov/resource-center/sanctions/SDN-List>.

In accordance with OFAC regulations, if it is determined that you or any other person or entity claiming the benefits of any coverage has violated U.S. sanctions law or is a Specially Designated National and Blocked Person, as identified by OFAC, any coverage will be considered a blocked or frozen contract and all provisions of any coverage provided are immediately subject to OFAC. When a surety bond or other form of surety coverage is considered to be such a blocked or frozen contract, no payments nor premium refunds may be made without authorization from OFAC. Other limitations on the premiums and payments may also apply.

Any reproductions are void.

Surety Claims Submission: LexonClaimAdministration@sompo-intl.com

Telephone: 615-553-9500 Mailing Address: Sompo International; 12890 Lebanon Road; Mount Juliet, TN 37122-2870

BID BOND

(To be submitted, at the option of the bidder, in lieu of certified check for guarantee.)

KNOW ALL MEN BY THESE PRESENTS, that we (hereinafter called the "principal")

Winn Construction Services, Inc

(name of contractor)

74 Hudson River Rd, Waterford, NY 12188

(address)

and **ENDURANCE ASSURANCE CORPORATION**

(name of surety)

of **4 Manhattanville Rd, Purchase, NY 10577**

(address)

(hereinafter called the "surety") are held and firmly bound unto the County of Albany (hereinafter called the "owner") in the full and just sum of:

Five Percent of the total bid amount Dollars (\$ **5%**)

good and lawful money of the United State of American, to the payment of which said sum of money, well and truly to be made and one, the said principal binds himself, his heirs, executors, administrators, successors or assignees and the said surety binds itself, its successors and assignees, jointly and severally, firmly by these presents.

Whereas said principal has submitted to the County of Albany a certain bid, attached hereto and hereby made a part hereof to enter into an agreement for Project No. 23-C583, CR2 (Cole Hill Road) over Fox Creek Bridge Replacement Project (hereinafter called the "project").

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH THAT

- a) If said bid shall be rejected, or
- b) If said bid shall be accepted and the principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said bid) and shall furnish a bond for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the Agreement created of said bid, or
- c) In the event of the failure of the principal to enter such contract and give such bonds, if the principal shall pay to the owner the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the surety for any and all claims hereunder shall, in no event, exceed the total amount of this obligation as herein stated.

The surety, for value received, hereby stipulates and agrees that the obligations of said surety and its bond shall be in no way impaired or affected by any extension of the time

within which the owner may accept such bid; and said surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, we have executed this bond the ____ day of _____, 2025.

PRINCIPAL(s):

Winn Construction Services, Inc (L.S.)

Dustin Winn, President

(Printed Name)

(L.S.)

(Printed Name)

(L.S.)

(Corporate Seal)

(Printed Name)

(L.S.)

(Printed Name)

SURETY:

ENDURANCE ASSURANCE CORPORATION

(Printed Name of Surety)

(Corporate Seal)

4 Mahattanville Rd, Purchase, NY 10577

(Address of Surety)

By:

Gary A. Cardinale

Gary A. Cardinale

(Printed Name of Attorney-in-Fact)

NOTE: The surety company must append statement of its financial condition and a copy of the resolution authorizing the execution of bonds by officers of the company.

IMPORTANT: Surety companies executing bonds must be authorized to transact business in the State of New York.

Acknowledgment by Principal:

If Individual or Individuals:

State of _____

County of _____

On this _____ day of _____, 2025, before me personally appeared _____
 _____ to me known and known to me to be the same person(s) described in and
 who executed the within instrument, and he (or they severally) acknowledged to me that he (or
 they) executed the same.

Notary Public, State of _____

Qualified in _____

My commission expires _____

If Corporation:

State of New YorkCounty of Saratoga

On this 10th day of April, 2025, before me personally appeared Dustin
Winn to me known, who, being by me sworn, did say that he resides at (give
 address) 125 Joann Way, Amsterdam, NY 12010;
 that he is the (give title) President of the (name of corporation)
Winn Construction Services, Inc., the corporation described in and which executed
 the above instrument; that he knows the seal of the corporation; that the seal affixed to the
 instrument is such corporate seal; that it was so affixed by order of the board of directors of the
 corporation, and that he signed his name thereto by like order.

Mackenzie Taylor
 Notary Public, State of NEW YORK
 Qualified in Albany County
 My commission expires September 7, 2025

Mackenzie M. Taylor NOTARY PUBLIC, STATE OF NEW YORK Registration No. 01TA6421583 Qualified in Albany County Commission Expires September 07, 2025
--

Acknowledgment by Surety Company:

If Individual or Individuals:

State of _____

County of _____

On this _____ day of _____, 2025, before me personally appeared _____
 _____ to me known and known to me to be the same person(s) described in and who
 executed the within instrument, and he (or they severally) acknowledged to me that he (or they)
 executed the same.

Notary Public, State of _____

Qualified in _____

My commission expires _____

If Corporation:

State of New YorkCounty of Erie

On this 10th day of April, 2025, before me personally appeared Gary A. Cardinale
 _____ to me known, who, being by me sworn, did say that he resides at (give
 address) Erie County, New York;
 that he is the (give title) Attorney In Fact of the (name of corporation)
ENDURANCE ASSURANCE CORPORATION, the corporation described in and which executed the
 above instrument; that he knows the seal of the corporation; that the seal affixed to the instrument
 is such corporate seal; that it was so affixed by order of the board of directors of the corporation,
 and that he signed his name thereto by like order.

*Lisa M. Reese*_____
Notary Public, State of New YorkQualified in Erie CountyMy commission expires 10/26/2027

LISA M REESE
 NOTARY PUBLIC, STATE OF NEW YORK
 Registration No. 01RE0014975
 Qualified in Erie County
 Commission Expires October 26, 2027

ENDURANCE AMERICAN INSURANCE COMPANY

Balance Sheet - Statutory - Basis

December 31, 2024

Assets:

Bonds	\$	553,198,732
Common stocks		355,173,210
Cash and cash equivalents		155,748,454
Other invested assets		918,697
Total cash and invested assets		<u>1,065,039,093</u>

Agents' balances or uncollected premiums		85,133,530
Reinsurance recoverable on loss and loss adjustment expense payments		549,007
Funds held by or deposited with reinsured companies		76,970,387
Investment income due and accrued		4,039,135
Net deferred tax asset		5,478,465
Receivables from parent, subsidiaries and affiliates		36,774,781
Total admitted assets	\$	<u>1,273,984,398</u>

Liabilities:

Reinsurance payable on paid loss and loss adjustment expenses	\$	549,007
Other expenses		177,549
Ceded reinsurance premiums payable		91,637,936
Current federal and foreign income taxes		2,403,471
Amounts withheld or retained by company for account of others		181,891
Remittances and items not allocated		(511)
Payable to parent, subsidiaries and affiliates		36,774,781
Total liabilities		<u>131,724,124</u>

Capital and surplus:

Common capital stock		6,000,000
Gross paid in and contributed surplus		1,130,153,297
Unassigned funds (surplus)		6,106,977
Total capital and surplus		<u>1,142,260,274</u>

Total liabilities and capital and surplus	\$	<u>1,273,984,398</u>
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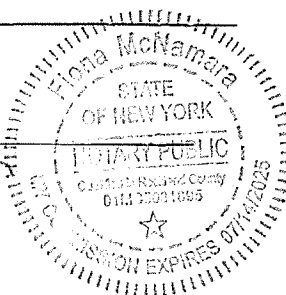
I, Hana Entela, Treasurer of Endurance American Insurance Company (the "Company") do hereby certify that to the best of my knowledge and belief, the foregoing is a full and true Statutory Statement of Admitted Assets, Liabilities, Capital and Surplus of the Company as of December 31, 2024 prepared in conformity with accounting practices prescribed or permitted by the State of Delaware Department of Insurance. The foregoing statement should not be taken as a complete statement of financial condition of the Company. Such a statement is available upon request at the Company's office located at 4 Manhattanville Road, Purchase, NY 10577.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the seal of the Company at Purchase, New York.

Hana Entela

Subscribed and sworn to before me this 25th day of March, 2025
State of New York, County of Westchester

Fiona McNamara



KNOW ALL BY THESE PRESENTS, that **Endurance Assurance Corporation**, a Delaware corporation ("EAC"), **Endurance American Insurance Company**, a Delaware corporation ("EAIC"), **Lexon Insurance Company**, a Texas corporation ("LIC"), and/or **Bond Safeguard Insurance Company**, a South Dakota corporation ("BSIC"), each, a "Company" and collectively, "**Sompo International**," do hereby constitute and appoint: **Gary A. Cardinale, Joseph V. Cardinale, Salvatore Cardinale** as true and lawful Attorney(s)-In-Fact to make, execute, seal, and deliver for, and on its behalf as surety or co-surety; bonds and undertakings given for any and all purposes, also to execute and deliver on its behalf as aforesaid renewals, extensions, agreements, waivers, consents or stipulations relating to such bonds or undertakings provided, however, that no single bond or undertaking so made, executed and delivered shall obligate the Company for any portion of the penal sum thereof in excess of the sum of **One Hundred Million Dollars (\$100,000,000.00)**.

Such bonds and undertakings for said purposes, when duly executed by said attorney(s)-in-fact, shall be binding upon the Company as fully and to the same extent as if signed by the President of the Company under its corporate seal attested by its Corporate Secretary.

This appointment is made under and by authority of certain resolutions adopted by the board of directors of each Company by unanimous written consent effective the 30th day of March, 2023 for BSIC and LIC and the 17th day of May, 2023 for EAC and EAIC, a copy of which appears below under the heading entitled "Certificate".

This Power of Attorney is signed and sealed by facsimile under and by authority of the following resolution adopted by the board of directors of each Company by unanimous written consent effective the 30th day of March, 2023 for BSIC and LIC and the 17th day of May, 2023 for EAC and EAIC and said resolution has not since been revoked, amended or repealed:

RESOLVED, that the signature of an individual named above and the seal of the Company may be affixed to any such power of attorney or any certificate relating thereto by facsimile, and any such power of attorney or certificate bearing such facsimile signature or seal shall be valid and binding upon the Company in the future with respect to any bond or undertaking to which it is attached.

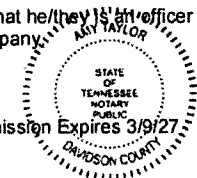
IN WITNESS WHEREOF, each Company has caused this instrument to be signed by the following officers, and its corporate seal to be affixed this 25th day of May, 2023.

Endurance Assurance Corporation By: <i>Richard M Appel</i> Richard Appel, SVP & Senior Counsel 	Endurance American Insurance Company By: <i>Richard M Appel</i> Richard Appel, SVP & Senior Counsel 	Lexon Insurance Company By: <i>Richard M Appel</i> Richard Appel, SVP & Senior Counsel 	Bond Safeguard Insurance Company By: <i>Richard M Appel</i> Richard Appel, SVP & Senior Counsel 
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ACKNOWLEDGEMENT

On this 25th day of May, 2023, before me, personally came the above signatories known to me, who being duly sworn, did depose and say that he/she is an officer of each of the Companies; and that he executed said instrument on behalf of each Company by authority of his office under the by-laws of each Company.

By: *Amy Taylor*
Amy Taylor, Notary Public - My Commission Expires 3/9/27



CERTIFICATE

I, the undersigned Officer of each Company, DO HEREBY CERTIFY that:

1. That the original power of attorney of which the foregoing is a copy was duly executed on behalf of each Company and has not since been revoked, amended or modified; that the undersigned has compared the foregoing copy thereof with the original power of attorney, and that the same is a true and correct copy of the original power of attorney and of the whole thereof;
2. The following are resolutions which were adopted by the board of directors of each Company by unanimous written consent effective 30th day of March, 2023 for BSIC and LIC and the 17th day of May, 2023 for EAC and EAIC and said resolutions have not since been revoked, amended or modified:

"RESOLVED, that each of the individuals named below is authorized to make, execute, seal and deliver for and on behalf of the Company any and all bonds, undertakings or obligations in surety or co-surety with others: **RICHARD M. APPEL, MATTHEW E. CURRAN, MARGARET HYLAND, SHARON L. SIMS, CHRISTOPHER L. SPARRO,** and be it further

RESOLVED, that each of the individuals named above is authorized to appoint attorneys-in-fact for the purpose of making, executing, sealing and delivering bonds, undertakings or obligations in surety or co-surety for and on behalf of the Company."

3. The undersigned further certifies that the above resolutions are true and correct copies of the resolutions as so recorded and of the whole thereof.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the corporate seal this 10th day of April, 20 25.

By: *Daniel S. Lurie*
Daniel S. Lurie, Secretary

NOTICE: U. S. TREASURY DEPARTMENT'S OFFICE OF FOREIGN ASSETS CONTROL (OFAC)

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Any reproductions are void.

Surety Claims Submission: LexonClaimAdministration@sompo-intl.com

Telephone: 615-553-9500 Mailing Address: Sompo International; 12890 Lebanon Road; Mount Juliet, TN 37122-2870

**CERTIFIED COPY OF RESOLUTION OF
BOARD OF DIRECTORS OF**

(Must be submitted if bidder is a corporation)

Winn Construction Services, Inc.
(name of corporation)

"RESOLVED that Dustin Winn, President to
(person authorized to sign) (title)

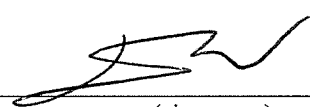
Winn Construction Services, Inc. be authorized to sign and submit the bid of this corporation
(name of corporation)

for the following project: Project No. 23-C583 (BID # 2025-061)
CR2 (Cole Hill Road) over Fox Creek bridge replacement project

and to include in such bid the certificate as to non-collusion, and for any inaccuracies or misstatements in such certificate this corporated bidder shall be liable under the penalties perjury."

The foregoing is a true and correct copy of the resolution adopted by Winn Construction Services, Inc.
(name of corporation)

_____ at a meeting of its Board of Directors held on the 9th day
of April, 2025.

By: 
(signature)

Dustin Winn
(typed)

(Seal)

Title: President

Date: 4/9/25

NON-COLLUSIVE BIDDING CERTIFICATION

By submission of this bid for Project No. 23-C583 (BID # 2025-061)
CR2 (Cole Hill Road) over Fox Creek Bridge Replacement
Project

each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid, each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief:

1. The prices in this bid have been arrived at independently without collusion, consultation, communication or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;
2. Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and
3. No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

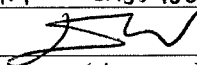
A bid shall not be considered for award, nor shall any award be made where 1, 2 and 3 above, have not been complied with, provided, however, that in any case, the bidder cannot make the foregoing certification, the bidder shall so state and shall furnish with the bid, a signed statement which sets forth in detail the reasons thereof. Where 1, 2 and 3 above have not been complied with, the bid shall not be considered for any award, nor shall any award be made, unless the head of the Purchasing Unit to the political subdivision, public department, agency or official thereof to which the bid is made, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

The fact that a bidder a) has published price lists, rates or tariffs covering items being procured, b) has informed prospective customer of proposed or pending publication of new or revised price lists for such items, or c) has sold the same items to other customers at the same prices being bid, does not constitute, without more, a disclosure within the meaning of paragraph above.

Any bid hereafter made to any political subdivision of the State or any public department, agency or official thereof by a corporate bidder for work or services performed to be performed or goods sold or to be sold, where competitive bidding is required by statute, rule, regulation, local law, and where such bid contains the certification referred to in paragraph above, shall be deemed to have been authorized by the Board of Directors of the bidder, and such authorization shall be deemed to include the submission of the bid and the inclusion therein of the certificate as to non-collusion as the act and deed of the corporation.

I, hereby affirm under the penalties of perjury that the foregoing statement is true.

Firm: Winn Construction Services, Inc.

By: 
(signature)

Dustin Winn
(typed)

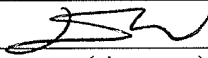
Title: President

Date: 4/10/25

NON-INTERRUPTION OF WORK AGREEMENT

By submission of this bid for Project No. 23-C583 (BID # 2025-061)
CR2 (Cole Hill Road) over Fox Creek Bridge Replacement
Project

the bidder agrees that if this bid is accepted, he will not intentionally engage in any course of conduct or activity, or employ for the purposes of performing the public work, any subcontractors, employees, labor or materials which will or may result in the interruption of the performance of the public work due to labor strife or unrest by workmen employed by the bidder or by any of the trades working in or about the public works and/or premises where the work is being performed.

Firm: Winn Construction Services, Inc.
By: 
(signature)
Dustin Winn
(typed)
Title: President
Date: 4/10/25

ATTACHMENT "A"

**SHEET MS4-1: BIDDER/PROPOSER CERTIFICATION STATEMENT(TO BE USED
WITH SECTION 34 PART A – GENERAL CONTRACTS)**

As a bidder seeking to provide services on behalf of Albany County, I certify under penalty of law that I understand and agree to comply with the terms and conditions of the New York State Pollutant Discharge Elimination System ("SPDES") General Permit for Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4 Permit) and Albany County Local Law 7 of 2007, and agree to implement any Best Management Practices or corrective actions identified by Albany County or an authorized representative thereof as necessary to maintain compliance. I understand that Albany County must comply with the terms and conditions of the aforementioned MS4 Permit, and that it is unlawful for any person to directly or indirectly cause or contribute to a violation of water quality standards. I am also aware that County Local Law 7 of 2007 prohibits any activities that cause or contribute to a violation of the County's SPDES permit. Further, I understand that any non-compliance by Albany County will not diminish, eliminate or lessen my own liability.

Name of Third Party Entity: Winn Construction Services, Inc
 Address: 74 Hudson River Rd, Waterford, NY 12188

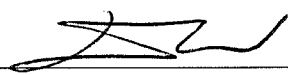
Phone Number(s): 607-316-2973

Description of activities to be performed by your firm or organization within Albany County are related to the Albany County Storm Water Management Program (SWMP) (include any activities that have the potential to generate or prevent pollution and/or affect water quality):

Bridge Replacement at CR2 over Fox Creek

Description of where the work is to be performed within Albany County facilities:

Bridge Construction


 Signature

Dustin Winn
 Printed Name

President
 Title

4/10/25
 Date

BIDDERS QUALIFICATION QUESTIONNAIRE

The undersigned guarantees the accuracy of all statements and answers herein contained. (Please print in ink.)

1. How many years has your firm been in business? 11 years
2. What has been the dollar volume of your firm's business for each of the past three years?
 Year: 2024 \$ 26,650,000 Year: 2023 \$ 22,448,412 Year: 2022 \$ 13,045,724
3. List up to five projects of this nature (bridge rehabilitation) that you have completed in the last three years, and give the name, address and telephone number of a reference from each. Also, give the completion date, the original contract bid price, the completed cost and a brief description of each project listed. Submit additional sheets if necessary.
See Attached

4. List all the projects presently under construction by your firm, the dollar volume of the contract and the percentage completion of the contract. Submit additional sheets if necessary.
See Attached

5. Has your firm ever failed to complete work awarded to it? If so, state where and why.
No

6. Is your firm presently, or has your firm ever been a party defendant in a lawsuit commenced against your firm alleging failure to properly complete work in accordance with the contract for same? If so, give details.
No

7. Has your firm received two final determinations within any consecutive six year period, the second final determination occurring within the past five years, that your firm willfully failed to pay the prevailing rate of wages or to provide supplements in accordance with Article 8 of the Labor Law? If so, give details.

No

8. Do you plan to sublet any part of this work? If so, give details (description of work, dollar value, name of subcontractor).

Guide rail - TBD

Paving - TBD

9. What equipment do you own that is available for this work? Be specific.

Cranes, Excavators, Dozers, Loaders, Pumps, Piling equipment, etc.

10. What equipment do you plan to rent or purchase for this work? Be specific.

None

11. Have you ever performed work under the direction of a professional engineer or registered architect? If so, list up to three such firms, giving the name of the firm, its address, telephone number and the name of the project (list most recent projects).

Yes, see Attached

12. Give the name, address and telephone number of an individual who represents each of the following, and whom the owner may contact to investigate your financial responsibility: a surety, a bank and a major material supplier.

See Attached

13. Give a summary of your financial statement. List assets and liabilities (submit additional sheets, if necessary).

TO be provided upon request if
Low Bid,

14. State the true, exact correct and complete name of the partnership, corporation or trade name under which you do business, and the address of the place of business. (If a corporation, state the name and title of all officers. If a partnership, state the name of all partners. If a trade name, state the names of the individuals who do business under the trade name.) It is absolutely necessary that this information be furnished.

a) Correct name of bidder: Winn Construction Services, Inc.

b) The business is a Corporation

c) The address of principal place is: 74 Hudson River Rd
Waterford, NY 12188

d) The names and titles of the corporate officers, partners or individuals doing business under a trade name, are as follows:

Dustin Winn - President

Keith Decker - VP

William Lindheimer - Secretary & Treasurer

Firm: Winn Construction Services, Inc.

By:

(signature)

Dustin Winn

(typed)

Title:

President

Date:

4/10/25

ATTACHMENT "C"
ALBANY COUNTY
VENDOR RESPONSIBILITY QUESTIONNAIRE

1. VENDOR IS: ☒ PRIME CONTRACTOR			
2. VENDOR'S LEGAL BUSINESS NAME <i>Winn Construction Services, Inc</i>		3. IDENTIFICATION NUMBERS a) FEIN # <i>46-2428144</i> b) DUNS #	
4. D/B/A – Doing Business As (if applicable) & COUNTY FIELD:		5. WEBSITE ADDRESS (if applicable)	
6. ADDRESS OF PRIMARY PLACE OF BUSINESS/EXECUTIVE OFFICE <i>74 Hudson River Rd Waterford, NY 12188</i>		7. TELEPHONE NO. <i>607-316-2973</i>	8. FAX NUMBER <i>518-238-2211</i>
9. ADDRESS OF PRIMARY PLACE OF BUSINESS/EXECUTIVE OFFICE <i>IN NEW YORK STATE, if different from above</i>		10. TELEPHONE NO.	11. FAX NUMBER
12. AUTHORIZED CONTACT FOR THIS QUESTIONNAIRE Name <i>Dustin Winn</i> Title <i>President</i> Telephone Number <i>607-316-2973</i> Fax Number <i>518-238-2211</i> e-mail <i>dowinn@Winn-construction.com</i>			
13. LIST ALL OF THE VENDOR'S PRINCIPAL OWNERS.			
a) NAME <i>Dustin Winn</i>	TITLE <i>President</i>	b) NAME <i>Keith Decker</i>	TITLE <i>VP</i>
c) NAME <i>William Lindhorner</i>	TITLE <i>Sec./Treas.</i>	d) NAME	TITLE
A DETAILED EXPLANATION IS REQUIRED FOR EACH QUESTION ANSWERED WITH A "YES," AND MUST BE PROVIDED AS AN ATTACHMENT TO THE COMPLETED QUESTIONNAIRE. YOU MUST PROVIDE ADEQUATE DETAILS OR DOCUMENTS TO AID THE COUNTY IN MAKING A DETERMINATION OF VENDOR RESPONSIBILITY. PLEASE NUMBER EACH RESPONSE TO MATCH THE QUESTION NUMBER.			
14. DOES THE VENDOR USE, OR HAS IT USED IN THE PAST FIVE YEARS, ANY OTHER BUSINESS NAME, FEIN, or D/B/A OTHER THAN THOSE LISTED IN ITEMS 2-4 ABOVE? List all other business name(s), Federal Employer Identification Number(s) or any D/B/A names and the dates that these names or numbers were/are in use. Explain the relationship to the vendor.		☐ Yes ☒ No	
15. ARE THERE ANY INDIVIDUALS NOW SERVING IN A MANAGERIAL OR CONSULTING CAPACITY TO THE VENDOR, INCLUDING PRINCIPAL OWNERS AND OFFICERS, WHO NOW SERVE OR IN THE PAST YEAR HAVE SERVED AS:		☐ Yes ☒ No	
a) An elected or appointed public official or officer? <i>List each individual's name, business title, the name of the organization and position elected or appointed to, and dates of service</i>		☐ Yes ☒ No	
b) An officer of any political party organization in Albany County, whether paid or unpaid? <i>List each individuals name, business title or consulting capacity and the official political position held with applicable service dates.</i>		☐ Yes ☒ No	

16.	WITHIN THE PAST FIVE YEARS, HAS THE VENDOR, ANY INDIVIDUALS SERVING IN MANAGERIAL OR CONSULTING CAPACITY, PRINCIPAL OWNERS, OFFICERS, MAJOR STOCKHOLDER(S) (10% OR MORE OF THE VOTING SHARES FOR PUBLICLY TRADED COMPANIES, 25% OR MORE OF THE SHARES FOR ALL OTHER COMPANIES), AFFILIATE OR ANY PERSON INVOLVED IN THE BIDDING OR CONTRACTING PROCESS:	
a)	1. been suspended, debarred or terminated by a local, state or federal authority in connection with a contract or contracting process; 2. been disqualified for cause as a bidder on any permit, license, concession franchise or lease; 3. entered into an agreement to a voluntary exclusion from bidding/contracting; 4. had a bid rejected on an Albany County contract for failure to comply with the MacBride Fair Employment Principles; 5. had a low bid rejected on a local, state or federal contract for failure to meet statutory affirmative action or M/WBE requirements on a previously held contract; 6. had status as a Women's Business Enterprise, Minority Business Enterprise or Disadvantaged Business Enterprise, de-certified, revoked or forfeited; 7. been subject to an administrative proceeding or civil action seeking specific performance or restitution in connection with any local, state or federal government contract; 8. been denied an award of a local, state or federal government contract, had a contract suspended or had a contract terminated for non-responsibility; or 9. had a local, state or federal government contract suspended or terminated for cause prior to the completion of the term of the contract.	☐ Yes ☒ No
b)	been indicted, convicted, received a judgment against them or a grant of immunity for any business-related conduct constituting a crime under local, state or federal law including but not limited to, fraud extortion, bribery, racketeering, price-fixing, bid collusion or any crime related to truthfulness and/or business conduct?	☐ Yes ☒ No
c)	been issued a citation, notice, violation order, or are pending an administrative hearing or proceeding or determination of violations of: 1. federal, state or local health laws, rules or regulations.	☐ Yes ☒ No
17.	IN THE PAST THREE YEARS, HAS THE VENDOR OR ITS AFFILIATES ¹ HAD ANY CLAIMS, JUDGMENTS, INJUNCTIONS, LIENS, FINES OR PENALTIES SECURED BY ANY GOVERNMENTAL AGENCY? Indicate if this is applicable to the submitting vendor or affiliate. State whether the situation(s) was a claim, judgment, injunction, lien or other with an explanation. Provide the name(s) and address(es) of the agency, the amount of the original obligation and outstanding balance. If any of these items are open, unsatisfied, indicate the status of each item as "open" or "unsatisfied."	☐ Yes ☒ No
18.	DURING THE PAST THREE YEARS, HAS THE VENDOR FAILED TO: a) file returns or pay any applicable federal, state or city taxes? <i>Identify the taxing jurisdiction, type of tax, liability year(s), and tax liability amount the vendor failed to file/pay and the current status of the liability.</i> b) file returns or pay New York State unemployment insurance? <i>Indicate the years the vendor failed to file/pay the insurance and the current status of the liability.</i> c) Property Tax <i>Indicate the years the vendor failed to file.</i>	☐ Yes ☒ No ☐ Yes ☒ No ☐ Yes ☒ No
19.	HAVE ANY BANKRUPTCY PROCEEDINGS BEEN INITIATED BY OR AGAINST THE VENDOR OR ITS AFFILIATES ¹ WITHIN THE PAST SEVEN YEARS (WHETHER OR NOT CLOSED) OR IS ANY BANKRUPTCY PROCEEDING PENDING BY OR AGAINST THE VENDOR OR ITS AFFILIATES REGARDLESS OF THE DATE OF FILING? Indicate if this is applicable to the submitting vendor or affiliate. If it is an affiliate, include the affiliate's name and FEIN. Provide the court name, address and docket number. Indicate if the proceedings have been initiated, remain pending or have been closed. If closed, provide the date closed.	☐ Yes ☒ No

20.	IS THE VENDOR CURRENTLY INSOLVENT, OR DOES VENDOR CURRENTLY HAVE REASON TO BELIEVE THAT AN INVOLUNTARY BANKRUPTCY PROCEEDING MAY BE BROUGHT AGAINST IT? Provide financial information to support the vendor's current position, for example, Current Ratio, Debt Ratio, Age of Accounts Payable, Cash Flow and any documents that will provide the agency with an understanding of the vendor's situation.	☐ Yes ☒ No
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21.	IN THE PAST FIVE YEARS, HAS THE VENDOR OR ANY AFFILIATES ¹ : a) defaulted or been terminated on, or had its surety called upon to complete, any contract (public or private) awarded;	☐ Yes ☒ No
Indicate if this is applicable to the submitting vendor or affiliate. Detail the situation(s) that gave rise to the negative action, any corrective action taken by the vendor and the name of the contracting agency.		

¹ "Affiliate" meaning: (a) any entity in which the vendor owns more than 50% of the voting stock; (b) any individual, entity or group of principal owners or officers who own more than 50% of the voting stock of the vendor; or (c) any entity whose voting stock is more than 50% owned by the same individual, entity or group described in clause (b). In addition, if a vendor owns less than 50% of the voting stock of another entity, but directs or has the right to direct such entity's daily operations, that entity will be an "affiliate" for purposes of this questionnaire.

**ALBANY COUNTY
VENDOR RESPONSIBILITY QUESTIONNAIRE**

FEIN # 46-2428144

State of:)
) ss:
County of:)

CERTIFICATION:

The undersigned: recognizes that this questionnaire is submitted for the express purpose of assisting the County of Albany in making a determination regarding an award of contract or approval of a subcontract; acknowledges that the County may in its discretion, by means which it may choose, verify the truth and accuracy of all statements made herein; acknowledges that intentional submission of false or misleading information may constitute a felony under Penal Law Section 210.40 or a misdemeanor under Penal Law Section 210.35 or Section 210.45, and may also be punishable by a fine and/or imprisonment of up to five years under 18 USC Section 1001 and may result in contract termination; and states that the information submitted in this questionnaire and any attached pages is true, accurate and complete.

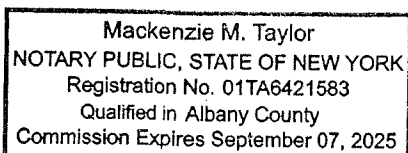
The undersigned certifies that he/she:

- Has not altered the content of the questions in the questionnaire in any manner;
- Has read and understands all of the items contained in the questionnaire and any pages attached by the submitting vendor;
- Has supplied full and complete responses to each item therein to the best of his/her knowledge, information and belief;
- Is knowledgeable about the submitting vendor's business and operations;
- Understands that Albany County will rely on the information supplied in the questionnaire when entering into a contract with the vendor;
- Is under duty to notify the Albany County Purchasing Division of any material changes to the vendor's responses.

Name of Business Winn Construction Services Signature of Owner [Signature]
Address 74 Hudson River Rd Printed Name of Signatory Dustin Winn
City, State, Zip Watford, NY 12188 Title _____

Sworn before me this 10th day of April, 2025;

Mackenzie Taylor
Notary Public



Dustin Winn
Printed Name
[Signature]
Signature
4/10/25
Date

Acknowledgment by Bidder:

If Individual or Individuals:

State of _____

County of _____

On this _____ day of _____, 2025, before me personally appeared _____
 _____ to me known and known to me to be the same person(s) described in
 and who executed the within instrument, and he (or they severally) acknowledged to me that he
 (or they) executed the same.

Notary Public, State of _____

Qualified in _____

My commission expires _____

If Corporation:

State of NYCounty of Saratoga

On this 10th day of April, 2025, before me personally appeared Dustin
Winn to me known, who, being by me sworn, did say the he resides at (give
 address) 125 Joann Way, Amsterdam, NY 12010;
 that he is the (give title) President of the (name of corporation) Winn
Construction Services, the corporation described in and which executed the above
 instrument; that he knows the seal of the corporation; that the seal affixed to the instrument is
 such corporate seal; that it was so affixed by order of the Board of Directors of the corporation,
 and that he signed his name thereto by like order.

Mackenzie TaylorNotary Public, State of New YorkQualified in Albany CountyMy commission expires September 7, 2025

If Partnership:

State of _____

County of _____

On the _____ day of _____, 2025, before me personally came _____
 _____, to me known to be the individual who executed the foregoing, and
 who, being duly sworn, did depose and say that he/she is a partner of the firm _____
 _____ and that he/she has the authority to sign the same, and
 acknowledged that he/she executed the same as the act and deed of said partnership.

Notary Public, State of _____

Qualified in _____

My commission expires _____

SCHEDULE OF MBE/WBE PARTICIPATION

PROJECT IDENTIFICATION

Project No. 23-C583 (BID # 2025-061)
 Title: CR2 (Cole Hill Road) over Fox
 Creek Bridge Replacement Project

BIDDER:

Name: Winn Construction Services, Inc.

Address: 74 Hudson River Road
Waterford, NY 12188

Total Bid Amount: \$ 1,542,139.00

Fed. Emp. ID #: 46-2428144
 Telephone No. 518-238-2216

MBE Goal: 7% x Total Bid Amount = \$ 107,949.73

WBE Goal: 5% x Total Bid Amount = \$ 77,106.95

Bidder is an approved _____ MBE, _____ WBE, _____ majority firm as described in Article SC-19, Affirmative Action Plan of the Supplementary Conditions of the Project Manual (check appropriate category).

MBE/WBE participation is broken down into joint ventures with bidder, subcontracting construction, trucking or services, and materials or supplies. Joint ventures between the prime bidder and MBE/WBE firms are shown below. Other MBE/WBE participation is shown on next page.

JOINT VENTURES WITH BIDDER (check one of the following)

☒ No MBE/WBE joint ventures with bidder on this contract.

_____ Bidder is joint venturing with the following firm(s):
 (attach copy of joint venture agreements to this form)

Name: _____
 Address: _____

Telephone: _____
 Contact Person: _____
 Fed. Emp. ID #: _____
 Approved _____ MBE _____ WBE
 _____ Majority Firm

MBE Share of Joint Venture: _____ % x Total Bid Amount = \$ _____

WBE Share of Joint Venture: _____ % x Total Bid Amount = \$ _____

OTHER MBE/WBE PARTICIPATION:

Complete each section below where appropriate showing all MBE/WBE participation other than joint ventures. Enter the type of participation for each MBE/WBE as one of the following:

- SC - Subcontract Construction
- TS - Trucking or Services
- MS - Source of Materials or Supplies

SCHEDULE OF MBE/WBE PARTICIPATION (con't)

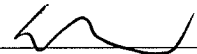
Show the actual amount to be paid to the MBE/WBE, not the contract item bid price.

<u>MBE Firm Name</u>	<u>Work Description</u>	<u>Type Participation</u>	<u>Amount</u>
<u>54 km Land Survey</u>	<u>Survey</u>	<u>SC</u>	<u>\$ 13,960.00</u>
_____	_____	_____	<u>\$ _____</u>
_____	_____	_____	<u>\$ _____</u>
_____	_____	_____	<u>\$ _____</u>
Subtotal			<u>\$ 13,960.00</u>
MBE Share of Joint Venture			<u>\$ _____</u>
TOTAL MBE PARTICIPATION			<u>\$ 13,960.00</u>

<u>WBE Firm Name</u>	<u>Work Description</u>	<u>Type Participation</u>	<u>Amount</u>
<u>City Mark Striping</u>	<u>Striping</u>	<u>SC</u>	<u>\$ 1,995.00</u>
<u>AAA Reinforcing</u>	<u>Rebar</u>	<u>SC</u>	<u>\$ 14,000.00</u>
_____	_____	_____	<u>\$ _____</u>
_____	_____	_____	<u>\$ _____</u>
Subtotal			<u>\$ 15,995.00</u>
MBE Share of Joint Venture			<u>\$ _____</u>
TOTAL MBE PARTICIPATION			<u>\$ 15,995.00</u>

IMPORTANT:

If the TOTAL MBE PARTICIPATION and/or the TOTAL WBE PARTICIPATION is less than the goal amounts, bidder must attach documentation demonstrating good faith efforts to retain MBE's/WBE's. Such documentation shall include: 1) name of MBE/WBE firm, 2) individual contacted, 3) description of work to be done, 4) quotation or proposal received (if any), 5) description of follow-up actions, and 6) explanation of reason(s) why the firm will not be used, for all MBE's/WBE's solicited for participation in this project.

Firm: Winn Construction Services Inc. By: 
 (Signature)
 Date: 4/10/25 Dustin Winn
 (Typed)
 Title: President

CONFIDENTIAL

Credit Reference Sheet

Winn Construction Services, Inc.

74 Hudson River Rd.

Waterford, NY 12188

Phone: 518-238-2210

Fax: 518-238-2211

Date of Incorporation – 3/28/2013

Business Entity – S Corporation (New York State)

Federal Tax ID No. – 46-2428144

Business Principles and Title – Dustin J. Winn, P.E., President, d.winn@winn-construction.com

Accounts Payable Email – ap@winn-construction.com

Credit References:

White Cap

17 Commercial Ave.
Albany, NY 12205

Phone: 518-704-2678

Email: Stephany.goyette@whitecap.com

Contact: Stephany Goyette

Cranesville Block Co., Inc.

1250 Riverfront Center
Amsterdam, NY 12010

Phone: 518-237-2342

Email: cpatti@cranesville.com

Contact: Cheryl Patti

Dimension Fabricators

2000 Seventh Street
Glenville, NY 12302

Phone: 518-374-1936

Email : rebeccam@dimensionfab.com

Contact: Rebecca Morton

Bank Reference:

Arrow Bank

250 Glen Street, PO Box 307
Glens Falls, NY 12801

Phone: 518-793-4121

Acct No: 1340122777

Contact: Patricia Netoskie, VP, Branch Manager

Bonding Agent:

World Wide Bonding Agency

2846 William Street
Cheektowaga, NY 14227

Contact: Gary Cardinale

Phone: 716-681-7685

Fax: 716-681-7683

Insurance Agent:

Arthur J. Gallagher

30 Century Hill Drive – Suite 200
Latham, NY 12110

Phone: 518-869-3535

Fax: 518-533-6892

Contact: David Brockmann, Senior VP

Projects Completed
January 2018 through September 2023

Number	Project Name	Contract Amount	Type of Work	% Subcom.	Completed	Location	Contact Person	Phone Number	Address 1	City	St	Zip
11802	Herkimer Rail Trail	\$365,000.93	Bridge Replacement	0	Sep-18	Herkimer, NY	Ken Barth	518-376-1779	2170 River Road	Coymans	NY	12045
11803	Jordan Falls Rd. Bridge	\$11,163,725.91	Bridge Replacement	25	Dec-18	Croghan, NY	Warren Shaw	315-376-5350	7660 North State St	Lewisville	NY	13367
11804	Saratoga Lake Gas Co.	\$100,000.00	Crane Service	0	Dec-18	Saratoga Lake, NY	Will Lindheimer	518-937-0473	74 Hudson River Road	Watford	NY	12188
11808	Oneida County - Woodhull Rd.	\$415,497.00	Bridge Deck Replacement	20	1-Dec	Foresport, NY	Tim Decker	315-793-6736	800 Park Ave	Utica	NY	13501
11901	SUCC- East Dam Dr. Water Main	\$469,872.00	Waterline Installation	15	Sep-19	Oneonta, NY	Casper Knapp, PE	518-320-1704	353 Broadway	Albany	NY	12246
11902	Dutchess County Bulls Head Rd	\$2,223,865.00	Bridge Replacement	31	Jun-20	Stanhope, NY	Mat D'Arcovich	845-466-2975	678 Dutchess Turnpike	Poughkeepsie	NY	12603
11903	Scotch Ridge Rd.	\$124,967.74	Reinforced Concrete	0	Jul-19	Stanhope, NY	Ken Barth	518-376-1779	2170 River Road	Coymans	NY	12045
11904	Albany-Hudson Electric Trail	\$1,729,765.00	Construction of 4	0	Nov-20	Rensselaer County, NY	Ken Barth	518-376-1779	2170 River Road	Coymans	NY	12045
11905	Benon Road over Hatch Brook	\$706,023.93	Bridge Replacement	20	Nov-19	Benon, NY	Tracy Edgese	518-490-7141	103 Country View Drive	Lake Placid	NY	12109
11906	Watervliet Arsenal - Filler Foundation	\$49,180.00	Reinforced Concrete	0	Nov-19	Watervliet, NY	Chris Calver	518-955-7754	587 Exchange St. - Suite 211	Buffalo	NY	14210
11907	J-Squared Pump Station	\$188,152.03	Excavation Support	0	Nov-19	Herkimer Falls, NY	John Sala	518-652-9049	277 Wolf Hill Road	Voorheesville	NY	12186
11908	AWET Bridge & Piling	\$79,946.50	Piling Installation	0	Aug-19	Columbia County, NY	Mike Malchow	518-955-4770	91 Newman Road	Hudson	NY	12534
11910	Ford Road	\$87,167.00	Temporary Bridge Installation	0	Nov-19	Pittsford, NY	Joseph Teliska	518-429-8878	124 Bloomingrove Drive	Troy	NY	12180
11911	Tenmile Zipline	\$511,500.00	Reinforced Concrete Towers for Zipline	0	May-20	Lake Placid, NY	Eric Chylak	435-339-8803	340 S. Main Street	Coastville	UT	64017
11912	Hamilton County - Pawley Rd.	\$3,344.00	Temporary Bridge	0	Dec-19	Hamilton County, NY	Trep Edgese	518-548-7141	102 Country View Drive	Lake Placid	NY	12108
11913	A Collinsville Nulden Hook Piling	\$115,000.00	Pile Installation for	0	Jan-20	Nulden Hook, NY	Mike Malchow	518-956-4270	81 Niagara Road	Hudson	NY	12534
12001	Murfield Rd. Italawassa Bridge	\$172,584.00	Bridge Replacement	13	Oct-20	Niagara, NY	Daniel Gosselin, PE	516-216-1801	28 Church Street	Niagara	NY	12143
12002	Mill Street Bridge Rehab	\$990,565.00	Bridge Rehabilitation	19	Oct-20	Oneida, NY	Tim Decker	315-793-6736	5999 Judd Road	Oriskany	NY	13424
12003	Cleveland Boats - Shoreline St	\$911,459.00	Waterfront Bulkhead	10	Jul-20	Cleveland, NY	Corey Walsh, PE	518-402-8638	625 Broadway - 3rd Floor	Albany	NY	12235027
12005	CR 13 over Gannett Creek	\$733,055.00	Bridge Replacement	12	Sep-20	Saratoga County, NY	Jon Szostak	518-885-2235	40 McVester Street	Ballston Spa	NY	12020
12006	Trotter Water Tank	\$115,300.00	Foundations	5	Jul-20	Troy, NY	Ed Shull	518-793-2634	45 Casew Road	Cumansbury	NY	13804
12007	Water Lake Dam Repairs & Impr	\$1,655,906.60	Dam Rehabilitation	5	May-21	Oneonta, NY	Jamie McNamara	607-432-0410	258 Mart St	Oneonta	NY	13820
12008	Richfield St over Steele Creek	\$153,553.89	Driveway Piles	0	Aug-20	Illion, NY	Steve Jablonski	315-698-9341	678 County Highway 108	St. Johnsville	NY	13452
12010	Cattletown WWTP Upgrade	\$223,000.00	Excavation Support	0	Nov-20	Cattletown, NY	John Sala	518-652-9049	277 Wolf Hill Road	Voorheesville	NY	12186
12011	Crescent Dam A&B Conc. Repair	\$3,127,000.00	Dam Rehabilitation	11	Dec-21	Cohoes, NY	Jean LaSasso, PE	518-459-0673	PO Box 437	White Plains	NY	10601
12014	2. Tachildt Grander Foundation	\$726,000.00	Reinforced Concrete	4	Nov-21	Watervliet, NY	J.P. Amalgam	716-525-2754	505 Elicot St. Suite 100	Buffalo	NY	14203
12101	Saratoga Trail Phase 2	\$250,535.00	Driveway Piles and	0	May-21	Pittsford, NY	Walter Tupper	518-451-4321	73 Trade Road	Pittsford	NY	12901
12102	Burlington Engineering - Groat	\$16,400.00	Grouting of Machine	0	Apr-21	Watervliet, NY	D. Barer	802-224-8920	52 State Street	Montpelier	VT	05602
12103	Unisa Grander Foundation	\$338,950.00	Reinforced Concrete	0	May-21	Watervliet, NY	J.P. Amalgam	716-525-2754	505 Elicot St. Suite 100	Buffalo	NY	14203
12104	Ballard Foundation	\$40,900.00	Reinforced Concrete	0	Apr-21	Watervliet, NY	J.P. Amalgam	716-525-2754	505 Elicot St. Suite 100	Buffalo	NY	14203
12105	Tank Foundation	\$179,188.00	Reinforced Concrete	0	May-21	Albany, NY	Don Flannery	518-588-6357	763 Schenange Turnpike	Albany	NY	12015
12106	Dutchess County Culverts	\$1,153,990.00	Bridge and Culvert	25	Nov-21	North East, NY	Mat D'Arcovich	845-466-2975	678 Dutchess Turnpike	Poughkeepsie	NY	12603
12107	Cree Feedlot & E.I.B. Foundation	\$241,304.55	Reinforced Concrete	0	Jan-21	Watervliet, NY	J.P. Amalgam	716-525-2754	505 Elicot St. Suite 100	Buffalo	NY	14203
12108	Remsen Pedestrian Bridge	\$335,700.00	Pedestrian / Utility	1	May-22	Remsen, NY	Bryan Tremblay, PE	315-457-5200	10068 Pine St	Remsen	NY	13438
12109	Fox Hill Rd	\$355,336.70	Bridge Replacement	24	Nov-21	Edinburg, NY	Alex Brown, PE	518-689-1823	45 Millard Road	Edinburg	NY	12134
12110	Remsen City Em. Millers Corners	\$66,128.88	Emergency Roadway and Drainage Repairs	0	Aug-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Drive	Troy	NY	12180
12112	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12113	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12114	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12115	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12116	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12117	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12118	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12119	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12120	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12121	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12122	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12123	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12124	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12125	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12126	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12127	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12128	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12129	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12130	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12131	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12132	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12133	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12134	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12135	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12136	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12137	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12138	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12139	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12140	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12141	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12142	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12143	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12144	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12145	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12146	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12147	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12148	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12149	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12150	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12151	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12152	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12153	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12154	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12155	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12156	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12157	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12158	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12159	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12160	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12161	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21	Rensselaer County, NY	Joseph Teliska	518-429-8828	124 Bloomingrove Dr	Troy	NY	12180
12162	Remsen City Em. Taborian Rd	\$732,372.86	Emergency Roadway and Drainage Repairs	0	Dec-21</							

21904	NG Bethlehem Foundations	\$563,500.00	Driven Pile for Foundation	0	Jun-19	Bethlehem, NY	Will Lindheimer	74 Hudson River Road	Waterford NY	12188
21905	Deppmayr USA - Lake Placid S	\$59,914.32	Foundations for Gondola	0	May-20	Lake Placid, NY	Steve Mayhew	3160 West 500 South	Salt Lake City UT	84104
22001	Citico Valley Energy Center	\$1,650,000.00	Excavation & Grading	0	Sep-20	Dover Plains, NY	Keith Decker	74 Hudson River Road	Waterford NY	12188
22002	Synstar Development	\$77,000.00	Bridge Construction	0	Oct-20	Clifton Park, NY	Mark Reusch	1 Fairchild Square STE 107	Clifton Park, NY	12065
22101	Dr. Reddy Retaining Wall Repair	\$165,300.00	Concrete Retaining	0	May-22	Middleburgh, NY	Mike Hayes, Project Manager	484 Western Turnpike	Alamont, NY	12009
22201	Roberts Lane Bridge	\$172,317.67	Wall Repair	0	Apr-22	Clifton Park, NY	Mark Reusch	1 Fairchild Square STE 107	Clifton Park, NY	12065
22302	LaFarge - Samson Feeder	\$171,200.00	Reinforced Concrete	0	May-22	Ravena, NY	Ken Barth	484 Western Turnpike	Alamont, NY	12009
22305	Dr. Fredrick Brenner Repairs	\$39,600.00	Foundations	0	Jul-22	Middleburgh, NY	Rodell Armitin	1974 State Route 145	Middleburgh, NY	12122
22306	CSX Newburgh	\$377,000.00	Installation of Utilities under CSX Rail	0	Dec-22	Newburgh, NY	Joe Navarro	2170 River Road	Coymans, NY	12045
22307	Mitsubishi Foundations	\$20,800.00	Reinforced Concrete Foundations	0	Aug-22	Coymans, NY	Walter Harbacz	2170 River Road	Coymans, NY	12045
22308	Hoffman Cox West H-Piles	\$108,200.00	Driven Pile	0	Aug-22	Cohoes, NY	Kevin Glemon	1 West St	Green Island, NY	12183
22301	CSX East Schuyler	2,637,000.00	Repair of Railroad Bridge Abutments	0	Aug-23	East Schuyler, NY	Michael Dumais	500 Water St	Jacksonville, FL	32202
22302	CSX Newburgh Bridge Replacement	5,238,615.45	Construction	15	Dec-24	Newburgh, NY	Michael Dumais	500 Water St	Jacksonville, FL	32202
22303	CSX Savannah Test Pile	102,000.00	Piling	7	Aug-23	Savannah, NY	Michael Dumais	500 Water St	Jacksonville, FL	32202
31201	CSX Savannah	3,500.00	Concrete	0	Mar-23	Waterford, NY	Chris Galver	5 Veterans Memorial Drive	Green Island, NY	12183
31202	Bida 135 Concrete Piers - WVA	3,500.00	Concrete Bascals	0	Mar-23	Waterford, NY	Chris Galver	2359 Route 300	Wallkill, NY	12589
31203	Great Hollow Steindle Foundation	32,500.00	Groutline	0	Sep-23	Waterford, NY	David Lighter	82 State Street	Montpelier, VT	05602



DANIEL P. MCCOY
COUNTY EXECUTIVE

MICHAEL MCLAUGHLIN
DEPUTY COUNTY EXECUTIVE

COUNTY OF ALBANY
DEPARTMENT OF PUBLIC WORKS
449 NEW SALEM ROAD
VOORHEESVILLE, NEW YORK 12186-4826
(518) 765-2055 - FAX (518) 447-7047
www.albanycountyny.gov

LISA M. RAMUNDO
COMMISSIONER

SCOTT D. DUNCAN
DEPUTY COMMISSIONER

April 25, 2025

Hon. Joanne Cunningham, Chairwoman
Albany County Legislature
112 State Street, Rm. 710
Albany, NY 12207

Dear Chairwoman Cunningham:

We request the Legislature's approval to enter into an agreement with Capital Region Transportation Council (CRTC), acting on behalf of the Capital District Transportation Committee (CDTC) which is the Metropolitan Planning Organization (MPO) for the Capital District, for the Active Transportation Technical Assistance Study. This agreement will be for an eighteen-month period beginning on April 1, 2025 through September 30, 2026 with a cost of \$65,000.00.

The CRTC will provide professional and technical services for the study as outlined in the attached document. These professional services include data collection, general transportation planning and technical assistance in support of the Complete Streets Study approved by the Legislature (Res. No. 572, 9/9/24).

If there are any questions or further information is needed, please feel free to contact my office.

Sincerely,

Lisa M. Ramundo
Commissioner

cc: Hon. Dennis Feeney, Majority Leader
Hon. Frank Mauriello, Minority Leader
Rebekah Kennedy, Majority Counsel
James Curran, Minority Counsel



County of Albany

Harold L. Joyce
Albany County Office
Building
112 State Street - Albany,
NY 12207

Legislation Text

File #: TMP-6544, Version: 1

REQUEST FOR LEGISLATIVE ACTION

Description (e.g., Contract Authorization for Information Services):

Contract Authorization for 2025-2026 Agreement with Capital Region Transportation Council (CRTC)

Date: 4/25/25
Department: Public Works
Attending Meeting: Lisa M. Ramundo, Commissioner
Submitted By: Rosa Maria Tirino
Title: Director of Operations
Phone: 518-655-7919

Purpose of Request: Contract Authorization Enter text.

CONTRACT TERMS/CONDITIONS:

Party Names and Addresses:

Capital Region Transportation Council, One Park Place, Suite 101, Albany, NY 12205

Term: (Start/end date or duration) 4/1/25-9/30/26
Amount/Raise Schedule/Fee: \$65,000.00

BUDGET INFORMATION:

Is there a Fiscal Impact: Yes ☒ No ☐
Anticipated in Budget: Yes ☒ No ☐
Spreadsheet attached: Yes ☐ No ☒

Source of Funding - (Percentages)

Federal: Enter text. County: 100%
State: Enter text. Local: Enter text.

County Budget Accounts:

Revenue Account and Line: Enter text.
Revenue Amount: Enter text.
Appropriation Account and Line: D95020.44003 & D95010.44485
Appropriation Amount: \$15,000 \$50,000

ADDITIONAL INFORMATION:

Mandated Program/Service: Yes ☐ No ☒
If Mandated, Cite Authority: Enter text.
Request for Bids / Proposals:

Competitive Bidding Exempt:	Yes ☒ No ☐
# of Response(s):	Enter text.
# of MWBE:	Enter text.
# of Veteran Business:	Enter text.
Bond Resolution No.:	Enter text.
Apprenticeship Program	Yes ☐ No ☒

Previous requests for Identical or Similar Action:

Resolution/Law Number and Date: Enter text.

DESCRIPTION OF REQUEST: (state briefly why legislative action is requested)

We request the Legislature's approval to enter into an agreement with Capital Region Transportation Council (CRTC), acting on behalf of the Capital District Transportation Committee (CDTC) which is the Metropolitan Planning Organization (MPO) for the Capital District, for the Active Transportation Technical Assistance Study. This agreement will be for an eighteen-month period beginning on April 1, 2025 through September 30, 2026 with a cost of \$65,000.00. The CRTC will provide professional and technical services for the study as outlined in the attached document. These professional services include data collection, general transportation planning and technical assistance in support of the Complete Streets Study approved by the Legislature (Res. No. 572, 9/9/24).



MEMORANDUM OF UNDERSTANDING

This agreement is entered into this ____ day of _____, 2025 by and between the Capital Region Transportation Council, One Park Place, Suite #101, Albany New York 12205 and Albany County, 112 State Street, Albany NY 12207.

WITNESSETH

WHEREAS, the Albany County (hereafter referred to as the "County") has requested technical assistance from the Capital Region Transportation Council (hereafter referred to as the "Transportation Council"), the Metropolitan Planning Organization for the Capital Region, in its 2025-2026 Unified Planning Work Program for the Active Transportation Technical Assistance Study (hereafter referred to as the "Study");

WHEREAS, the Transportation Council has included the Study in its 2025-2026 Unified Planning Work Program;

WHEREAS, the approved cost for consultant services related to the Study is \$65,000;

WHEREAS, Albany County will provide \$65,000 in cash for the Study;

WHEREAS, the Transportation Council expects the Study to be completed within eighteen (18) months of the date of consultant contract execution;

WHEREAS, the following milestones will apply to complete the Study:

1. By September 30, 2025 – Return the signed Memorandum of Understanding to the Transportation Council.
2. Within two (2) months of consultant contract execution – have a Study kick-off meeting.
3. Within eighteen (18) months – consultant completes 100% of the scope of work.

WHEREAS, the parties will jointly guide the consultant with the assistance of a Study Advisory Committee that will include, at a minimum, one staff member of the Transportation Council;

WHEREAS, the parties will jointly assume ownership of all draft and final products including graphics, data, reports, etc. related to the Study;

WHEREAS, the parties desire to set forth the rights and responsibilities in facilitating the Study;

NOW, THEREFORE, parties hereby agree to the following:

1. The Transportation Council will be responsible for:
 - a. Aiding the County in developing a detailed scope of work for the Study.
 - b. Drafting a detailed Request for Expression of Interest for the Study and advertising the Study in the New York State Contract Reporter, on the Transportation Council website, and on the New York State Metropolitan Planning Organizations website.
 - c. Aiding the County in selecting a consultant to perform the Study.
 - d. Documenting the consultant selection process and providing notification of the consultant selection or rejection.
 - e. Securing an executable agreement between the consultant and the Capital District Transportation Authority, the host agency of the Transportation Council.
 - f. Approving the membership of the Study Advisory Committee.
 - g. Attending all Study Advisory Committee or Study related meetings including the kickoff meeting, public meetings, and any other decision-making meeting.
 - h. Providing technical assistance.
 - i. Addressing all contracting issues including review of deliverables and payment to the consultant.
 - j. Invoicing the County for \$65,000, following execution of the consultant contract, due to the Transportation Council within 60 days of issuance of the Transportation Council's invoice.
 - k. Providing the County with copies of consultant invoices and supporting progress reports following payment authorization.
2. The County will be responsible for:
 - a. Reviewing and following the Transportation Council Community Planning Support 2025-2026 Planning Study Administration and Procedures guidance document.
 - b. Working with the Transportation Council staff to complete the Study within eighteen (18) months of the date of consultant contract execution. If unforeseen delays arise, the County will provide the Transportation Council with a written explanation.
 - c. Providing the Transportation Council with \$65,000 for the Study within 60 days of issuance of the Transportation Council's invoice.
 - d. Following the Transportation Council guidelines regarding consultant selection.
 - e. Organizing and maintaining a Study Advisory Committee that will include at least one member of the Transportation Council's staff.
 - f. Including the Transportation Council and Study Advisory Committee in decisions related to meeting times and dates, public meeting dates and format, and any other Plan related decisions with the consultant.
 - g. Attending all Study Advisory Committee or Study related meetings including the kickoff meeting, public meetings, and any other decision-making meeting.
 - h. Providing technical assistance and reviewing products.
 - i. Informing the Transportation Council of any problems with the consultant.
 - j. Presenting the findings of the Study to the Transportation Council Planning Committee, Transportation Council Advisory Committees and/or the Community Planning Forum.

The signatories affirm they are duly authorized by their governing bodies to execute this agreement.

IN WITNESS WHEREOF, the parties hereto have executed this agreement on this ____ day of _____ 2025.

FOR THE CAPITAL REGION
TRANSPORTATION COUNCIL

FOR ALBANY COUNTY

Executive Director

County Executive



DANIEL P. MCCOY
COUNTY EXECUTIVE

MICHAEL McLAUGHLIN
DEPUTY COUNTY EXECUTIVE

COUNTY OF ALBANY
DEPARTMENT OF GENERAL SERVICES
112 STATE STREET, SUITE 1300
ALBANY, NEW YORK 12207
(518) 447-7210 FAX (518) 447-7747
WWW.ALBANYCOUNTY.COM

DAVID M. LATINA
COMMISSIONER

SCOTT D. ALLARDICE
DEPUTY COMMISSIONER

April 23, 2025

Honorable Joanne Cunningham, Chairwoman
Albany County Legislature
112 State Street, Room 710
Albany, New York 12207

Re: Agreement between NYS Unified Court System and the County of Albany for custodial services, building maintenance and minor repairs.

Dear Chairwoman Cunningham:

The Department of General Services requests Legislative authorization to exercise the second period of the current five (5) year contract, Resolution 164 of 2024, with the New York State Unified Court System Third Judicial District in accordance with the terms of Chapter 686 of the Laws of 1996.

This authorization will cover services provided from April 1, 2024 through March 31, 2025 and provide reimbursements totaling \$ 823,326.00 as detailed in Appendix B of the proposed agreement.

Further Legislative authorization will be required for each successive annual reimbursement.

If you should have any questions, please do not hesitate to contact me.

Sincerely yours,

David M. Latina
Commissioner

DML:tas
Enclosure(s)

cc: Dennis Feeney, Majority Leader
Frank Mauriello, Minority Leader
Rebekah Kennedy, Majority Counsel
James Curran, Minority Counsel



County of Albany

Harold L. Joyce
Albany County Office
Building
112 State Street - Albany,
NY 12207

Legislation Text

File #: TMP-6548, Version: 1

REQUEST FOR LEGISLATIVE ACTION

Description (e.g., Contract Authorization for Information Services):

Agreement between NYS Unified Court System and the County of Albany for custodial services, building maintenance and minor repairs.

Date: 4/28/2025
Department: General Services
Attending Meeting: Commissioner Latina
Submitted By: David M. Latina
Title: Commissioner
Phone: 518-447-7210

Purpose of Request: Contract Authorization Chapter 686 of the Laws of 1996

CONTRACT TERMS/CONDITIONS:

Party Names and Addresses:

NYS Unified Court System Third Judicial District, 2500 Pond View, Suite 210, Castleton-On-Hudson, NY 12033

Term: (Start/end date or duration) April 1, 2024 through March 31, 2025
Amount/Raise Schedule/Fee: \$823,326.00

BUDGET INFORMATION:

Is there a Fiscal Impact: Yes ☒ No ☐
Anticipated in Budget: Yes ☒ No ☐
Spreadsheet attached: Yes ☐ No ☒

Source of Funding - (Percentages)

Federal:	0	County:	0
State:	100	Local:	0

County Budget Accounts:

Revenue Account and Line:	A1620-01270
Revenue Amount:	\$823,326.00
Appropriation Account and Line:	A1164-4046
Appropriation Amount:	\$823,326.00

ADDITIONAL INFORMATION:

Mandated Program/Service: Yes ☒ No ☐
If Mandated, Cite Authority: Chapter 686 of the Laws of 1996

Request for Bids / Proposals:

Competitive Bidding Exempt: Yes ☒ No ☐

of Response(s): Enter text.

of MWBE: Enter text.

of Veteran Business: Enter text.

Bond Resolution No.: Enter text.

Apprenticeship Program Yes ☐ No ☒

Previous requests for Identical or Similar Action:

Resolution/Law Number and Date: 164 of 2024 Dated 4/8/2024

DESCRIPTION OF REQUEST: (state briefly why legislative action is requested)

The Department of General Services requests Legislative authorization to exercise the second period of the current five (5) year contract, Resolution 164 of 2024, with the New York State Unified Court System Third Judicial District in accordance with the terms of Chapter 686 of the Laws of 1996.

This authorization will cover services provided from April 1, 2024 through March 31, 2025 and provide reimbursements totaling \$ 823,326.00 as detailed in Appendix B of the proposed agreement.

Further Legislative authorization will be required for each successive annual reimbursement.



New York State Unified Court System

Office of the Administrative Judge • 3rd Judicial District

Hon. James P. Murphy
Deputy Chief Administrative Judge
for Courts Outside New York City

Hon. Gerald W. Connolly
Administrative Judge

Amelia Lepore Sessions
District Executive

Matt Schaefer
Deputy District Executive

April 16, 2025

The Honorable Daniel McCoy
County of Albany
112 State Street – Room 900
Albany, New York 12207

Re: Agreement between UCS and the County of Albany for Court
Cleaning and Minor Repairs (Contract No. C300501) Annual Renewal
Letter and Budget (Appendix B) for SFY 2024-25

Dear County Executive McCoy:

Please be advised that pursuant to Section I of the existing contract between the Unified Court System and County of Albany we are hereby establishing a renewal period in the five-year term of this agreement. Said renewal period shall commence on April 1, 2024 and shall terminate on March 31, 2025. During this 2024-2025 renewal period, all terms and conditions of the above-referenced Agreement shall continue to apply, except as specified below.

The proposed budget for services to be rendered pursuant to this contract in the 2024-2025 period shall be \$823,326.00. Pursuant to the provisions of Chapter 686 of the Laws of 1996, as amended to date, the maximum compensation for the 2024-2025 period shall be 100% of that amount. The attached revised Appendix B, detailing the proposed budget for the renewal period, shall be incorporated into the Agreement and shall replace all prior Appendix B's. The signatures below shall confirm acceptance of this renewal by the County of Albany and by the UCS.

Unified Court System
Court Cleaning and Minor Repairs Proposed Budget Form
(Appendix B to a contract between a local government entity and the NYS Unified Court System pursuant to Chapter 686, Laws of 1996)

State Fiscal Year: 2024-2025 (April 1, 2024 - March 31, 2025)

Name of County or City: Albany County, C300501

List Court Buildings:			Court Spaces to be Cleaned and Repaired Pursuant to this Budget	
Name and Address of Each Court Building (Including County Clerk Space)	Owned or Leased	Total Building Net Usable Square Feet	Court Related Net Usable Sq. Ft.	Aid Eligible Percentage
County Court, 16 Eagle Street, Albany NY 12207	Owned	104,432	70,565	68%
Judicial Center, 6 Lodge Street, Albany NY 12207	Owned	76,066	40,315	53%
Family Court, 32 Clinton Ave, Albany NY 12207	Owned	83,595	66,040	79%
Combined		264,093	176,920	67%

Note: Divide Court SF by Total SF for percent

Anticipated Changes in Location or Space Utilization:

Name and Address of Affected Building(s)	Nature of Changes	Target Date

1 Cleaning Costs:

1(a) Service Contracts

Budget Line #	Contractor	Type of Service	Building	Contract Amounts for Budget Period	Aid Eligible Percentage	Budget Request
1	NYSID	Janitorial Services	Judicial Center	\$175,976	53%	\$93,267
2	NYSID	Janitorial Services	Family Courthouse	\$195,442	79%	\$154,399
3	NYSID	Additional Cleaning	OCA	\$50,000	100%	\$50,000
4	Unifirst	Floor Mats & Mops	Courthouse	\$8,250	68%	\$5,610
5	Unifirst	Floor Mats	Judicial Center	\$4,125	53%	\$2,186
6	Unifirst	Floor Mats	Family Courthouse	\$3,750	79%	\$2,963
1(a) Subtotal:						\$308,425

1(b) Local Payroll

	No. of Positions	Building	Annual Wages	Fringe Benefits	Total Personal Service Costs	Aid Eligible Percentage	Budget Request
7							
8							
9	6	All	\$272,725	\$190,908	\$463,633	67%	\$310,634
10							
11							
12							
1(b) Subtotal:							\$310,634

1(c) Supplies and Equipment

	Type of Material	Building	Quantity/Unit	Costs	Aid Eligible Percentage	Budget Request
13						
14	Housekeeping Supplies	Courthouse	1	\$6,950	68%	\$4,726
15						
16	Small Equipment	Courthouse	1	\$350	68%	\$238
17						
18						
					1(c) Subtotal:	\$4,964

1(d) - Total Cleaning Costs (1a+1b+1c): \$624,023

2 Trash Removal and Disposal

2(a) Trash Removal

	Contractor or Agency	Building	Quantity/Unit	Costs	Aid Eligible Percentage	Budget Request
19						
20	County Waste Service	Courthouse	1	\$6,750	68%	\$4,590
21	County Waste Service	Judicial Center	1	\$6,500	53%	\$3,445
22	County Waste Service	Family Courthouse	1	\$5,250	79%	\$4,148
23						
2(a) Total:						\$12,183

2(b) Trash Disposal

	Contractor or Agency	Building	Quantity/Unit	Costs	Aid Eligible Percentage	Budget Request
24						
25	N/A					
26						
27						
28						
2(b) Total:						\$0

2(c) - Total Trash Removal & Disposal (2a+2b): 2(c) **\$12,183**

3 HVAC Cleaning Costs

3(a) Duct Work Cleaning and Filter Changing By Service Contract

	Contractor	Type of Service	Building	Contract Amounts for Budget Period	Aid Eligible Percentage	Budget Request
29						
30		Duct Work/Filter Change	Judicial Center	\$0	53%	\$0
31		Duct Work/Filter Change	Courthouse	\$0	68%	\$0
32		Duct Work/Filter Change	Family Courthouse	\$0	79%	\$0
33						
34						
3(a) Subtotal:						\$0

3(b) Duct Work Cleaning and Filter Changing by Local Payroll

	No. of Positions	Building	Annual Wages	Fringe Benefits	Total Personal Service Costs	Aid Eligible Percentage	Budget Request
35							
36	1	Courthouse	\$3,200	\$2,112	\$5,312	68%	\$3,612
37							
38	1	Judicial Center	\$2,150	\$1,419	\$3,569	53%	\$1,892
39							
40	1	Family Courthouse	\$750	\$495	\$1,245	79%	\$984
3(b) Subtotal:							\$6,487

3(c) Filter Changing - Filters Only

	Type of Material	Building	Quantity/Unit	Costs	Aid Eligible Percentage	Budget Request
41						
42	Sock Filters	Courthouse	12	\$840	68%	\$6,854
43	Sock Filters	Judicial Center	6	\$420	53%	\$1,336
44	Sock Filters	Family Courthouse	6	\$420	79%	\$1,991
45						
46						
3(c) Subtotal:						\$10,181

3(d) Total HVAC Ductwork Cleaning & Filter Changing Costs (3a+3b+3c): 3(d) **\$16,668**

4 GRAND TOTAL - ALL "CLEANING COSTS":

Grand Total Boxes 1d + 2c + 3d: 4 **\$652,874**

5 Proposed "Tenant" Work

Use the following codes: a - Flooring and Carpeting
b - Painting
c - Interior Ceilings
d - Bathrooms
e - Fixtures
f - Minor Renovation
g - Other (Identify)

Work to be Performed:

	Code	Describe Work	Building	Wages	Fringe	Supplies	Total Costs	Aid Eligible Percentage	Budget Request
47	a/b/e/f/g	Continuous Facility Improvements and Updates	All				\$32,000	100%	\$32,000
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
Total (5):									\$32,000

6 TOTAL - 100% REIMBURSIBLE EXPENSES:
(Cleaning Costs & Tenant Work)

Total (4+5) 6: **\$684,874**

7 **Building and Property Maintenance:**

7(a) Service Contracts

Use Codes A-G:

a - Pest Control
b - Elevators
c - HVAC
d - Telephone Wiring

e - Security & Alarm Systems
f - Property Maintenance
g - Other (Identify)

	Code	Contractor	Type Work Performed	Building	Contract Amounts for Budget Period	Aid Eligible Percentage	Budget Request
58	A	Alleymor	Pest Control	Courthouse	\$1,000	68%	\$680
59	A	Alleymor	Pest Control	Family Courthouse	\$750	79%	\$593
60	A	Alleymor	Pest Control	Judicial Center	\$750	53%	\$398
61	B	Kone Elevator	Elevator Maintenance	Family Courthouse	\$12,225	79%	\$9,658
62	B	Kone Elevator	Elevator Maintenance	Judicial Center	\$21,250	53%	\$11,263
63	B	Kone Elevator	Elevator Maintenance	Courthouse	\$35,250	68%	\$23,970
64	C	BPI Mechanical, Gotham	HVAC Maintenance	Family Courthouse	\$12,125	79%	\$9,579
65	C	J Control & Eckert Mechanical	HVAC Maintenance	Judicial Center	\$25,575	53%	\$13,555
66	C	Eckert Mechanical	HVAC Maintenance	Courthouse	\$21,150	68%	\$14,382
67	E	Worksheet will provide info.	Security Alarm Services	FC - CH - JC	\$37,750	100%	\$37,750
68	G	Worksheet will provide info.	Others	FC - CH - JC	\$34,250	100%	\$34,250
7(a) Subtotal:							\$156,076

7(b) Local Payroll

	No. of Positions	Building	Annual Wages	Fringes	Total Costs	Aid Eligible Percentage	Budget Request
69							
70	4	All	\$203,284	\$142,299	\$345,583	67%	\$231,540
71							
72							
73							
74							
75							
76							
7(b) Subtotal:							\$231,540

7(c) Supplies and Equipment

	Type of Material	Building	Quantity/Unit	Costs	Aid Eligible Percentage	Budget Request
77	Maintenance Supplies & Equipment	Courthouse	1	\$12,500	68%	\$8,500
78	Maintenance Supplies & Equipment	Judicial Center	1	\$150	53%	\$80
79	Maintenance Supplies & Equipment	Family Courthouse	1	\$1,000	79%	\$790
80				\$0	0%	
81						
7(c) Subtotal:						\$9,370

7 (d) Total - Building and Property Maintenance Costs (7a+7b+7c) 7(d): **\$396,986**

8 Total - Building and Property Maintenance Costs: 8 **\$396,986**

9 Total Cost Reimbursable @ 25% = (Box 8 x 25%) 9 **\$99,246**

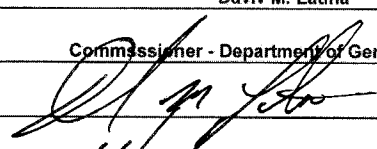
10 Total Proposed Direct Costs (Item 6 + Item 9): 10 **\$784,120**

11 Overhead Costs (Item 10 x .05): 11 **\$39,206**

12 Total Proposed Contract Amount (Item 10 + Item 11): 12 **\$823,326**

13 Local Government Certification:

I hereby certify that the cost estimates contained herein were developed using the best available information and that the proposed budget amounts are just, true and correct to the best of my knowledge.

Name: Daviv M. Latina
 Title: Commissioner - Department of General Services
 Signature: 
 Date: 4/28/2021

County or City: Albany County
 Address: 112 State Street - Room 1300
 Albany, New York 12207
 Phone: (518) 339-5108

ENDNOTES:

Use budget line numbers for reference and include remarks or explanations below.

Line No. Explanation:

CLAIM FOR PAYMENT

State of
New York

Vendor Information

Vendor Name COUNTY OF ALBANY		Vendor Identification Number 1000002428			
Address 112 State Street		City Albany	State NY	Zip Code 12207	
		Invoice Number			
Purchase Order No. and Date	Description of Materials/Service	Quantity	Unit	Price	Amount
	Municipal Reimbursement for Court Facilities Cleaning, Maintenance and Minor Repairs (CH686) pursuant to Contract UCS05-C300501-5000279 for Fiscal Year 2024-25 (April 1, 2024 thru March 31, 2025). Quarter: _____				\$
Vendor Certification I certify that the above bill is just, true and correct; that no pan thereof has been paid except as stated and that the balance is actually due and owing, and that taxes from which the State is exempt are excluded Commissioner _____ Vendor's Signature in Ink _____ Date _____ Title County of Albany _____ Name of Company				Total	\$
				Discount %	
				Net	\$

NYS Agency Information

Vendor Identification Number 1000002428		Vendor Location ID		Vendor Address Sequence	
Voucher ID	Business Unit Name Unified Court System - COJ	Bus. Unit UCS05	Interest Eligible (Y/N) N	Contract ID UCS05-C300501-5000279	
Payment Date (MM) (DD) (YY)		Liability Date (MM) (DD) (YY)		Merch/Inv. Rec'd Date (MM) (DD) (YY)	
Withholding Class	Withholding Amount	Handling Code	Payee Amount \$	Agency Internal Use	
Invoice Number			Invoice Date		

PeopleSoft Format Charge Lines (If Applicable)

Business Unit	Department	Program	Fund	Account
UCS05	5000280	54374	22501	60301
Budget Reference	Project ID	Activity	Class	Operating Unit
2024-25				113850
Product	Chartfield 1 - Accumulator	Chartfield 2 - Agency Use	Chartfield 3	Amount
				\$

Legacy Format Charge Lines (If Applicable)

Expenditures								Liquidation			
Dept	Cost Center	Var	Yr.	Object	Dept.	Statewide	Amount	Orig. Agency	PO/Contract	Line	F/P
Liability Date		From Date		TC	Subledger			Optional			

RESOLUTION NO. 164**AUTHORIZING AN AGREEMENT WITH THE NEW YORK STATE UNIFIED COURT SYSTEM REGARDING CUSTODIAL, BUILDING PREVENTIVE MAINTENANCE, AND REPAIR SERVICES FOR THE ALBANY COUNTY COURT HOUSE, JUDICIAL CENTER, AND FAMILY COURT FACILITIES**

Introduced: 4/8/24

By Public Works Committee:

WHEREAS, The Commissioner of the Department of General Services has requested authorization to enter into a five-year agreement with the New York State Unified Court System (NYSUCS) regarding reimbursement for custodial services, building preventive maintenance, and repair services for the Albany County Court House, Judicial Center, and Family Court facilities for a term commencing April 1, 2023 and ending March 31, 2028, with a provision for five separate one-year contracts for each year of the agreement, and

WHEREAS, Further legislative action will be required for each successive annual reimbursement, and

WHEREAS, NYSUCS will reimburse the County for said services in accordance with the terms included in the first year of the aforementioned agreement in the amount of \$819,763 commencing April 1, 2023 and ending March 31, 2024, now, therefore, be it

RESOLVED, By the Albany County Legislature that the County Executive is authorized to enter into a five-year agreement with NYSUCS for the provision of custodial services, building maintenance, and minor repairs at the aforementioned locations for a term commencing April 1, 2023 and ending March 31, 2028, with five separate one-year contracts provided for, and, be it further

RESOLVED, That the County Executive is further authorized to enter into the first year of the aforementioned five-year agreement with NYSUCS in the amount of \$819,763 for reimbursement of custodial services, building maintenance, and minor repairs for a term commencing April 1, 2023 and ending March 31, 2024, and, be it further

RESOLVED, That the County Attorney is authorized to approve said agreements as to form and content, and, be it further

RESOLVED, That the Clerk of the County Legislature is directed to forward certified copies of this resolution to the appropriate County Officials.

Adopted by unanimous vote – 4/8/24

State of New York
County of Albany

This is to certify that I, the undersigned, Clerk of the Albany County Legislature, have compared the foregoing copy of the resolution and/or local law with the original resolution and/or local law now on file in the office, and which was passed by the Legislature of said County on the 8th day of April, 2024, a majority of all members elected to the Legislature voting in favor thereof, and that the same is a correct and true transcript of such original resolution and/or local law and the whole thereof.



IN WITNESS THEREOF, I have hereunto set my hand and the official seal of the County Legislature this 11th day of April, 2024.

A handwritten signature in cursive script, reading "Nicole Chambers", is written over a horizontal line.

Clerk, Albany County Legislature



Daniel P. McCoy
County Executive

Mark S. Olsen
Executive Director

April 29th, 2025

The Honorable Joanne Cunningham
Chairwoman, Albany County Legislature
Legislative Clerk's Office
112 State Street, Suite 710
Albany, New York 12207

Dear Chairwoman Cunningham:

Shaker Place Rehabilitation and Nursing Center (SPRNC) respectfully requests approval of a contract for the general construction of a Café in the employee dining area. The Café is part of the Food Service and Distribution Equipment project in the 2026-2030 Albany County Capital Plan.

A Request for Bid (RFB) was solicited for the construction project, RFB #2025-30. There was one (1) responsible bidder for the general construction of the project, AOW Construction, LLC. The bid was submitted for \$390,690.00 with a 20% contingency allowance of \$78,138.00 for a total of \$468,828.00. The agreement will commence June 12th, 2025 and end June 11th, 2027.

If any additional information is required, please do not hesitate to contact me.

Sincerely,

Mark S. Olsen
Executive Director

cc: Dennis Feeney, Majority Leader
Frank Mauriello, Minority Leader
Rebekah Kennedy, Majority Counsel
James Curran, Minority Counsel





County of Albany

Harold L. Joyce
Albany County Office
Building
112 State Street - Albany,
NY 12207

Legislation Text

File #: TMP-6573, Version: 1

REQUEST FOR LEGISLATIVE ACTION

Description (e.g., Contract Authorization for Information Services):

CONTRACT AUTHORIZATION WITH AOW CONSTRUCTION, LLC FOR THE GENERAL CONSTRUCTION OF A CAFÉ AT SHAKER PLACE REHABILITATION AND NURSING CENTER.

Date: 4/30/2025
Department: Shaker Place Rehabilitation and Nursing Center
Attending Meeting: Mark S. Olsen
Submitted By: Shawn Thelen
Title: Deputy Executive Director
Phone: 518-447-7108

Purpose of Request: Contract Authorization two years

CONTRACT TERMS/CONDITIONS:

Party Names and Addresses: AOW Construction, LLC.
30 Essex Street, Albany NY 12206

Term: (Start/end date or duration) June 12th, 2025 through June 11th, 2027
Amount/Raise Schedule/Fee: **\$468,828.00**

BUDGET INFORMATION:

Is there a Fiscal Impact: Yes ☒ No ☐
Anticipated in Budget: Yes ☒ No ☐
Spreadsheet attached: Yes ☐ No ☒

Source of Funding - (Percentages)

Federal:	0	County:	100
State:	0	Local:	0

County Budget Accounts:

Revenue Account and Line:	Enter text.
Revenue Amount:	Enter text.
Appropriation Account and Line:	Enter text.
Appropriation Amount:	Enter text.

ADDITIONAL INFORMATION:

Mandated Program/Service: Yes ☐ No ☒

If Mandated, Cite Authority: Enter text.
Request for Bids / Proposals:
 Competitive Bidding Exempt: Yes ☐ No ☒
 # of Response(s): 1
 # of MWBE: 0
 # of Veteran Business: 0
Bond Resolution No.: Enter text.
Apprenticeship Program Yes ☒ No ☐

Previous requests for Identical or Similar Action:

Resolution/Law Number and Date: Enter text.

DESCRIPTION OF REQUEST: (state briefly why legislative action is requested)

Shaker Place Rehabilitation and Nursing Center (SPRNC) respectfully requests approval of a contract for the general construction of a Café in the employee dining area. The Café is part of the Food Service and Distribution Equipment project in the 2026-2030 Albany County Capital Plan.

COUNTY OF ALBANY

GC - BID FORM

BID IDENTIFICATION:

Title: **Shaker Place Café Project**
 Bid Number: **2025-030 - GC- General Construction**

THIS BID IS SUBMITTED TO:

Pamela O Neill, Purchasing Agent
 Albany County Department of General Services
 Purchasing Division
 112 State Street, Room 1000
 Albany, NY 12207

1. The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into a Contract with the owner in the form included in the Contract Documents to complete all Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with the Contract Documents.
2. BIDDER accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the Disposition of Bid Security. This Bid may remain open for ninety (90) days after the day of Bid opening. BIDDER will sign the Contract and submit the Contract Security and other documents required by the Contract Documents within fifteen days after the date of OWNER'S Notice of Award.
3. In submitting this Bid, BIDDER represents, as more fully set forth in this Contract, that:

- (a) BIDDER has examined copies of all the Contract Documents and of the following addenda: (If none, so state)

Date	Number
3/6/25	#1

(receipt of all of which is hereby acknowledged) and also copies of the Notice to Bidders and the Instructions to Bidders;

- (b) BIDDER has examined the site and locality where the Work is to be performed, the legal requirements (federal, state and local laws, ordinances, rules and regulations) and the conditions affecting cost, progress or performance of the Work and has made such independent investigations as BIDDER deems necessary;

BF1

- (c) This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; BIDDER has not directly or indirectly induced or solicited any other BIDDER to submit a false or sham Bid; BIDDER has not solicited or induced any person, firm or a corporation to refrain from bidding; and BIDDER has not sought by collusion to obtain for himself any advantage over any other Bidder or over the owner.

4. BIDDER will complete the Work for the following prices(s): (Attach Bid Proposal)
5. BIDDER agrees to commence the Work within the number of calendar days or by the specific date indicated in the Contract. BIDDER agrees that the Work will be completed within the number of Calendar days or by the specific date indicated in the contract.
6. The following documents are attached to and made a condition of this Bid:
- (a) Non-Collusive Bidding Certificate (Attachment "A")
 - (b) Acknowledgment by Bidder (Attachment "B")
 - (c) Vendor Responsibility Questionnaire (Attachment "C")
 - (d) Iranian Energy Divestment Certification (Attachment "D")
 - (e) MS-4-1 Certification Statement RE: Stormwater Discharges (Attachment "E")
 - (f) Bidder Qualification Questionnaire (Attachment "F")
 - (g) Non Interruption of Work Agreement (Attachment "G")
 - (h) Required Apprenticeship Training Program Documentation (refer to RFB Section 27)

7. Communication concerning this Bid shall be addressed to:

James A. Urner, Jr. - President

jurner@aowconstruction.com

Phone: 518-482-3400

8. Terms used in this Bid have the meanings assigned to them in the Contract and General Provisions.

COUNTY OF ALBANY

GC - BID FORM

BID IDENTIFICATION:

Title: Shaker Place Café Project
 Bid Number: 2025-030 - GC- General Construction

Conditions:

1. All bid prices must include all materials, labor, equipment, incidentals and other associated costs.
2. General Construction Base Bid work shall carry a 20% Base Bid Contingency Allowance for additional work discovered during construction beyond scope of work indicated on drawings and specifications. Contractor shall receive advance approval from the County Engineer prior to performing any additional work.

LUMP SUM BASE BID:

\$ 390,690 (a)

20 % CONTINGENCY ALLOWANCE:

\$ 77,810 (b)

TOTAL BASE BID (a) + (b):
(Base Bid + Contingency Allowance)

\$ 468,500

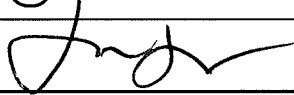
COUNTY OF ALBANY**BID FORM****BID IDENTIFICATION:**

Title: **Shaker Place Café Project**
Bid Number: **2025-030 - GC- General Construction**

COMPANY: AOW Construction, LLC
ADDRESS: 30 Essex Street
CITY, STATE, ZIP: Albany, NY 12206
TEL. NO.: 518-482-3400
FAX NO.: 518-482-3444
FEDERAL TAX ID NO.: 83-2875089

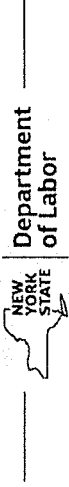
CERTIFICATE OF REGISTRATION NUMBER
(ARTICLE 8 PUBLIC WORK CONTRACTOR REGISTRY)

24-64NEY-CR

REPRESENTATIVE: James A. Urner, Jr.
E-MAIL: jurner@apwconstruction.com
SIGNATURE AND TITLE 
President

DATE 3/20/25

WE ARE YOUR DOL



DIVISION OF SAFETY AND HEALTH LICENSE AND CERTIFICATE UNIT, STATE OFFICE CAMPUS, BUILDING 12, ALBANY, NY 12226

CERTIFICATE OF CONTRACTOR REGISTRATION

This Certificate Entitles the Holder to Perform and Bid on Public Work and

Covered Private Construction Projects in the State of New York,

Subject to the Prevailing Wage Requirements of

NYS Labor Law Article 8

AOW CONSTRUCTION LLC

30 Essex Street

Albany, New York 12206

Phone Number: 5184823400

Registration Number: 24-64NEY-CR

Date of Issue: 2024-12-17

Expiration Date: 2026-12-29

(This license is valid only for the contractor named above)

Roberta Reardon
Commissioner

New York State Department of
Labor



Document A310™ – 2010

Conforms with The American Institute of Architects AIA Document 310

Bid Bond

Bond# AOWC3-18-25-1

CONTRACTOR:

(Name, legal status and address)

AOW Construction, LLC
30 Essex Street
Albany, NY 12206

SURETY:

(Name, legal status and principal place of business)

Travelers Casualty and Surety Company of America

One Tower Square
Hartford, CT 06183

Mailing Address for Notices

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

OWNER:

(Name, legal status and address)

County of Albany Department of General Services
112 State Street
Albany, NY 12207

BOND AMOUNT:

5%

Five Percent of Amount Bid

PROJECT:

(Name, location or address, and Project number, if any)

Shaker Place Cafe Project, RFB# 2025-030

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this 18th day of March, 2025.

(Witness)

AOW Construction, LLC

(Principal)

(Seal)

By:

(Title) James A. Urner Jr. President

Travelers Casualty and Surety Company of America

(Surety)

(Seal)

By:

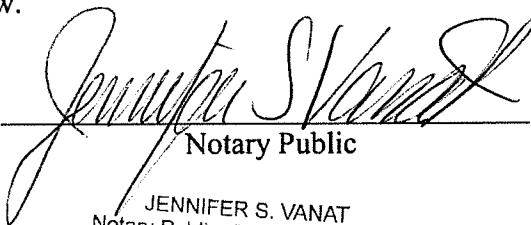
(Title) Renee A. Manny Attorney-in-Fact

(Witness)

ACKNOWLEDGMENT OF SURETY

State of New York)
County of Albany)

On this 18th day of March, 2025, before me personally appeared Renee A. Manny to me known, who, being by me duly sworn, did depose and say: that s/he resides at Rensselaer, NY, that s/he is the Attorney-In-Fact of Travelers Casualty and Surety Company of America, the corporation described in and which executed the annexed instrument; that s/he knows the corporate seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by order of the Board of Directors of said corporation; that s/he signed his/her name thereto by like order; and that the liabilities of said corporation do not exceed its assets as ascertained in the manner provided by law.


Notary Public

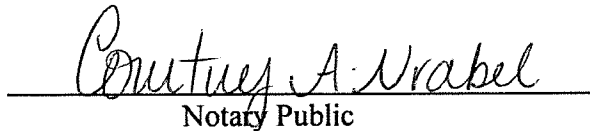
JENNIFER S. VANAT
Notary Public, State of New York
Qualified in Columbia County
Reg # 01VA6135808
Commission Expires Oct. 24, 2025

ACKNOWLEDGMENT OF CORPORATION

State of New York)
County of Albany)

On this 19th day of March, 2025, before me personally appeared James A. Urner, Jr. to me known, who being by me first duly sworn, did depose and say that s/he resides in Glenmont, N.Y. that s/he is the President of AOW Construction, LLC the corporation described in and which executed the foregoing instrument; that s/he knows the corporate seal of said corporation, that the corporate seal affixed to said instrument is such corporate seal, that it was so affixed by order and authority of the Board of directors of said corporation, and that s/he signed his/her name thereto by like order and authority.

Courtney A Vrabel
Notary Public, State of New York
Reg. No. 01VR6347773
Qualified in Schenectady County
Commission Expires 09/12/2028


Notary Public



Travelers Casualty and Surety Company of America
Travelers Casualty and Surety Company
St. Paul Fire and Marine Insurance Company

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company are corporations duly organized under the laws of the State of Connecticut (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint **Kevin Garrity, Christopher Terzian, Stephen J. Donnelly, Renee A. Manny, Lori Francett, Audrey J. Daniels, John F. Murray Jr., Jennifer S. Vanat, Casey W LaChapelle, and Maddalena Bucciero of Albany, New York** their true and lawful Attorney (s)-in-Fact to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in the business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

IN WITNESS WHEREOF, the Companies have caused this instrument to be signed, and their corporate seals to be hereto affixed, this **21st** day of **April**, 2021.

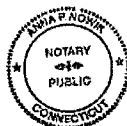
State of Connecticut

City of Hartford ss.

On this the **21st** day of **April**, 2021, before me personally appeared **Robert L. Raney**, who acknowledged himself to be the Senior Vice President of each of the Companies, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of said Companies by himself as a duly authorized officer.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

My Commission expires the **30th** day of **June**, 2026



Anna P. Nowik

Anna P. Nowik, Notary Public

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of each of the Companies, which resolutions are now in full force and effect, reading as follows:

RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

FURTHER RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

FURTHER RESOLVED, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

FURTHER RESOLVED, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, **Kevin E. Hughes**, the undersigned, Assistant Secretary of each of the Companies, do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which remains in full force and effect.

Dated this 18th day of March, 2025



Kevin E. Hughes

Kevin E. Hughes, Assistant Secretary

To verify the authenticity of this Power of Attorney, please call us at 1-800-421-3880.

Please refer to the above-named Attorney(s)-in-Fact and the details of the bond to which this Power of Attorney is attached.

TRAVELERS CASUALTY AND SURETY COMPANY OF AMERICA

HARTFORD, CONNECTICUT 06183

FINANCIAL STATEMENT AS OF JUNE 30, 2024

AS FILED IN THE STATE OF NEW YORK

CAPITAL STOCK \$ 6,480,000

ASSETS		LIABILITIES & SURPLUS	
BONDS	\$ 5,267,015,811	LOSSES	\$ 1,590,424,351
STOCKS	112,711,407	LOSS ADJUSTMENT EXPENSES	149,480,040
CASH AND INVESTED CASH	100,839,391	COMMISSIONS	40,934,764
OTHER INVESTED ASSETS	8,438,458	OTHER EXPENSES	43,004,640
SECURITIES LENDING REINVESTED COLLATERAL ASSETS	6,187,377	TAXES, LICENSES AND FEES	13,292,018
INVESTMENT INCOME DUE AND ACCRUED	43,484,130	UNEARNED PREMIUMS	1,581,422,838
PREMIUM BALANCES	377,822,041	ADVANCE PREMIUM	2,249,301
REINSURANCE RECOVERABLE	80,794,793	POLICYHOLDER DIVIDENDS	24,705,696
NET DEFERRED TAX ASSET	75,333,829	CEDED REINSURANCE NET PREMIUMS PAYABLE	81,537,271
GUARANTY FUNDS RECEIVABLE OR ON DEPOSIT	2,005,930	CURRENT FEDERAL AND FOREIGN INCOME TAXES	3,870,451
RECEIVABLE FROM PARENTS, SUBSIDIARIES AND AFFILIATES	80,016,296	AMOUNTS WITHHELD / RETAINED BY COMPANY FOR OTHERS	18,802,427
OTHER ASSETS	1,442,323	REMITTANCES AND ITEMS NOT ALLOCATED	8,424,672
		PROVISION FOR REINSURANCE	9,891,783
		PAYABLE FOR SECURITIES LENDING	6,187,377
		OTHER ACCRUED EXPENSES AND LIABILITIES	369,797
		TOTAL LIABILITIES	\$ 3,574,577,426
		CAPITAL STOCK	\$ 6,480,000
		PAID IN SURPLUS	433,803,760
		OTHER SURPLUS	2,141,230,599
		TOTAL SURPLUS TO POLICYHOLDERS	\$ 2,581,514,359
TOTAL ASSETS	\$ 6,156,091,785	TOTAL LIABILITIES & SURPLUS	\$ 6,156,091,785

STATE OF CONNECTICUT)
COUNTY OF HARTFORD) SS.
CITY OF HARTFORD)

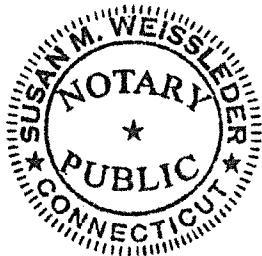
MICHAEL J. DOODY, BEING DULY SWORN, SAYS THAT HE IS VICE PRESIDENT - FINANCE, OF TRAVELERS CASUALTY AND SURETY COMPANY OF AMERICA, AND THAT TO THE BEST OF HIS KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT STATEMENT OF THE FINANCIAL CONDITION OF SAID COMPANY AS OF THE 30TH DAY OF JUNE, 2024.

Michael J. Doody
VICE PRESIDENT - FINANCE

SUBSCRIBED AND SWORN TO BEFORE ME THIS
16TH DAY OF AUGUST, 2024

Susan M. Weissleder
NOTARY PUBLIC

SUSAN M. WEISSLEDER
Notary Public
My Commission Expires November 30, 2027



ATTACHMENT "A"
NON-COLLUSIVE BIDDING CERTIFICATE PURSUANT TO
SECTION 103-D OF THE NEW YORK STATE GENERAL MUNICIPAL LAW

A. By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid, each party thereto certifies as to its own organizations, under penalty of perjury, that to the best of knowledge and belief:

(1) The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor.

(2) Unless otherwise required by law, the prices which have been quoted in this bid have not knowingly been disclosed by the bidder and will not knowingly be disclosed by the bidder, directly or indirectly, prior to opening, to any bidder or to any competitor.

(3) No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

A bid shall not be considered for award nor shall any award be made where (1), (2), and (3) above have not been complied with; provided, however, that in any case the bidder cannot make the foregoing certification, the bidder shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons thereof. Where (1), (2), and (3) above have not been complied with, the bid shall not be considered for any award nor shall any award be made unless the head of the Purchasing Unit to the political subdivision, public department, agency or official thereof to which the bid is made, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

The fact that a bidder (a) has published price lists, rates, or tariffs covering items being procured, (b) has informed prospective customer of proposed or pending publication of new or revised price lists for such items, or (c) has sold the same items to other customers at the same prices being bid, does not constitute, without more, a disclosure within the meaning of paragraph "A" above.

B. Any bid hereafter made to any political subdivision of the state or any public department, agency or official thereof by a corporate bidder for work or services performed or to be performed or goods sold or to be sold, where competitive bidding is required by statute, rule, regulation, local law, and where such bid contains the certification referred to in paragraph "A" of this section, shall be deemed to have been authorized by the Board of Directors of the bidder, and such authorization shall be deemed to include the submission of the bid and the inclusion therein of the certificate as to non-collusion as the act and deed of the corporation



Signature

President

Title

AOW Construction, LLC

Company Name

3/20/25

Date

ATTACHMENT "B" **ACKNOWLEDGMENT BY BIDDER**

If Individual or Individuals:

STATE OF _____)
COUNTY OF _____) SS.:

On this _____ day of _____, 200__, before me personally appeared _____ to me known and known to me to be the same person(s) described in and who executed the within instrument, and he (or they severally) acknowledged to me that he (or they) executed the same.

Notary Public, State of _____

Qualified in _____

Commission Expires _____

If Corporation:

STATE OF New York)
COUNTY OF Albany) SS.:

On this 20th day of March, 2025, before me personally appeared James A. Urner, Jr. to me known, who, being by me sworn, did say that he resides at (give address) Glenmont, NY that he ~~the~~ (give title) President of the (name of corporation) AOW Construction, LLC, the corporation described in and which executed the above instrument; that he knows the seal of the corporation, and that the seal affixed to the instrument is such corporate seal; that it was so affixed by order of the board of directors of the corporation, and that he signed his name thereto by like order.

Courtney A Vrabel
Notary Public, State of New York
Reg. No. 01VR6347773
Qualified in Schenectady County
Commission Expires 09/12/2028

Courtney A Vrabel

Notary Public, State of New York

Qualified in Schenectady

Commission Expires September 12, 2028

If Partnership:

STATE OF _____)
COUNTY OF _____) SS.:

On the _____ day of _____, 200__, before me personally came _____ to me known to be the individual who executed the foregoing, and who, being duly sworn, did depose and say that he / she is a partner of the firm of _____ and that he / she has the authority to sign the same, and acknowledged that he / she executed the same as the act and deed of said partnership.

Notary Public, State of _____

Qualified in _____

Commission Expires _____

ATTACHMENT "C"
ALBANY COUNTY
VENDOR RESPONSIBILITY QUESTIONNAIRE

1. VENDOR IS: ☒ PRIME CONTRACTOR		
2. VENDOR'S LEGAL BUSINESS NAME AOW Construction, LLC	3. IDENTIFICATION NUMBERS a) FEIN # 83-2875089 b) DUNS #	
4. D/B/A – Doing Business As (if applicable) & COUNTY FIELD: 30 Essex Street, Albany, NY 12206	5. WEBSITE ADDRESS (if applicable) www.aowconstruction.com	
6. ADDRESS OF PRIMARY PLACE OF BUSINESS/EXECUTIVE OFFICE	7. TELEPHONE NUMBER 518-482-3400	8. FAX NUMBER 518-482-3444
9. ADDRESS OF PRIMARY PLACE OF BUSINESS/EXECUTIVE OFFICE <i>IN NEW YORK STATE, if different from above</i>	10. TELEPHONE NUMBER	11. FAX NUMBER
12. AUTHORIZED CONTACT FOR THIS QUESTIONNAIRE Name James A. Urner, Jr. Title President Telephone Number 518-512-5500 Fax Number 518-482-3444 e-mail jurner@aowconstruction.com		
13. LIST ALL OF THE VENDOR'S PRINCIPAL OWNERS.		
a) NAME James A. Urner, Jr.	TITLE President	b) NAME Craig Kennedy
c) NAME Nicole Armsby	TITLE Treasurer	d) NAME Debra Oliver
TITLE Vice President		
TITLE Secretary		
A DETAILED EXPLANATION IS REQUIRED FOR EACH QUESTION ANSWERED WITH A "YES," AND MUST BE PROVIDED AS AN ATTACHMENT TO THE COMPLETED QUESTIONNAIRE. YOU MUST PROVIDE ADEQUATE DETAILS OR DOCUMENTS TO AID THE COUNTY IN MAKING A DETERMINATION OF VENDOR RESPONSIBILITY. PLEASE NUMBER EACH RESPONSE TO MATCH THE QUESTION NUMBER.		
14. DOES THE VENDOR USE, OR HAS IT USED IN THE PAST FIVE (5) YEARS, ANY OTHER BUSINESS NAME, FEIN, or D/B/A OTHER THAN THOSE LISTED IN ITEMS 2-4 ABOVE? List all other business name(s), Federal Employer Identification Number(s) or any D/B/A names and the dates that these names or numbers were/are in use. Explain the relationship to the vendor. ☐ Yes ☒ No		
15. ARE THERE ANY INDIVIDUALS NOW SERVING IN A MANAGERIAL OR CONSULTING CAPACITY TO THE VENDOR, INCLUDING PRICIPAL OWNERS AND OFFICERS, WHO NOW SERVE OR IN THE PAST ONE (1) YEARS HAVE SERVED AS: a) An elected or appointed public official or officer? <i>List each individual's name, business title, the name of the organization and position elected or appointed to, and dates of service</i> ☐ Yes ☒ No b) An officer of any political party organization in Albany County, whether paid or unpaid? <i>List each individuals name, business title or consulting capacity and the official political position held with applicable service dates.</i> ☐ Yes ☒ No		

16.	WITHIN THE PAST (5) YEARS, HAS THE VENDOR, ANY INDIVIDUALS SERVING IN MANAGERIAL OR CONSULTING CAPACITY, PRINCIPAL OWNERS, OFFICERS, MAJOR STOCKHOLDER(S) (10% OR MORE OF THE VOTING SHARES FOR PUBLICLY TRADED COMPANIES, 25% OR MORE OF THE SHARES FOR ALL OTHER COMPANIES), AFFILIATE OR ANY PERSON INVOLVED IN THE BIDDING OR CONTRACTING PROCESS:	☐ Yes ☒ No
a)	1. been suspended, debarred or terminated by a local, state or federal authority in connection with a contract or contracting process; 2. been disqualified for cause as a bidder on any permit, license, concession franchise or lease; 3. entered into an agreement to a voluntary exclusion from bidding/contracting; 4. had a bid rejected on an Albany County contract for failure to comply with the MacBride Fair Employment Principles; 5. had a low bid rejected on a local, state or federal contract for failure to meet statutory affirmative action or M/WBE requirements on a previously held contract; 6. had status as a Women's Business Enterprise, Minority Business Enterprise or Disadvantaged Business Enterprise, de-certified, revoked or forfeited; 7. been subject to an administrative proceeding or civil action seeking specific performance or restitution in connection with any local, state or federal government contract; 8. been denied an award of a local, state or federal government contract, had a contract suspended or had a contract terminated for non-responsibility; or 9. had a local, state or federal government contract suspended or terminated for cause prior to the completion of the term of the contract.	☐ Yes ☒ No
b)	been indicted, convicted, received a judgment against them or a grant of immunity for any business-related conduct constituting a crime under local, state or federal law including but not limited to, fraud extortion, bribery, racketeering, price-fixing, bid collusion or any crime related to truthfulness and/or business conduct?	☐ Yes ☒ No
c)	been issued a citation, notice, violation order, or are pending an administrative hearing or proceeding or determination of violations of: 1. federal, state or local health laws, rules or regulations.	☐ Yes ☒ No
17.	IN THE PAST THREE (3) YEARS, HAS THE VENDOR OR ITS AFFILIATES HAD ANY CLAIMS, JUDGMENTS, INJUNCTIONS, LIENS, FINES OR PENALTIES SECURED BY ANY GOVERNMENTAL AGENCY? Indicate if this is applicable to the submitting vendor or affiliate. State whether the situation(s) was a claim, judgment, injunction, lien or other with an explanation. Provide the name(s) and address(es) of the agency, the amount of the original obligation and outstanding balance. If any of these items are open, unsatisfied, indicate the status of each item as "open" or "unsatisfied."	☐ Yes ☒ No
18.	DURING THE PAST THREE (3) YEARS, HAS THE VENDOR FAILED TO: a) file returns or pay any applicable federal, state or city taxes? <i>Identify the taxing jurisdiction, type of tax, liability year(s), and tax liability amount the vendor failed to file/pay and the current status of the liability.</i> b) file returns or pay New York State unemployment insurance? <i>Indicate the years the vendor failed to file/pay the insurance and the current status of the liability.</i> c) Property Tax <i>Indicate the years the vendor failed to file.</i>	☐ Yes ☒ No ☐ Yes ☒ No ☐ Yes ☒ No
19.	HAVE ANY BANKRUPTCY PROCEEDINGS BEEN INITIATED BY OR AGAINST THE VENDOR OR ITS AFFILIATES WITHIN THE PAST SEVEN (7) YEARS (WHETHER OR NOT CLOSED) OR IS ANY BANKRUPTCY PROCEEDING PENDING BY OR AGAINST THE VENDOR OR ITS AFFILIATES REGARDLESS OF THE DATE OF FILING? Indicate if this is applicable to the submitting vendor or affiliate. If it is an affiliate, include the affiliate's name and FEIN. Provide the court name, address and docket number. Indicate if the proceedings have been initiated, remain pending or have been closed. If closed, provide the date closed.	☐ Yes ☒ No
20.	IS THE VENDOR CURRENTLY INSOLVENT, OR DOES VENDOR CURRENTLY HAVE REASON TO BELIEVE THAT AN INVOLUNTARY BANKRUPTCY PROCEEDING MAY BE BROUGHT AGAINST IT? Provide financial information to support the vendor's current position, for example, Current Ratio, Debt Ratio, Age of Accounts Payable, Cash Flow and any documents that will provide the agency with an understanding of the vendor's situation.	☐ Yes ☒ No

21. IN THE PAST FIVE (5) YEARS, HAS THE VENDOR OR ANY AFFILIATES¹ :

☐ Yes ☒ No

a) defaulted or been terminated on, or had its surety called upon to complete, any contract (public or private) awarded;

Indicate if this is applicable to the submitting vendor or affiliate. Detail the situation(s) that gave rise to the negative action, any corrective action taken by the vendor and the name of the contracting agency.

¹ "Affiliate" meaning: (a) any entity in which the vendor owns more than 50% of the voting stock; (b) any individual, entity or group of principal owners or officers who own more than 50% of the voting stock of the vendor; or (c) any entity whose voting stock is more than 50% owned by the same individual, entity or group described in clause (b). In addition, if a vendor owns less than 50% of the voting stock of another entity, but directs or has the right to direct such entity's daily operations, that entity will be an "affiliate" for purposes of this questionnaire.

**ALBANY COUNTY
VENDOR RESPONSIBILITY QUESTIONNAIRE**

FEIN # 83-2875089

State of: New York)
) ss:
County of: Albany)

CERTIFICATION:

The undersigned: recognizes that this questionnaire is submitted for the express purpose of assisting the County of Albany in making a determination regarding an award of contract or approval of a subcontract; acknowledges that the County may in its discretion, by means which it may choose, verify the truth and accuracy of all statements made herein; acknowledges that intentional submission of false or misleading information may constitute a felony under Penal Law Section 210.40 or a misdemeanor under Penal Law Section 210.35 or Section 210.45, and may also be punishable by a fine and/or imprisonment of up to five years under 18 USC Section 1001 and may result in contract termination; and states that the information submitted in this questionnaire and any attached pages is true, accurate and complete.

The undersigned certifies that he/she:

- Has not altered the content of the questions in the questionnaire in any manner;
- Has read and understands all of the items contained in the questionnaire and any pages attached by the submitting vendor;
- Has supplied full and complete responses to each item therein to the best of his/her knowledge, information and belief;
- Is knowledgeable about the submitting vendor's business and operations;
- Understands that Albany County will rely on the information supplied in the questionnaire when entering into a contract with the vendor;
- Is under duty to notify the Albany County Purchasing Division of any material changes to the vendor's responses.

Name of Business AOW Construction, LLC

Signature of Owner

Address 30 Essex Street

Printed Name of Signatory James A. Urner, Jr.

City, State, Zip Albany, NY 12206

Title President

Sworn before me this 20th day of March, 2025

Courtney A Vrabel
Notary Public

Courtney A Vrabel
Notary Public, State of New York
Reg. No. 01VR6347773
Qualified in Schenectady County
Commission Expires 09/12/2028

Nicole Armsby - Treasurer

Printed Name

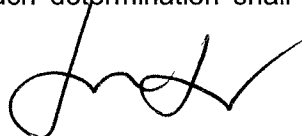
Signature

March 20, 2025

Date

Attachment "D"
Certification Pursuant to Section 103-g
Of the New York State
General Municipal Law

- A. By submission of this bid/proposal, each bidder/proposer and each person signing on behalf of any bidder/proposer certifies, and in the case of a joint bid, each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that each bidder is not on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the New York State Finance Law.
- B. A Bid/Proposal shall not be considered for award, nor shall any award be made where the condition set forth in Paragraph A above has not been complied with; provided, however, that in any case the bidder/proposer cannot make the foregoing certification set forth in Paragraph A above, the bidder/proposer shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons therefor. Where Paragraph A above cannot be complied with, the Purchasing Unit to the political subdivision, public department, agency or official thereof to which the bid/proposal is made, or his designee, may award a bid/proposal, on a case by case business under the following circumstances:
1. The investment activities in Iran were made before April 12, 2012, the investment activities in Iran have not been expanded or renewed after April 12, 2012, and the Bidder/Proposer has adopted, publicized and is implementing a formal plan to cease the investment activities in Iran and to refrain from engaging in any new investments in Iran; or
 2. The political subdivision makes a determination that the goods or services are necessary for the political subdivision to perform its functions and that, absent such an exemption, the political subdivision would be unable to obtain the goods or services for which the contract is offered. Such determination shall be made in writing and shall be a public document.



Signature

President

Title

AOW Construction, LLC

Company Name

3/20/2025

Date

ATTACHMENT "E"**Sheet MS4-1: Bidder/Proposer Certification Statement (to be used with Section 34 Part A – General Contracts)**

As a bidder seeking to provide services on behalf of Albany County, I certify under penalty of law that I understand and agree to comply with the terms and conditions of the New York State Pollutant Discharge Elimination System ("SPDES") General Permit for Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4 Permit) and Albany County Local Law 7 of 2007, and agree to implement any Best Management Practices or corrective actions identified by Albany County or an authorized representative thereof as necessary to maintain compliance. I understand that Albany County must comply with the terms and conditions of the aforementioned MS4 Permit, and that it is unlawful for any person to directly or indirectly cause or contribute to a violation of water quality standards. I am also aware that County Local Law 7 of 2007 prohibits any activities that cause or contribute to a violation of the County's SPDES permit. Further, I understand that any non-compliance by Albany County will not diminish, eliminate or lessen my own liability.

Name of Third Party Entity: AOW Construction, LLC

Address: 30 Essex Street

Albany, NY 12206

Phone Number(s): 518-482-3400

Description of activities to be performed by your firm or organization within Albany County are related to the Albany County Storm Water Management Program (SWMP) (include any activities that have the potential to generate or prevent pollution and/or affect water quality):

Description of where the work is to be performed within Albany County facilities:

Shaker Place Nursing and Rehabilitation Center, 100 Heritage Lane, Albany, NY 12211

Signature

James A. Urner, Jr.

Printed Name

President

Title

March 20, 2025

Date

ATTACHMENT "F"
BIDDER QUALIFICATION QUESTIONNAIRE

The undersigned guarantees the accuracy of all statements and answers herein contained. (Please print in ink or type in the spaces provided). Attach additional sheets if necessary. This statement of Bidder's qualifications is required of all Bidders. Additional data on Bidder's qualifications may be requested from selected Bidders after the Bid opening.

1. How many years has your firm been in business? 5 years

2. List up to three (3) projects of this nature that you have completed in the last three (3) years, and give the name, address and telephone number of a reference from each. Also give the completion date, the original contract bid price and the completed cost of each project listed.

1. See Attached

2.

3.

ATTACHMENT "F"
BIDDER QUALIFICATION QUESTIONNAIRE

3. List projects presently under contract by your firm, the dollar volume of the contract and the percentage completion of the contract.

See Attached

4. Has your firm ever failed to complete work awarded to it, if so, state where and why.

No

5. Is your firm presently or has your firm ever been a party defendant in a lawsuit commenced against your firm alleging failure to properly complete work in accordance with the contract for same; if so, give details.

No

ATTACHMENT " F "
BIDDER QUALIFICATION QUESTIONNAIRE

6. Has your firm received two (2) final determinations within any consecutive six-year period, the second final determination occurring within the past five (5) years, that your firm willfully failed to pay the prevailing rate of wages or to provide supplements with Article 8 of the Labor Law, if so, give details.

No

7. Do you plan to sublet any part of this work? If so, give details.

No

8. Give the name, address and telephone number of an individual who represents each of the following and whom the Owner may contact to investigate your financial responsibility: a surety, and a bank.

Patty Erwin, Vice President, NBT Bank, North America, 80 Wolf Road, Suite 101, Albany, NY 12205 518-437-4107

Casey LaChapelle, Vice President, Surety & Construction Services, NFP, 159 Wolf Road, Albany, NY 12205 518-244-4320

BQ3

ATTACHMENT "F"
BIDDER QUALIFICATION QUESTIONNAIRE

9. Give a summary of your financial statement. (List assets and liabilities, use an insert sheet, if needed).

See Attached

10. State the true, exact, correct and complete name of the partnership, corporation or trade name under which you do business, and the address of the place of business. (If a corporation, state the name and title of all officers. If a partnership, state the name of all partners. If a trade name, state the names of the individuals who do business under the trade name.) It is absolutely necessary that information be furnished.

AOW Construction LLC

Correct Name of Bidder

(a) The business is a: **Corporation**

(b) The address of principal place of business is: **30 Essex Street, Albany, NY 12206**

(c) The names of the corporate officers, or partners, or individuals doing business under a trade name, are as follows:

James A. Urner, Jr. - President, Craig Kennedy - VP,

Nicole Armsby - Treasurer & Debra Oliver - Secretary

ATTACHMENT " F "
BIDDER QUALIFICATION QUESTIONNAIRE

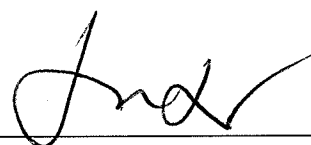
11. Is your firm qualified to do business in the State of New York? Yes ☒ No ____.
- If No, signing this qualification statement constitutes agreement to obtain such qualification prior to award of contract immediately upon owner's request.

AOW Construction, LLC

Firm

Dated: 3/20/2025

By



James A. Urner, Jr

(Typed)



Design-Construct
Construction Management
General Construction

AOW Construction
30 Essex Street
Albany, New York 12206

Major Projects Completed - Last 5 Years - Last Updated 31 December, 2024									
Project Name/Owner/Contact	AOW Construction Role	Contact Phone Number	Contact Email	Architect	Architect Phone Number	Contract Award Date	Date Completed	Contract Amount	% Complete with Own Forces
Steamboat Phase I Renovations / AHA / Tim O'Byrne	Prime	(518)641.7536	TOByrne@AlbanyHousing.org	SWBR	(315)488.5635	Oct-22	Jul-24	\$31,308,500	12%
Albany High School Phase 3 Addition and Renovation / Turner (CM) / Bill Steele	Subcontractor to AOW Associates	(518)419.0664	wsteele@tcco.com	CS Arch	(518)463.0868	Jul-20	Oct-23	\$27,747,100	15%
Martin Luther King Phase II / THA / Deb Witkowski	Subcontractor to AOW Associates	(518)273.3600	deb.witowski@trovhousing.org	RIDA Architecture	(518)713.4537	Aug-19	Nov-20	\$11,558,800	20%
SUNY Albany Campus Building 35 Renovation / SUNY / John Baldwin	Subcontractor to AOW Associates	(518)442.3874	lbaldwin@albany.edu	JMZ Architects & Planners	(518)793.0786	Apr-20	Jun-22	\$9,071,400	20%
Whiteface Mid-Station Lodge (Gilbane - CM) / ORDA / Bob Hammond	Subcontractor to AOW Associates	(518)302.5332	bhammond@orda.org	AES Northeast	(518)561.1598	Jul-20	Apr-22	\$7,349,000	25%
Health & Stern Building / HVCC / Steve Cowan	Prime	(518)857.5409	s.cowan@hvcc.edu	Mosaic Associates	(518)479.4000	Apr-22	Oct-23	\$6,441,100	15%
SUNY Albany Lecture Center Phase IV / SUCF / Michelle Grant	Subcontractor to AOW Associates	(518)320.3235	Michelle.Grant@suny.edu	Architecture +	(518)272.4481	Jan-22	Jan-24	\$5,871,700	20%
Eastern Star Home/Jeffrey French	Subcontractor to AOW Associates	(315)736.9311	jfrench@eshomeny.org	John W Baumgarten Architect PC	(516)939.2383	May-18	Aug-21	\$5,840,700	15%
911 Public Safety Building / Albany County Sheriff / Michael Martin	Subcontractor to AOW Associates	(518)447.7032	mmartin@albanycounty.com	SEI Design Group	(585)442.7010	9/1/2021	Apr-23	\$4,964,100	20%
Fort Hudson Nursing Renovation / Fort Hudson Network/ Andrew Cruikshank	Subcontractor to AOW Associates	(518)747.2811	acruikshank@forthudson.com	Angerame Architects	(518)454.9333	Dec-16	Dec-20	\$4,904,100	20%
Farren Care Center Demolition / SPHP / Michael Tierney	Prime	(518)525.3111	Michael.Tierney@sphp.com	Cannon Design	(617)742.5440	Oct-22	Apr-24	\$4,754,900	5%
5th Floor Renovation / SUCF / Natalie Christman	Subcontractor to AOW Associates	(518)813.7196	natalie.christman@suny.edu	Holt Architects	(607)273.7600	Sep-22	Apr-24	\$4,370,400	15%
5th Floor Renovation / SUCF / Natalie Christman	Subcontractor to AOW Associates	(518)813.7196	natalie.christman@suny.edu	Holt Architects	(607)273.7600	Oct-22	Apr-24	\$4,317,000	15%
Wilton Primary Care Phases 2 & 3 / Saratoga Hospital / Jeff Casale	Prime	(518)583.8457	jcasale@saratogahospital.org	SMRT Architects & Engineers	(877)700.7678	Aug-21	Jun-22	\$4,036,500	30%



Design-Construct
Construction Management
General Construction

AOW Construction
30 Essex Street
Albany, New York 12206

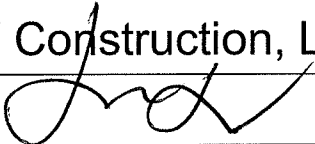
Major Projects in Progress - Last Updated 31 December, 2024									
Project Name/Owner/Contact	AOW Construction Role	Contact Phone Number	Contact Email	Architect	Architect Phone Number	Contract Award Date	Contract Value	% Complete	Anticipated Completion Date
Renovate Former Albany High School Building - Phase II / Doug Dickinson (CS Arch)	Prime	(518)898.9826	ddickinson@csarchpc.com	CS Arch	(518)898.9826	Jul-24	\$32,631,800	5%	Aug-26
Albany High School Phase 4 Additions and Renovations / Turner (CM) / John Hunt	Prime	(518)419.5101	johunt@tcco.com	CS Arch	(518)463.0868	May-23	\$21,591,700	82%	Aug-25
Albany County Airport Concourse A Rehabilitation / Turner (CM) / Robert Wagner	Prime	(518)432.0277	rwagner@tcco.com	Franklin McCredie Architecture	(617)350.7900	Jul-24	\$12,733,800	17%	Jul-26
Sunnyview Hospital Renovation / SPHP / Jonathan Otterbeck	Prime	(518)525.3110	Jonathan.Otterbeck@sphp.com	Hyman Hayes Associates	(518)452.3740	Feb-22	\$8,792,400	97%	Mar-25
Shaker Place Vehicle Storage Facility / Albany County/John Neri	Prime	(518)447.5562	John.Neri@albanycountyny.gov	Angerame Architects	(518)454.9300	Mar-24	\$7,967,900	75%	Apr-25
SUNY Albany PAC Electrical System Upgrade Phase 1 / David LaComb	Prime	(518)442.3400	dlacomb@albany.edu	ME Engineering	(518)533-2171	Jul-24	\$6,271,900	5%	Nov-25
SUNY Albany Lecture Center Phase V / SUNY / John Baldwin	Prime	(518)442.3874	jlbaldwin@albany.edu	Architecture +	(518)272.4481	Aug-23	\$5,337,800	98%	Jan-25
Beverwyck Modernization / SPHP / David Wendth	Prime	(518)271.5024	David.Wendth@sphp.com	Richard E Jones Associates	(518)793.1015	Sep-22	\$4,252,300	95%	Apr-25
Glen Eddy Modernization & ALU / SPHP / Michael Tierney	Prime	(518)525.3111	Michael.Tierney@sphp.com	Richard E Jones Associates	(518)793.1015	Sep-22	\$3,988,100	98%	Mar-25
Ray Wemple Memorial Rink/ Schenectady County/Erin Reich	Prime	(518)338.8026	Erin.reich@schenectadycountyny.gov	C2 Design Group	(518)320.8250	Mar-24	\$3,607,700	93%	Apr-25
Proctors American Theater - Troy/ Proctors/ Philip Morris	Prime	(518)382.3884	info@proctors.org	SWBR	(518)618.0900	Jun-25	\$3,550,000	0%	Dec-25
SUNY Albany Livingston Tower Refresh/ DASNY/John Olzewski	Prime	(518)442.3353	jolzewski@dasny.org	CHA	(518)453.4500	Apr-24	\$3,445,600	99%	Jan-25
4th Floor Renovation / SUCE / Brian Parlman	Prime	(518)320.1721	Brian.Parlman@suny.edu	Ashley McGraw	(315)425.1811	Feb-25	\$3,257,800	0%	Nov-25

ATTACHMENT " G "
NON-INTERRUPTION OF WORK AGREEMENT

By submission of the bid for:

The bidder agrees that if this bid is accepted, he/she will not intentionally engage in any course of conduct or activity, or employ for the purposes of performing the public work, any subcontractors, employees, labor or materials which will or may result in the interruption of the performance of the public work due to labor strife or unrest by workmen employed by the bidder or by any of the trades working in or about the public works and/or premises where the work is being performed.

Firm: AOW Construction, LLC

By: 
(Signature)

James A. Urner, Jr.

(Typed)

Title: President

Date: 3/20/2025

RFB-2025-030 Bid Tabulation General Construction
Shaker Place Café Project

Bidder	AOW Construction	
Lump Sum Bid	\$ 390,690.00	
20% Contingency	\$ 78,138.00	
Total Bid Amount	\$ 468,828.00	

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**ALBANY COUNTY SHAKER PLACE REHABILITATION
& NURSING CENTER CAFÉ RENOVATION
ALBANY, NEW YORK**

October 6, 2023

OWNER

County of Albany
Shaker Place Nursing Home
Albany, New York

ARCHITECT

Angerame Architects, P.C.
30 Essex Street
Albany, New York 12206
(518) 454-9300

STRUCTURAL ENGINEER

MRH Engineering, P.C.
20 Bayberry Drive
Queensbury, New York 12804
(518) 792-4042

**MECHANICAL/PLUMBING/
ELECTRICAL ENGINEER**

Engineered Solutions
646 Plank Road, #104
Clifton Park, New York 12065
(518) 280-2410

NOTICE TO BIDDERS -- ALBANY COUNTY
REQUEST FOR BIDS #2024-150

Sealed Bids for Shaker Place Café Project as requested by Shaker Place Nursing and Rehabilitation Center will be received by the Albany County Purchasing Agent, Room 1000, 112 State Street, Albany, New York 12207 until 11:00 AM, local time on Thursday, _____.

Request for Bid (RFB) documents may be obtained at the office of the Albany County Purchasing Agent, as noted above. RFB documents may be available for download from the Empire State Bid System website at <http://www.empirestatebidsystem.com> starting by close of business (4:30 p.m.) on **(insert publish date)**.

A site visit will be held (insert date, time and location). This is the only scheduled site visit. Interested bidders are strongly urged to attend.

Pamela O Neill
Purchasing Agent

Dated: Albany, New York
(insert today's date)

PUBLISH ONE DAY – (insert publish date) -- THE EVANGELIST
PUBLISH ONE DAY – (insert publish date) -- THE TIMES UNION

**COUNTY OF ALBANY
DEPARTMENT OF GENERAL SERVICES PURCHASING DIVISION
112 STATE STREET, ROOM 1000, ALBANY, NY 12207
TELEPHONE: 518-447-7140/ FAX: 518-447-5588
Pamela.oneill@albanycountyny.gov**

TITLE: Shaker Place Café Project RFB NUMBER: 2024-150

Receipt Confirmation Form

Please complete and return this confirmation form as soon as possible:

Pamela O Neill
Purchasing Agent
County of Albany
112 State Street, Room 1000
Albany, NY 12207

**IF YOU PLAN TO SUBMIT A BID, YOU MUST RETURN
THIS FORM TO ENSURE THAT YOU WILL RECEIVE ALL
FURTHER COMMUNICATION REGARDING THIS RFB.**

Company Name: _____

Address: _____

City: _____ State: _____ Zip Code: _____

Contact Person: _____

Title: _____

Phone Number: _____ Fax Number: _____ E-Mail: _____

If a Bidders/Proposers meeting has been arranged for this Bid/RFP, please indicate if you plan to attend:
☐ **Yes** / ☐ **No**

I authorize the County of Albany to send further correspondence that the County deems to be of an urgent nature by the following method (check):

Fax Number: _____ E-Mail: _____

COUNTY OF ALBANY
DEPARTMENT OF GENERAL SERVICES
PURCHASING DIVISION
112 STATE STREET, ROOM 1000
ALBANY, NY 12207

NON-BIDDER RESPONSE

RFB #2023-109

The Albany County Department of General Services, Purchasing Division, is interested in the reasons why bidders fail to submit bids. Please indicate your reason(s) by checking all appropriate item(s) below and returning this form to the above address.

- ☐ Could not meet specifications or Scope of Services.
- ☐ Items or materials requested not manufactured by us or not available to our company.
- ☐ Insurance requirements are too restricting.
- ☐ Bond requirements are too restricting.
- ☐ Specifications or Scope of Services not clearly understood or applicable (too vague, too rigid, etc.).
- ☐ Project not suited to firm.
- ☐ Quantities too small.
- ☐ Insufficient time allowed for preparation of bid.
- ☐ Other reasons; please state and define:

Vendor Name: _____

Contact Person: _____

Vendor Address: _____

Vendor Telephone: _____

COUNTY OF ALBANY
REQUEST FOR BIDS
GENERAL INSTRUCTIONS TO BIDDERS

BID DISTRIBUTION- *IMPORTANT NOTICE*

The County of Albany officially distributes bidding documents through the Purchasing Division Office or through the Empire State Bid System website at <http://www.empirestatebidsystem.com>. Copies of bidding documents obtained from any other source are not considered official documents. Only those vendors who obtain bidding documents from either the Purchasing Division Office or the Empire State Bid System are guaranteed to receive addendum information, if such information is issued.

If you have obtained this document from a source other than the Albany County Purchasing Division or the Empire State Bid System, it is strongly recommended that you obtain an official copy.

SECTION 1: BID IDENTIFICATION

- 1.1 Title: **Shaker Place Café Project**
- 1.2 Requesting Department: **Shaker Place Nursing and Rehabilitation Center**
- 1.3 Bid Number: **2024-150**

SECTION 2: PURPOSE

- 2.1 The intent of these specifications is to furnish information to responsible bidders for the purpose of obtaining bids for **Shaker Place Café Project** as requested by **Shaker Place Nursing and Rehabilitation Center**.
- 2.2 Minority Business Enterprises (MBE's) and Women Business Enterprises (WBE's) are encouraged to apply.
- 2.3 The apparent Successful Bidder will be required to submit DBE participation information and, as a condition of receiving the contract, demonstrate good faith efforts in meeting DBE goals, as outlined in Article SC 19 of the Albany County Affirmative Action Plan, attached hereto

SECTION 3: BIDDING DOCUMENTS

- 3.1 Complete sets of the Bidding Documents may be obtained or examined as stated in the Notice to Bidders.

- 3.2 Complete sets of Bidding Documents must be used in preparing bids. The County does not assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

SECTION 4: SUBMISSION OF BIDS

- 4.1 Bids and any other required documents must be submitted, sealed in an opaque envelope, plainly marked with the name and number of the bid and the name and address of the bidder and accompanied by the required documents. Bids must be received no later than **XX:XX A.M. ON [INSERT BID OPENING DAY], [BID OPENING DATE] HERE,** at the following address:

Pamela O Neill
Albany County Purchasing Agent
112 State Street, **Room 1000**
Albany, NY 12207

- 4.2 All bids received after the time stated in the “Notice to Bidders”, or the bid submission deadline as modified by formal addendum consistent with Section 14 of this Request for Bids, may not be considered and will be returned to the bidder. The bidder assumes the risk of any delay in the mail or in the handling of the mail by employees of Albany County. Whether sent by mail or by means of personal delivery, the bidder assumes responsibility for having his bid deposited on time at the place specified.
- 4.3 Albany County reserves the right to reject any or all bids in whole or in part, to waive any and all informalities, and to disregard all non-conforming, non-responsive or conditional bids.

- 4.4 There will be a site visit on _____, at _____

This will be the only scheduled site visit. Interested bidders are strongly urged to attend.

SECTION 5: TERM OF BID

- 5.1 The bid shall be in effect from the date of contract execution until completion of all work under the contract. Prices shall remain firm for the entire bid period.

SECTION 6: BID SECURITY

- 6.1 Each bid must be accompanied by a bid bond or certified check in the amount of **5% of total bid in United State Currency** drawn upon a national or state bank or trust company, to the order of the Director of Finance, Albany, County. If bid is accepted, the successful

Bidder will enter into a contract for the same and will execute such further security as may be required for the performance of the contract. BID SECURITY SHALL BE INCLUDED WITH BID AT TIME OF BID OPENING; FAILURE TO DO SO MAY CAUSE REJECTION OF THE BID AS MATERIALLY INCOMPLETE.

6.2 The Bid Security of the successful Bidder will be retained until such Bidder has executed the contract and furnished the required Contract Security, whereupon it will be returned. If the successful Bidder fails to execute and deliver the contract and furnish the required Contract Security within fifteen (15) days of the Notice of Award, the County may annul the Notice of Award and the Bid Security of that Bidder will be forfeited.

6.3 Bid security of other bidders will be returned within seven (7) days after the award of contract to the successful Bidder.

SECTION 7: QUALIFICATION OF BIDDER

7.1 All bidders shall submit the Bidder Qualification Questionnaire as part of the bid. Each bid must contain evidence of the bidder's qualification to do business in New York State or covenant to obtain such qualification prior to award.

7.2 All bidders shall submit the Vendor Responsibility Questionnaire (Attachment "C") as part of the bid.

7.3 In addition, Albany County may make such investigations it deems necessary to determine the ability of the Bidder to perform the work. The bidder shall furnish to the County, within five (5) days of a request, all such information and data for this purpose as may be requested. The County reserves the right to reject any bid if the information submitted by, or investigation of, a bidder fails to satisfy the County that such bidder is properly qualified to carry out the obligations of the contract and to complete the work contemplated therein. Conditional bids will not be accepted.

7.4 All bidders must document five (5) or more years in the business of providing the **Construction Services**

7.5 Bidder must include at least five **Construction Services**, customer references.

SECTION 8: Section not in use

SECTION 9: DISQUALIFICATION

9.1 The County reserves the right to refuse to issue Bidding Documents to a prospective bidder should such bidder be in default for any of the following reasons:

- (a) Failure to comply with any pre-qualification regulations of the County, if such regulations are cited, or otherwise included, in the Bidding Documents as a requirement for bidding.
- (b) Bidder's failure to pay, or satisfactorily settle, all bills due for labor and materials on former contracts in force (with the Owner) at the time the County issues the Bidding Documents to a prospective bidder.
- (c) Bidder's default under previous contracts with the County.
- (d) Bidder's unsatisfactory work on previous contracts with the County.

9.2 Bids received from bidders who have previously failed to complete contracts within the time required, or who have previously performed similar work in an unsatisfactory manner, may be rejected. A bid may be rejected if the bidder cannot show that it has the necessary ability, plant and equipment to commence the work at the time prescribed and thereafter to perform and complete the work at the rate or within the time specified. A bid may be rejected if the bidder is already obligated for the performance of other work which would delay the commencement, performance or completion of the work.

9.3 Albany County reserves the right to reject any bid if the information submitted by, or investigation of, such bidder fails to satisfy the County that such bidder is properly qualified to carry out the obligations of the contract and to complete the work contemplated therein.

9.4 Bids will be considered irregular and shall be subject to rejection for the following reasons:

- (a) If the bid is on a form other than that furnished by Albany County, or, if the Albany County's form is altered, or, if any part of the bidding documents is detached.
- (b) If there are unauthorized additions, conditional or alternate pay items, or irregularities of any kind which make the bid incomplete, indefinite, or otherwise ambiguous.
- (c) If the bid is not accompanied by the bid security specified by the Albany County.

SECTION 10: PREVAILING WAGE

10.1 All laborers providing services under this contract, whether employed by the Contractor or by the Subcontractor(s), shall be paid not less than the current prevailing rate of wages and shall be provided supplements not less than the prevailing supplements as established by the New York State Department of Labor, per the New York State Prevailing Schedule of Wages.

10.2 All vendors submitting bids agree to conform to all current NYS Department of Labor and prevailing wage laws. The County has applied for and has received a PRC number for this project, which has been included with this document as an attachment. The successful vendor(s) is/are responsible for complying with all current labor rates and regulations

throughout the duration of any contract resulting from this document. For policy or rate questions call the NYS Department of Labor at (585) 258-4505. Actual rates are available via the internet at: <https://wpp.labor.state.ny.us/wpp/showFindProject.do?method=showIt> **or** from the Albany County Purchasing Department at the address listed on the Notice to Bidders.

- 10.3 Payrolls and Payroll Records: Every contractor and subcontractor MUST keep original payrolls or transcripts subscribed and affirmed as true under penalty of perjury. Payrolls must be maintained for at least five (5) years from the project's date of completion. At a minimum, payrolls must show the following information for each person employed on a public work project: Name, Social Security number, Classification(s) in which the worker was employed, Hourly wage rate(s) paid, Supplements paid or provide, and Daily and weekly number of hours worked in each classification.

Every contractor and subcontractor shall submit to the Department of Jurisdiction (Contracting Agency), within thirty (30) days after issuance of its first payroll and every thirty (30) days thereafter, a transcript of the original payrolls, subscribed and affirmed as true under penalty of perjury. The Department of Jurisdiction (Contracting Agency) shall receive and maintain such payrolls.

SECTION 11: NON-COLLUSIVE BIDDING CERTIFICATE

- 11.1 All bidders bidding under the provisions of the specifications are subject to the provisions of Section 103 of the General Municipal Law of the State of New York. A signed Non-Collusive Bidding Certificate (Attachment "A") is required to be submitted with each bid on the form provided by the County.

SECTION 12: BID FORM

- 12.1 The Bid Form is attached hereto; additional copies may be obtained from the County.
- 12.2 Bids must be made on the Bid Form provided by the County. The Bid Form must be completed in ink or by typewriter. The Bid Form must also be signed by an authorized representative of the bidder.
- 12.3 Bids by corporations must be executed in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign on behalf of the corporation) and the corporate seal must be affixed by the secretary or an assistant secretary. The corporate address and state of incorporation must be shown below the signature.
- 12.4 Bids by partnerships must be executed in the partnership name and signed by a partner, whose title must appear under the signature. The official address of the partnership must be shown below the signature.

12.5 All names must be printed or typed below the signature.

12.6 The bid must contain an acknowledgment of receipt of all Addenda (the number of which will be filled in on the Bid Form).

12.7 The address to which communications regarding the bid are to be directed must be included on the Bid Form.

SECTION 13: EQUIVALENT GOODS

13.1 Manufacturers name brands are listed to indicate minimum requirements and bidding may be on brands listed, (if specified), or equivalent. Specifications shall be furnished by bidder to support equivalency. In the event of any claim by any unsuccessful bidder concerning or relating to the issue of “equal or better” or “or equal”, the successful bidder agrees, that his own cost and expense, to defend such claim or claims and agrees to hold the County of Albany free and harmless from any and all claims for loss or damage arising out of this transaction for any reasons.

SECTION 14: SPECIFICATION CLARIFICATION

14.1 All inquiries with respect to this Request for Bids must be directed to the Albany County Purchasing Agent as follows:

Pamela O Neill
Albany County Purchasing Agent
112 State Street, **Room 1000**
Albany, NY 12207
Telephone: (518) 447-7140
Facsimile: (518) 447-5588
Email: pamela.oneill@albanycountyny.gov

14.2 All questions about the meaning or intent of the specifications must be submitted to the aforementioned designated person in writing. Replies will be issued by Addenda mailed or delivered to all parties recorded as having received the bidding documents. Questions received less than four (4) days prior to the date of submission of bids will not be answered. The County will be bound only by responses given by formal written Addenda.

SECTION 15: BID EVALUATION

15.1 Bids shall remain valid until:

- (a) the execution of a contract by Albany County; or
- (b) the award of a purchase order by Albany County; or

(c) as otherwise rejected by Albany County.

15.2 Bids received will be evaluated by Albany County and will be based, as a minimum, upon the following criteria:

(a) Lowest total bid cost and projected timetable for completion of services and/or delivery of goods described herein;

(b) Completeness of the bid; and

(c) Bidder's demonstrated capabilities and professional qualifications.

15.3 The County reserves the right to award this contract on a per item or aggregate basis, whichever is most beneficial to the County of Albany. Bidders need not submit bids for all items listed to be eligible for an award of this contract.

15.4 The County reserves the right to purchase items pursuant to General Municipal Law 103 from New York State Contracts, other County, political subdivision or district contracts, or other Governmental Agency or New York State Preferred Sources within its discretion.

SECTION 16: MODIFICATION AND WITHDRAWAL OF BIDS

16.1 Bids may be modified or withdrawn at any time prior to the opening of bids by an appropriate document duly executed (in the manner that a bid must be executed) and delivered to the place where bids are to be submitted.

16.2 If, prior to awarding of the contract or within three days after opening, whichever period is shorter, any bidder files a duly signed written notice with the County and promptly thereafter demonstrates to the reasonable satisfaction of the County that there was a material and substantial mistake in the preparation of its bid, that bidder may withdraw its bid and the bid security will be returned.

SECTION 17: AWARD OF BID

17.1 After the award has been approved by the proper County governing authority, the successful bidder will be issued a Notice of Award. A notice of contract award shall not be binding upon the County until the contract has been fully executed by both parties.

The following documents shall be incorporated, to the extent deemed appropriate in the sole discretion of the County, within the contract between Albany County and the apparent successful Bidder: the successful Bidder's bid, this Request For Bids and any written Addenda issued by Albany County in response to inquiries of prospective bidders as set forth in Section 12.2 hereof.

17.2 No successful bidder to whom a contract or purchase order is let, granted or awarded, shall assign, transfer, convey, sublet, or otherwise dispose of same, or of its right, title, and interest herein, including the performance of the contract or purchase order or the right to receive monies due or to become due, or of its power to execute the contract or purchase order without the prior written consent of the Albany County Purchasing Agent. In the event the contractor shall without prior written consent assign, transfer, convey, sublet or otherwise dispose of the contract or purchase order or of its right, title and interest therein, including the performance of this contract or purchase order, or the right to receive monies due or to become due, or its power to execute such contract or purchase order to any other person or corporations, or upon receipt by Albany County of an attachment against the Successful Bidder, the County of Albany shall be relieved and discharged from any and all liability and obligation growing out of such contract or purchase order to such contractor, and the person or corporation to which such contract or purchase order shall have been assigned, its assignees, transferees or sub lessees shall forfeit and lose all monies theretofore assigned under the contract or purchase order, except so much as may be required to pay its employees.

SECTION 18: PERFORMANCE BOND

18.1 A separate Performance and Payment, Labor and Materials Bond in a form satisfactory to the Albany County Purchasing Agent and the Albany County Attorney, or its cash equivalent, equal to **100% of Total bid** is required of the successful Bidder. The successful Bidder to whom the contract is awarded shall within seven (7) days after the date of notification of the acceptance of its bid, provide security as required by the contract in a form acceptable by the County.

In case of its failure to do so, or in case of its failure to give further security as herein prescribed, the successful Bidder will be considered as having abandoned the same and the certified check or other bid security accompanying its bid shall be forfeited to the County of Albany.

SECTION 19: INSURANCE REQUIREMENTS

19.1 The successful Bidder will be required to procure and maintain at its own expense the following insurance coverage:

- (a) **Workers' Compensation and Employers Liability Insurance:** A policy or policies providing protection for employees in the event of job-related injuries.
- (b) **Automobile Liability Insurance:** A policy or policies with the limits of not less than \$500,000 combined for each accident because of bodily injury sickness or disease, sustained by any person, caused by accident, and arising out of the ownership, maintenance or use of any automobile for damage because of injury to or destruction of property, including the loss of use thereof, caused by accident and arising out of the ownership, maintenance or use of any automobile.

- (c) **General Liability Insurance:** A policy or policies of comprehensive all-risk insurance with limits of not less than:

Liability For:	Combined Single Limit
Property Damage	\$1,000,000
Bodily Injury	\$1,000,000
Personal Injury	\$1,000,000

- (d) **Disability Insurance:** A policy or policies providing appropriate disability benefits in accordance with Section 220 Subdivision 8 of the Disability Benefits Law (DBL)

19.2 Each policy of insurance required shall be of form and content satisfactory to the Albany County Attorney.

- (a) The insurance policies shall name the County of Albany as certificate holder and primary/non-contributory additional insured on all liability policies. **The bid number must appear on policy.**
- (b) The policy shall not be changed or canceled until the expiration of thirty (30) days after written notice to Albany County. It shall be automatically renewed upon expiration and continued in force unless Albany County is given at least thirty (30) days written notice to the contrary.

19.3 No work shall be commenced under the contract or purchase order until the successful Bidder has delivered to the County Purchasing Agent or his designee proof of issuance of all policies of insurance required by the contract to be procured by the successful Bidder. If at any time, any of said policies shall expire or become unsatisfactory to the County, the successful Bidder shall promptly obtain a new policy and submit proof of insurance of the same to the County for approval. Upon failure of the successful Bidder to furnish, deliver and maintain such insurance as above provided, the contract or purchase order may, at the election of the County, be forthwith declared suspended, discontinued or terminated. Failure of the successful Bidder to procure and maintain any required insurance shall not relieve the successful Bidder from any liability under the contract, nor shall the insurance requirements be construed to conflict with the obligations of the successful Bidder concerning indemnification.

SECTION 20: INDEMNIFICATION

20.1 The successful Bidder shall defend, indemnify and save harmless the County, its employees and agents, from and against all claims, damages, losses and expenses (including, without limitation, reasonable attorneys' fees) arising out of, or in consequence of, any negligent or

intentional act or omission of the successful Bidder, its employees or agents, to the extent of its or their responsibility for such claims, damages, losses and expenses.

SECTION 21: REMEDY FOR BREACH

21.1 In the event of a breach by CONTRACTOR, CONTRACTOR shall pay to the COUNTY all direct and consequential damages caused by such breach, including, but not limited to, all sums expended by the COUNTY to procure a substitute contractor to satisfactorily complete the contract work, together with the COUNTY's own costs incurred in procuring a substitute contractor.

SECTION 22: DELIVERY AND PAYMENT

22.1 All bid prices shall include freight and shall be quoted F.O.B. destination.

22.2 Prior to payment, the items furnished and or work performed will be inspected by the Purchasing Agent or his designee to determine their conformity to specification. No payment will be made for items or work not meeting specification.

22.3 Payment will be made upon the submission of a completed Albany County Claim Form.

22.4 ALBANY COUNTY IS NOT SUBJECT TO FEDERAL, STATE OR LOCAL TAXES.

SECTION 23: CASH DISCOUNT

23.1 Cash discounts may be offered by a bidder for prompt payment of bills, but such cash discounts will not be taken into consideration in determining the low bidder.

23.2 For purposes of any applicable cash discount, the payment date shall be calculated from the receipt of invoice or final acceptance of the goods, whichever is later.

SECTION 24: EXTENSION OF BIDS TO ALL POLITICAL SUBDIVISIONS AND AUTHORIZED DISTRICTS LOCATED IN THE STATE OF NEW YORK

24.1 It is the intent of this Request For Bids that all political subdivisions, and districts located in the State of New York, be entitled to make purchases of materials, equipment or supplies from the resulting the bid award.

24.2 No officer, board or agency of a county, town, village, or school district shall make any purchase through the County when bids have been received for such purchase by such officer, board or agency, unless such purchase may be made upon the same terms, conditions and specifications at a lower price through the County.

24.3 All purchases shall be subject to audit and inspection by the other political subdivisions for which the purchase was made.

- 24.4 All orders will be placed by the participating entities. Each participating entity shall be billed by and make payment directly to the successful Bidder.
- 24.5 Upon request, participating entities must furnish the successful Bidder with the proper tax exemption certificates or documentation of tax exempt status. (Purchase orders should have this information and be retained for documenting the tax exempt sale.)
- 24.6 The sole responsibility in regard to performance of the bid, or any obligation, covenant, condition or term thereunder by the successful Bidder and the participating entities will be borne and is expressly assumed by the successful Bidder and the participating entities and not by Albany County. In the event of a failure or breach in performance of any such bid by a participating entity or the successful Bidder, Albany County, specifically and expressly disclaims any and all liability for such defective performance or breach, or failure of either party to perform in accordance with its obligations, covenants and the terms and conditions of this Albany County centralized bid.

SECTION 25: MACBRIDE PRINCIPLES

- 25.1 Contractor/Proposer hereby represents that said contractor/proposer is in compliance with the MacBride Principles of Fair Employment as set forth in Albany County Local Law No. [3] for 1993, in that said contractor/proposer either (a) has no business operations in Northern Ireland or (b) shall take lawful steps in good faith to conduct any business operations in Northern Ireland in accordance with the MacBride Principles, and shall permit independent monitoring of their compliance with such principles. In the event of a violation of this stipulation, the County reserves all rights to take remedial measures as authorized under section 4 of Local Law No. [3] in 1993, including, but not limited to, imposing sanctions, seeking compliance, recovering damages, declaring the contract/proposer in default and/or seeking debarment or suspension of the contractor/proposer.
- 25.2 In the case of a contract which must be let by competitive sealed bidding, whenever the lowest bidder has not agreed to stipulate to the conditions set forth in this section, and another bidder who has agreed to stipulate to such conditions has submitted a bid within five percent of the lowest bid for a contract to supply goods, services or construction of comparable quality, the contracting entity shall refer the contract to the County Legislature, which shall determine whether the lowest bidder is responsible. In making such determination, the County Legislature may consider, as a factor bearing on responsibility, whether the lowest bidder discriminates in employment in Northern Ireland.
- 25.3 As used in this section, the term “contract” shall not include contracts with government and non-profit organizations, contracts awarded pursuant to an emergency procurement procedure or contracts, resolutions, indentures, declarations of trust or other instruments of authorizing or relating to the authorization, issuance, award, sale or purchase or bonds, certificates of indebtedness, notes or other fiscal obligations of the County, provided that the policies of this section shall be considered when selecting managing underwriters in connection with such activities.

25.4 The provisions of this section shall not apply to contracts for which the County receive funds administered by the United States Department of Transportation, except to the extent Congress has directed that the Department of Transportation not withhold funds from states and localities that choose to implement selective purchasing policies based on agreement to comply with the MacBride Principles, or to the extent that such funds are not otherwise withheld by the Department of Transportation.

SECTION 26: NON-INTERRUPTION OF WORK AGREEMENT

26.1 The following is taken from Resolution No. 298 adopted by the Albany County Legislature on December 4, 1986:

“RESOLVED, That any person, firm, corporation, partnership or other entity (hereinafter “contractor”) as a prerequisite to the award of any public works contract by the County of Albany, shall agree that it will not intentionally engage in any course of conduct or activity, or employ for the purposes of performing the public work, any subcontractors, employees, labor or materials which will or may result in the interruption of the performance of the public work due to labor strife or unrest by workmen employed by the contractor or by any of the trades working in or about the public works and/or premises where the work is being performed, and, be it further

“RESOLVED, That in awarding contracts for public works, the County of Albany shall consider the ability of the contractor to undertake the work without interruption due to labor strife or unrest, and, be it further

“RESOLVED, That unless such contractor shall demonstrate to the satisfaction of the County of Albany that it will not intentionally engage in such conduct as aforesaid which will or may result in the interruption of the performance of the public work, then and in that event, such public works contract shall not be awarded to such contractor.”

A signed Non-Interruption of Work Agreement is required to be submitted with each bid in the form specified with the bid documents.

SECTION 27: APPRENTICESHIP TRAINING PROGRAMS

Contractors on an Albany Construction Project with an **anticipated total project cost** of more than \$250,000 are subject to the following:

- A. In accordance with Albany County Legislative Resolution No. 70 of February 10, 2003, Resolution No. 251-a of September 12, 2011 and Resolution No. 373 of August 13, 2018, together with Section 816-b of the New York State Labor Law, contractors of County construction projects with an aggregate value (which shall mean the total cost of all contracts of the project) in excess of \$250,000 or more shall have in place agreements providing appropriate apprenticeship training programs approved by the Commissioner of the Department of Labor for the type and scope of work to be performed, at the time of bid date and prior to entering into a contract with Albany County.

B. A bidder who submits a bid for a County construction contract for which the contract amount is \$250,000 or more **shall submit with the bid package** the following documents **for each apprentice agreement** intended to meet the requirements of Res. No. 373 for 2018:

(1). A copy of the current New York State Department of Labor (NYS DOL) “Apprentice Training Program Registration Agreement” (NYS DOL Agreement) issued to the bidder as a sponsor –or- issued to a NYS DOL apprenticeship sponsor with whom the bidder has an apprenticeship training agreement; AND

(2). If the bidder is not the named sponsor on the NYS DOL Agreement described in (a), a copy of the apprenticeship training agreement between the bidder and the named sponsor.

C. Prior to entering into a construction agreement with Albany County, a contractor shall submit, Certificates of Completion showing that the contractor, or its sponsor, graduated at least one apprentice from a state approved and registered apprenticeship program, in the trade and/or job title called for within the construction contract, within a time period immediately preceding the bid date of such project, the length of said time period to be calculated by adding twenty-four months to the specific trade’s program length as set forth in the New York State Prevailing Wage Schedule, except for the trade of laborer for which the length of the program is hereby defined to be two years. If a contractor is a signatory to a sponsor, the contractor shall submit to the County a letter from the sponsor verifying its signatory status.

Note: Apprenticeship agreements which are in probationary status shall be exempt from the graduation requirement during the period of probationary status, and apprenticeship agreements in place as of August 13, 2018 which were in probationary status during the period preceding the specific trade’s program length as set forth in the New York State Prevailing Wage Schedule, shall be exempt from the graduation requirement for a period measured from the date of the apprenticeship program is registered with the New York State Department of Labor, plus the specific trade’s program length, plus two years.

D. The contractor shall submit the required Certificates of Completion as part of any bid submitted in connection with a construction contract and shall provide to the County department or agency administering the construction contract the identity of apprentices who have graduated from its apprenticeship program.

E. If a contractor utilizes a subcontractor on the project, the contractor shall submit Certificates of Completion showing that the subcontractor or the subcontractor’s sponsor graduated at least one apprentice from a state approved and registered apprenticeship program, in the trade and/or job title called for within the construction contract, within a time period immediately preceding the bid date of such project, the length of said time period to be calculated by adding twenty-four months to the specific trade’s program length as set forth in the New York State Prevailing Wage Schedule, except for the trade of laborer for which

the length of the program is hereby defined to be two years. The contractor shall submit these certificates at a time designated by the department or agency administering the construction contract, but in any event, these forms must be received by the County prior to a subcontractor beginning work under the contract. If the subcontractor is a signatory to a sponsor, the contractor shall submit to the County a letter from the sponsor verifying the signatory status.

SECTION 28: OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) CONSTRUCTION SAFETY AND HEALTH COURSE

28.1 In compliance with NYS Labor Law Sec. 220-h, the contract required for the construction, reconstruction, maintenance and/or repair of the public work herein described, where the total cost of all work to be performed is at least TWO HUNDRED FIFTY THOUSAND (\$250,000.) DOLLARS, shall require that all laborers, workers, and mechanics employed in the performance of the work on the public work site either by the Contractor, sub-contractor or other person doing or contracting to do the whole or a part of the work herein described, shall be certified prior to performing any work on the project as having successfully completed a course in construction safety and health approved by the U.S. Department of Labor's Occupational Safety and Health Administration that is at least ten hours in duration.

SECTION 29: AFFIRMATIVE ACTION REQUIREMENTS

29.1 It is the policy of the County of Albany that Minority Business Enterprises (MBE) and Woman Business Enterprises (WBE) are afforded the maximum opportunity to participate in the performance of contracts, in excess of \$100,000, let by the County and its several agencies and authorities. The County commits itself to a goal oriented Contract Compliance Program which assures that Minority Business Enterprises and Woman Business Enterprises are considered in awarding contracts for goods, services and construction. Furthermore, it is the policy of the County of Albany that contractors and subcontractors utilize minority and women labor to the greatest extent feasible.

29.2 In bidding on this contract, the contractor acknowledges an understanding of this policy. The contractor shall carry out the policy by making every reasonable effort to award contracts and subcontracts to MBEs and WBEs and utilizing minority and women labor in the performance of this contract.

29.3 In an effort to assist contractors with compliance attached you will find the following: Article SC19-Affirmative Action Plan and Department of Affirmative Action Compliance Forms.

SECTION 30: SUBCONTRACTORS

30.1 When the preparation of separate specifications is not required, each bidder must submit with its bid a separate sealed list that names each subcontractor that the bidder will use to perform the work on the contract, and the agreed upon amount to be paid to each, for (1) plumbing

and gas fitting, (2) steam heating, hot water heating, ventilating and air conditioning apparatus, and (3) electric wiring and standard illuminating fixtures. After the low bid is announced, the sealed list submitted with the low bid must be opened and the names of the subcontractors announced. The sealed lists submitted by all other bidders must be returned unopened after the award of the contract.

Any subsequent change of subcontractor or agreed upon amount to be paid to each subcontractor must be approved by the political subdivision, upon a showing of "legitimate construction need" for the change, which must be open to public inspection. The term "legitimate construction need" is defined to include, but not be limited to (1) a change in project specification, (2) a change in construction material costs, (3) a change in subcontractor status as determined pursuant to Labor Law §222(2)(e), relative to project labor agreements, or (4) a situation in which the subcontractor has become otherwise unwilling, unable or unavailable to perform the subcontract.

SECTION 31: INTERPRETATION

- 31.1 In the event of any discrepancy, disagreement or ambiguity among the documents which comprise this RFB, and/or, the Agreement (between the County and the successful bidder/proposer) and its incorporated documents, the documents shall be given preference in the following order to interpret and to resolve such discrepancy, disagreement or ambiguity: 1) the Agreement; 2) the RFB; 3) the Contractor's bid.

SECTION 32: NON APPROPRIATIONS CLAUSE

- 32.1 Notwithstanding anything contained herein to the contrary, no default shall be deemed to occur in the event no funds or insufficient funds are appropriated and budgeted by or are otherwise unavailable to the County for payment under this Agreement. The County will immediately notify the Contractor of such occurrence and this Agreement shall terminate on the last day of the fiscal period for which appropriations were received without penalty or expense to the County of any kind whatsoever, except as to those portions herein agreed upon for which funds shall have been appropriated and budgeted.

SECTION 33: IRANIAN ENERGY SECTOR DIVESTMENT

- 33.1 Contractor/Proposer hereby represents that said Contractor/Proposer is in compliance with New York State General Municipal Law Section 103-g entitled "Iranian Energy Sector Divestment", in that said Contractor/Proposer has not:
- (a) Provided goods or services of \$20 Million or more in the energy sector of Iran including but not limited to the provision of oil or liquefied natural gas tankers or products used to construct or maintain pipelines used to transport oil or liquefied natural gas for the energy sector of Iran; or

- (b) Acted as a financial institution and extended \$20 Million or more in credit to another person for forty-five days or more, if that person's intent was to use the credit to provide goods or services in the energy sector in Iran.

33.2 Any Contractor/Proposer who has undertaken any of the above and is identified on a list created pursuant to Section 165-a (3)(b) of the New York State Finance Law as a person engaging in investment activities in Iran, shall not be deemed a responsible bidder pursuant to Section 103 of the New York State General Municipal Law.

33.3 Except as otherwise specifically provided herein, every Contractor/Proposer submitting a bid/proposal in response to this Request for Bids/Request for Proposals must certify and affirm the following under penalties of perjury:

- (a) "By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid, each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief, that each bidder is not on the list created pursuant to NYS Finance Law Section 165-a (3)(b)."

Albany County will accept this statement electronically in accordance with the provisions of Section 103 of the General Municipal Law.

33.4 Except as otherwise specifically provided herein, any Bid/Proposal that is submitted without having complied with subdivision (a) above, shall not be considered for award. In any case where the Bidder/Proposer cannot make the certification as set forth in subdivision (a) above, the Bidder/Proposer shall so state and shall furnish with the bid a signed statement setting forth in detail the reasons therefor. The County reserves its rights, in accordance with General Municipal Law Section 103-g to award the Bid/Proposal to any Bidder/Proposer who cannot make the certification, on a case-by-case basis under the following circumstances:

- (1) The investment activities in Iran were made before April 12, 2012, the investment activities in Iran have not been expanded or renewed after April 12, 2012, and the Bidder/Proposer has adopted, publicized and is implementing a formal plan to cease the investment activities in Iran and to refrain from engaging in any new investments in Iran; or
- (2) The County of Albany has made a determination that the goods or services are necessary for the County to perform its functions and that, absent such an exemption, the County of Albany would be unable to obtain the goods or services for which the Bid/Proposal is offered. Such determination shall be made by the County in writing and shall be a public document.

SECTION 34: STORMWATER MANAGEMENT PROGRAM

34.1 Bidder understands that Albany County is a regulated entity subject to the SPDES General Permit for Stormwater Discharges from Municipal Separate Storm Sewer Systems (GP-0-15-003), and must comply with the terms and conditions of the aforementioned Permit. Bidder further understands that under the New York State Environmental Conservation Law, it is unlawful for any person to directly or indirectly cause or contribute to a violation of water quality standards, and that Albany County adopted Local Law 7 of 2007 enabling the County to take action against any discharges that cause or contribute to a violation of water quality standards. Bidder agrees to comply with the terms and conditions of the SPDES General Permit for Stormwater Discharges from Municipal Separate Storm Sewer Systems (GP-0-15-003) as well as Albany County Local Law No. 7 for 2007 and any Best Management Practices developed pursuant to the foregoing, as established in Albany County's Stormwater Management Program Plan. Bidder also agrees to implement any corrective actions identified by Albany County or a representative pursuant to the above regulations, and further understands that any non-compliance by the County will not diminish, eliminate, or lessen Bidder's own liability. **Awarded bidder shall execute and deliver to the County a certification statement acknowledging the above provisions prior to commencing any work (see Sheet MS4-1/Attachment "E").**

SECTION 35: Section not in use

COUNTY OF ALBANY

BID FORM

BID IDENTIFICATION:

Title: **Shaker Place Café Project**
Bid Number: **2024-150**

THIS BID IS SUBMITTED TO:

Pamela O Neill, Purchasing Agent
Albany County Department of General Services
Purchasing Division
112 State Street, Room 1000
Albany, NY 12207

1. The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into a Contract with the owner in the form included in the Contract Documents to complete all Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with the Contract Documents.
2. BIDDER accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the Disposition of Bid Security. This Bid may remain open for ninety (90) days after the day of Bid opening. BIDDER will sign the Contract and submit the Contract Security and other documents required by the Contract Documents within fifteen days after the date of OWNER'S Notice of Award.
3. In submitting this Bid, BIDDER represents, as more fully set forth in this Contract, that:
 - (a) BIDDER has examined copies of all the Contract Documents and of the following addenda: (If none, so state)

Date

Number

(receipt of all of which is hereby acknowledged) and also copies of the Notice to Bidders and the Instructions to Bidders;

- (b) BIDDER has examined the site and locality where the Work is to be performed, the legal requirements (federal, state and local laws, ordinances, rules and regulations) and the conditions affecting cost, progress or performance of the Work and has made such independent investigations as BIDDER deems necessary;

BF1

(c) This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; BIDDER has not directly or indirectly induced or solicited any other BIDDER to submit a false or sham Bid; BIDDER has not solicited or induced any person, firm or a corporation to refrain from bidding; and BIDDER has not sought by collusion to obtain for himself any advantage over any other Bidder or over the owner.

4. BIDDER will complete the Work for the following prices(s): (Attach Bid Proposal)

5. BIDDER agrees to commence the Work within the number of calendar days or by the specific date indicated in the Contract. BIDDER agrees that the Work will be completed within the number of Calendar days or by the specific date indicated in the contract.

6. The following documents are attached to and made a condition of this Bid:

(a) Non-Collusive Bidding Certificate (Attachment "A")

(b) Acknowledgment by Bidder (Attachment "B")

(c) Vendor Responsibility Questionnaire (Attachment "C")

(d) Iranian Energy Divestment Certification (Attachment "D")

(e) MS-4-1 Certification Statement RE: Stormwater Discharges (Attachment "E")

(f) Bidder Qualification Questionnaire (Attachment "F")

(g) Non Interruption of Work Agreement (Attachment "G")

(h) Required Apprenticeship Training Program Documentation (refer to RFB Section 27)

7. Communication concerning this Bid shall be addressed to:

Phone: _____

8. Terms used in this Bid have the meanings assigned to them in the Contract and General Provisions.

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COUNTY OF ALBANY

BID FORM

BID IDENTIFICATION:

Title: **Shaker Place Café Project**
Bid Number: **2024-150**

Conditions:

1. All bid prices must include all materials, labor, equipment, incidentals and other associated costs.
2. Construction Base Bid work shall carry a 20% Base Bid Contingency Allowance for additional work discovered during construction beyond scope of work indicated on drawings and specifications. Contractor shall receive advance approval from the County prior to performing any additional work.

LUMP SUM BASE BID: \$ _____ (a)

20 % CONTINGENCY ALLOWANCE: \$ _____ (b)

TOTAL BASE BID (a) + (b): \$ _____
(Base Bid + Contingency Allowance)

COUNTY OF ALBANY

BID FORM

BID IDENTIFICATION:

Title: **Shaker Place Café Project**
Bid Number: **2024-150**

COMPANY: _____

ADDRESS: _____

CITY, STATE, ZIP: _____

TEL. NO.: _____

FAX NO.: _____

FEDERAL TAX ID NO.: _____

REPRESENTATIVE: _____

E-MAIL: _____

SIGNATURE AND TITLE _____

DATE _____

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Kathy Hochul, Governor

Roberta Reardon, Commissioner

Albany County

Pamela O'Neill, Purchasing Agent
112 State Street
Albany NY 12207

Schedule Year 2024 through 2025
Date Requested 11/04/2024
PRC# 2024013880

Location Shaker Place Nursing
Project ID# 2024-150
Project Type New Cafe Project for the Shaker Place Nursing and Rehabilitation Center

PREVAILING WAGE SCHEDULE FOR ARTICLE 8 PUBLIC WORK PROJECT

Attached is the current schedule(s) of the prevailing wage rates and prevailing hourly supplements for the project referenced above. A unique Prevailing Rate Case Number (PRC#) has been assigned to the schedule(s) for your project.

The schedule is effective from July 2024 through June 2025. All updates, corrections, posted on the 1st business day of each month, and future copies of the annual determination are available on the Department's website www.labor.ny.gov. Updated PDF copies of your schedule can be accessed by entering your assigned PRC# at the proper location on the website.

It is the responsibility of the contracting agency or its agent to annex and make part, the attached schedule, to the specifications for this project, when it is advertised for bids and /or to forward said schedules to the successful bidder(s), immediately upon receipt, in order to insure the proper payment of wages.

Please refer to the "General Provisions of Laws Covering Workers on Public Work Contracts" provided with this schedule, for the specific details relating to other responsibilities of the Department of Jurisdiction.

Upon completion or cancellation of this project, enter the required information and mail **OR** fax this form to the office shown at the bottom of this notice, **OR** fill out the electronic version via the NYSDOL website.

NOTICE OF COMPLETION / CANCELLATION OF PROJECT

Date Completed: _____ Date Cancelled: _____

Name & Title of Representative: _____

Phone: (518) 457-5589 Fax: (518) 485-1870
W. Averell Harriman State Office Campus, Bldg. 12, Room 130, Albany, NY 12240

ATTACHMENT "A"
NON-COLLUSIVE BIDDING CERTIFICATE PURSUANT TO
SECTION 103-D OF THE NEW YORK STATE GENERAL MUNICIPAL LAW

A. By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid, each party thereto certifies as to its own organizations, under penalty of perjury, that to the best of knowledge and belief:

(1) The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor.

(2) Unless otherwise required by law, the prices which have been quoted in this bid have not knowingly been disclosed by the bidder and will not knowingly be disclosed by the bidder, directly or indirectly, prior to opening, to any bidder or to any competitor.

(3) No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

A bid shall not be considered for award nor shall any award be made where (1), (2), and (3) above have not been complied with; provided, however, that in any case the bidder cannot make the foregoing certification, the bidder shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons thereof. Where (1), (2), and (3) above have not been complied with, the bid shall not be considered for any award nor shall any award be made unless the head of the Purchasing Unit to the political subdivision, public department, agency or official thereof to which the bid is made, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

The fact that a bidder (a) has published price lists, rates, or tariffs covering items being procured, (b) has informed prospective customer of proposed or pending publication of new or revised price lists for such items, or (c) has sold the same items to other customers at the same prices being bid, does not constitute, without more, a disclosure within the meaning of paragraph "A" above.

B. Any bid hereafter made to any political subdivision of the state or any public department, agency or official thereof by a corporate bidder for work or services performed or to be performed or goods sold or to be sold, where competitive bidding is required by statute, rule, regulation, local law, and where such bid contains the certification referred to in paragraph "A" of this section, shall be deemed to have been authorized by the Board of Directors of the bidder, and such authorization shall be deemed to include the submission of the bid and the inclusion therein of the certificate as to non-collusion as the act and deed of the corporation

Signature

Title

Date

Company Name

ATTACHMENT "B"
ACKNOWLEDGMENT BY BIDDER

If Individual or Individuals:

STATE OF _____)
COUNTY OF _____) SS.:

On this _____ day of _____, 200__, before me personally appeared _____ to me known and known to me to be the same person(s) described in and who executed the within instrument, and he (or they severally) acknowledged to me that he (or they) executed the same.

Notary Public, State of _____

Qualified in _____

Commission Expires _____

If Corporation:

STATE OF _____)
COUNTY OF _____) SS.:

On this _____ day of _____, 200__, before me personally appeared _____ to me known, who, being by me sworn, did say that he resides at (give address) _____; that he is the (give title) _____ of the (name of corporation) _____, the corporation described in and which executed the above instrument; that he knows the seal of the corporation, and that the seal affixed to the instrument is such corporate seal; that it was so affixed by order of the board of directors of the corporation, and that he signed his name thereto by like order.

Notary Public, State of _____

Qualified in _____

Commission Expires _____

If Partnership:

STATE OF _____)
COUNTY OF _____) SS.:

On the _____ day of _____, 200__, before me personally came _____, to me known to be the individual who executed the foregoing, and who, being duly sworn, did depose and say that he / she is a partner of the firm of _____ and that he / she has the authority to sign the same, and acknowledged that he / she executed the same as the act and deed of said partnership.

Notary Public, State of _____

Qualified in _____

Commission Expires _____

**ATTACHMENT “C”
ALBANY COUNTY
VENDOR RESPONSIBILITY QUESTIONNAIRE**

1. VENDOR IS: ☐ PRIME CONTRACTOR			
2. VENDOR’S LEGAL BUSINESS NAME		3. IDENTIFICATION NUMBERS a) FEIN # b) DUNS #	
4. D/B/A – Doing Business As (if applicable) & COUNTY FIELD:		5. WEBSITE ADDRESS (if applicable)	
6. ADDRESS OF PRIMARY PLACE OF BUSINESS/EXECUTIVE OFFICE		7. TELEPHONE NUMBER	8. FAX NUMBER
9. ADDRESS OF PRIMARY PLACE OF BUSINESS/EXECUTIVE OFFICE <i>IN NEW YORK STATE, if different from above</i>		10. TELEPHONE NUMBER	11. FAX NUMBER
12. AUTHORIZED CONTACT FOR THIS QUESTIONNAIRE Name Title Telephone Number Fax Number e-mail			
13. LIST ALL OF THE VENDOR’S PRINCIPAL OWNERS.			
a) NAME	TITLE	b) NAME	TITLE
c) NAME	TITLE	d) NAME	TITLE
A DETAILED EXPLANATION IS REQUIRED FOR EACH QUESTION ANSWERED WITH A “YES,” AND MUST BE PROVIDED AS AN ATTACHMENT TO THE COMPLETED QUESTIONNAIRE. YOU MUST PROVIDE ADEQUATE DETAILS OR DOCUMENTS TO AID THE COUNTY IN MAKING A DETERMINATION OF VENDOR RESPONSIBILITY. PLEASE NUMBER EACH RESPONSE TO MATCH THE QUESTION NUMBER.			
14. DOES THE VENDOR USE, OR HAS IT USED IN THE PAST FIVE (5) YEARS, ANY OTHER BUSINESS NAME, FEIN, or D/B/A OTHER THAN THOSE LISTED IN ITEMS 2-4 ABOVE? List all other business name(s), Federal Employer Identification Number(s) or any D/B/A names and the dates that these names or numbers were/are in use. Explain the relationship to the vendor. ☐ Yes ☐ No			
15. ARE THERE ANY INDIVIDUALS NOW SERVING IN A MANAGERIAL OR CONSULTING CAPACITY TO THE VENDOR, INCLUDING PRINCIPAL OWNERS AND OFFICERS, WHO NOW SERVE OR IN THE PAST ONE (1) YEARS HAVE SERVED AS:			
a) An elected or appointed public official or officer? <i>List each individual’s name, business title, the name of the organization and position elected or appointed to, and dates of service</i>		☐ Yes ☐ No	
b) An officer of any political party organization in Albany County, whether paid or unpaid? <i>List each individual’s name, business title or consulting capacity and the official political position held with applicable service dates.</i>		☐ Yes ☐ No	

16.	WITHIN THE PAST (5) YEARS, HAS THE VENDOR, ANY INDIVIDUALS SERVING IN MANAGERIAL OR CONSULTING CAPACITY, PRINCIPAL OWNERS, OFFICERS, MAJOR STOCKHOLDER(S) (10% OR MORE OF THE VOTING SHARES FOR PUBLICLY TRADED COMPANIES, 25% OR MORE OF THE SHARES FOR ALL OTHER COMPANIES), AFFILIATE OR ANY PERSON INVOLVED IN THE BIDDING OR CONTRACTING PROCESS: a) 1. been suspended, debarred or terminated by a local, state or federal authority in connection with a contract or contracting process; ☐ Yes ☐ No 2. been disqualified for cause as a bidder on any permit, license, concession franchise or lease; 3. entered into an agreement to a voluntary exclusion from bidding/contracting; 4. had a bid rejected on an Albany County contract for failure to comply with the MacBride Fair Employment Principles; 5. had a low bid rejected on a local, state or federal contract for failure to meet statutory affirmative action or M/WBE requirements on a previously held contract; 6. had status as a Women's Business Enterprise, Minority Business Enterprise or Disadvantaged Business Enterprise, de-certified, revoked or forfeited; 7. been subject to an administrative proceeding or civil action seeking specific performance or restitution in connection with any local, state or federal government contract; 8. been denied an award of a local, state or federal government contract, had a contract suspended or had a contract terminated for non-responsibility; or 9. had a local, state or federal government contract suspended or terminated for cause prior to the completion of the term of the contract. b) been indicted, convicted, received a judgment against them or a grant of immunity for any business-related conduct constituting a crime under local, state or federal law including but not limited to, fraud extortion, bribery, racketeering, price-fixing, bid collusion or any crime related to truthfulness and/or business conduct? ☐ Yes ☐ No c) been issued a citation, notice, violation order, or are pending an administrative hearing or proceeding or determination of violations of: ☐ Yes ☐ No 1. federal, state or local health laws, rules or regulations.
17.	IN THE PAST THREE (3) YEARS, HAS THE VENDOR OR ITS AFFILIATES H HAD ANY CLAIMS, JUDGMENTS, INJUNCTIONS, LIENS, FINES OR PENALTIES SECURED BY ANY GOVERNMENTAL AGENCY? ☐ Yes ☐ No Indicate if this is applicable to the submitting vendor or affiliate. State whether the situation(s) was a claim, judgment, injunction, lien or other with an explanation. Provide the name(s) and address(es) of the agency, the amount of the original obligation and outstanding balance. If any of these items are open, unsatisfied, indicate the status of each item as "open" or "unsatisfied."
18.	DURING THE PAST THREE (3) YEARS, HAS THE VENDOR FAILED TO: a) file returns or pay any applicable federal, state or city taxes? ☐ Yes ☐ No <i>Identify the taxing jurisdiction, type of tax, liability year(s), and tax liability amount the vendor failed to file/pay and the current status of the liability.</i> b) file returns or pay New York State unemployment insurance? ☐ Yes ☐ No <i>Indicate the years the vendor failed to file/pay the insurance and the current status of the liability.</i> c) Property Tax ☐ Yes ☐ No <i>Indicate the years the vendor failed to file.</i>
19.	HAVE ANY BANKRUPTCY PROCEEDINGS BEEN INITIATED BY OR AGAINST THE VENDOR OR ITS AFFILIATES I WITHIN THE PAST SEVEN (7) YEARS (WHETHER OR NOT CLOSED) OR IS ANY BANKRUPTCY PROCEEDING PENDING BY OR AGAINST THE VENDOR OR ITS AFFILIATES REGARDLESS OF THE DATE OF FILING? ☐ Yes ☐ No Indicate if this is applicable to the submitting vendor or affiliate. If it is an affiliate, include the affiliate's name and FEIN. Provide the court name, address and docket number. Indicate if the proceedings have been initiated, remain pending or have been closed. If closed, provide the date closed.
20.	IS THE VENDOR CURRENTLY INSOLVENT, OR DOES VENDOR CURRENTLY HAVE REASON TO BELIEVE THAT AN INVOLUNTARY BANKRUPTCY PROCEEDING MAY BE BROUGHT AGAINST IT? Provide financial information to support the vendor's current position, for example, Current Ration, Debt Ration, Age of Accounts Payable, Cash Flow and any documents that will provide the agency with an understanding of the vendor's situation. ☐ Yes ☐ No

21.	IN THE PAST FIVE (5) YEARS, HAS THE VENDOR OR ANY AFFILIATES ¹ :	☐ Yes	☐ No
	a) defaulted or been terminated on, or had its surety called upon to complete, any contract (public or private) awarded;		
Indicate if this is applicable to the submitting vendor or affiliate. Detail the situation(s) that gave rise to the negative action, any corrective action taken by the vendor and the name of the contracting agency.			

¹ “Affiliate” meaning: (a) any entity in which the vendor owns more than 50% of the voting stock; (b) any individual, entity or group of principal owners or officers who own more than 50% of the voting stock of the vendor; or (c) any entity whose voting stock is more than 50% owned by the same individual, entity or group described in clause (b). In addition, if a vendor owns less than 50% of the voting stock of another entity, but directs or has the right to direct such entity’s daily operations, that entity will be an “affiliate” for purposes of this questionnaire.

**ALBANY COUNTY
VENDOR RESPONSIBILITY QUESTIONNAIRE**

FEIN #

State of:)
) ss:
County of:)

CERTIFICATION:

The undersigned: recognizes that this questionnaire is submitted for the express purpose of assisting the County of Albany in making a determination regarding an award of contract or approval of a subcontract; acknowledges that the County may in its discretion, by means which it may choose, verify the truth and accuracy of all statements made herein; acknowledges that intentional submission of false or misleading information may constitute a felony under Penal Law Section 210.40 or a misdemeanor under Penal Law Section 210.35 or Section 210.45, and may also be punishable by a fine and/or imprisonment of up to five years under 18 USC Section 1001 and may result in contract termination; and states that the information submitted in this questionnaire and any attached pages is true, accurate and complete.

The undersigned certifies that he/she:

- Has not altered the content of the questions in the questionnaire in any manner;
- Has read and understands all of the items contained in the questionnaire and any pages attached by the submitting vendor;
- Has supplied full and complete responses to each item therein to the best of his/her knowledge, information ad belief;
- Is knowledgeable about the submitting vendor's business and operations;
- Understands that Albany County will rely on the information supplied in the questionnaire when entering into a contract with the vendor;
- Is under duty to notify the Albany County Purchasing Division of any material changes to the vendor's responses.

Name of Business

Signature of Owner _____

Address

Printed Name of Signatory _____

City, State, Zip

Title

Sworn before me this _____ day of _____, 20__;

Notary Public

Printed Name

Signature

Date

Attachment "D"
Certification Pursuant to Section 103-g
Of the New York State
General Municipal Law

- A. By submission of this bid/proposal, each bidder/proposer and each person signing on behalf of any bidder/proposer certifies, and in the case of a joint bid, each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that each bidder is not on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the New York State Finance Law.
- B. A Bid/Proposal shall not be considered for award, nor shall any award be made where the condition set forth in Paragraph A above has not been complied with; provided, however, that in any case the bidder/proposer cannot make the foregoing certification set forth in Paragraph A above, the bidder/proposer shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons therefor. Where Paragraph A above cannot be complied with, the Purchasing Unit to the political subdivision, public department, agency or official thereof to which the bid/proposal is made, or his designee, may award a bid/proposal, on a case by case business under the following circumstances:
1. The investment activities in Iran were made before April 12, 2012, the investment activities in Iran have not been expanded or renewed after April 12, 2012, and the Bidder/Proposer has adopted, publicized and is implementing a formal plan to cease the investment activities in Iran and to refrain from engaging in any new investments in Iran; or
 2. The political subdivision makes a determination that the goods or services are necessary for the political subdivision to perform its functions and that, absent such an exemption, the political subdivision would be unable to obtain the goods or services for which the contract is offered. Such determination shall be made in writing and shall be a public document.

Signature

Title

Date

Company Name

ATTACHMENT "E"

Sheet MS4-1: Bidder/Proposer Certification Statement (to be used with Section 34 Part A – General Contracts)

As a bidder seeking to provide services on behalf of Albany County, I certify under penalty of law that I understand and agree to comply with the terms and conditions of the New York State Pollutant Discharge Elimination System ("SPDES") General Permit for Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4 Permit) and Albany County Local Law 7 of 2007, and agree to implement any Best Management Practices or corrective actions identified by Albany County or an authorized representative thereof as necessary to maintain compliance. I understand that Albany County must comply with the terms and conditions of the aforementioned MS4 Permit, and that it is unlawful for any person to directly or indirectly cause or contribute to a violation of water quality standards. I am also aware that County Local Law 7 of 2007 prohibits any activities that cause or contribute to a violation of the County's SPDES permit. Further, I understand that any non-compliance by Albany County will not diminish, eliminate or lessen my own liability.

Name of Third Party Entity: _____

Address: _____

Phone Number(s): _____

Description of activities to be performed by your firm or organization within Albany County are related to the Albany County Storm Water Management Program (SWMP) (include any activities that have the potential to generate or prevent pollution and/or affect water quality):

Description of where the work is to be performed within Albany County facilities:

Signature

Printed Name

Title

Date

ATTACHMENT "F"
BIDDER QUALIFICATION QUESTIONNAIRE

The undersigned guarantees the accuracy of all statements and answers herein contained. (Please print in ink or type in the spaces provided). Attach additional sheets if necessary. This statement of Bidder's qualifications is required of all Bidders. Additional data on Bidder's qualifications may be requested from selected Bidders after the Bid opening.

1. How many years has your firm been in business? _____ years

2. List up to three (3) projects of this nature that you have completed in the last three (3) years, and give the name, address and telephone number of a reference from each. Also give the completion date, the original contract bid price and the completed cost of each project listed.

1. _____

2. _____

3. _____

BQ1

ATTACHMENT “F”
BIDDER QUALIFICATION QUESTIONNAIRE

3. List projects presently under contract by your firm, the dollar volume of the contract and the percentage completion of the contract.

4. Has your firm ever failed to complete work awarded to it, if so, state where and why.

5. Is your firm presently or has your firm ever been a party defendant in a lawsuit commenced against your firm alleging failure to properly complete work in accordance with the contract for same; if so, give details.

BQ2

ATTACHMENT "F"
BIDDER QUALIFICATION QUESTIONNAIRE

6. Has your firm received two (2) final determinations within any consecutive six-year period, the second final determination occurring within the past five (5) years, that your firm willfully failed to pay the prevailing rate of wages or to provide supplements with Article 8 of the Labor Law, if so, give details.

7. Do you plan to sublet any part of this work? If so, give details.

8. Give the name, address and telephone number of an individual who represents each of the following and whom the Owner may contact to investigate your financial responsibility: a surety, and a bank.

BQ3

ATTACHMENT "F"
BIDDER QUALIFICATION QUESTIONNAIRE

9. Give a summary of your financial statement. (List assets and liabilities, use an insert sheet, if needed).

10. State the true, exact, correct and complete name of the partnership, corporation or trade name under which you do business, and the address of the place of business. (If a corporation, state the name and title of all officers. If a partnership, state the name of all partners. If a trade name, state the names of the individuals who do business under the trade name.) It is absolutely necessary that information be furnished.

Correct Name of Bidder

(a) The business is a: _____

(b) The address of principal place of business is: _____

(c) The names of the corporate officers, or partners, or individuals doing business under a trade name, are as follows:

BQ4

ATTACHMENT "F"
BIDDER QUALIFICATION QUESTIONNAIRE

11. Is your firm qualified to do business in the State of New York? Yes ____ No ____.
If No, signing this qualification statement constitutes agreement to obtain such qualification prior to award of contract immediately upon owner's request.

Firm

Dated: _____

By _____

(Typed)

BQ5

ATTACHMENT "G"
NON-INTERRUPTION OF WORK AGREEMENT

By submission of the bid for:

The bidder agrees that if this bid is accepted, he/she will not intentionally engage in any course of conduct or activity, or employ for the purposes of performing the public work, any subcontractors, employees, labor or materials which will or may result in the interruption of the performance of the public work due to labor strife or unrest by workmen employed by the bidder or by any of the trades working in or about the public works and/or premises where the work is being performed.

Firm: _____

By: _____
(Signature)

(Typed)

Title: _____

Date: _____

County of Albany
Article SC19- Affirmative Action Plan

STATEMENT OF POLICY

The following is taken from Resolution No. 495 adopted by the Albany County Legislature on October 9, 2018.

Resolved, That the Albany County Legislature hereby approves and adopts the updates to the Affirmative Action Policy as reflected in the document annexed hereto, and be it further that the updated Affirmative Action Plan shall take effect immediately, and that the Commissioner of Human Resources and Director of the Division of Affirmative Action are directed to implement the policies reflected in the updated language of the Affirmative Action policy immediately and on a County-wide basis.

The following is taken from Resolution No. 26 adopted by the Albany County Legislature on June 10, 1996.

Resolved, By the Albany County Legislature that the Affirmative Action Plan so endorsed by the Albany County Executive and which is currently on file with the Clerk of the County Legislature, shall be the official plan of the County of Albany including the objectives, procedures and goals so stipulated.

It is the policy of the County of Albany that Minority Business Enterprises (MBE) and Woman Business Enterprises (WBE) are afforded the maximum opportunity to participate in the performance of contracts, in excess of \$100,000, let by the County and its several agencies and authorities. The County commits itself to a goal oriented Contract Compliance Program which assures that Minority Business Enterprises and Woman Business Enterprises are considered in awarding contracts for goods, services and construction. Furthermore, it is the policy of the County of Albany that contractors and subcontractors utilize minority and women labor to the greatest extent feasible.

In bidding on this contract, the contractor acknowledges an understanding of this policy. The contractor shall carry out the policy by making every reasonable effort to award contracts and subcontracts to MBEs and WBEs and utilizing minority and women labor in the performance of this contract.

ANTI-DISCRIMINATION CLAUSE 220-E - NYS Labor Law. Provisions in contracts prohibiting discrimination on account of race, creed, color or national origin in employment of citizens upon public works. Every contract for or on behalf of the state or a municipality for the construction, alteration or repair of any public building or public work or for the manufacture, sale or distribution of materials, equipment or supplies shall contain provisions by which the contractor with the state or municipality agrees: (a) That in the hiring of employees for the performance of work under this contract or any subcontract hereunder, no contractor, subcontractor, nor any person acting on behalf of such contractor or subcontractor, shall by reason of race, creed, color, disability, sex or national origin discriminate against any citizen of the state of New York who is qualified and available to perform the work to which the employment relates; (b) That no contractor, subcontractor, nor any person on his behalf shall, in any manner, discriminate against or intimidate any employee hired for the performance of work under this contract on account of race, creed, color, disability, sex or national origin; (c) That there may be deducted from the amount payable to the contractor by the state or municipality under this contract a penalty of fifty dollars for each person for each calendar day during which such person was discriminated against or intimidated in violation of the provisions of the contract; (d) That this contract may be cancelled or terminated by the state or municipality, and all moneys due or to become due hereunder may be forfeited, for a second or any subsequent violation of the terms or conditions of this section of the contract; and (e) The aforesaid provisions of this section covering every contract for or on behalf of the state or a municipality for the manufacture, sale or distribution of materials, equipment or supplies shall be limited to operations performed within the territorial limits of the state of New York.

ADMINISTRATION

The County's Division of Affirmative Action is charged with the responsibility of monitoring Affirmative Action in all contracts. All County procurements will be made with an understanding that the complete participation of bona fide MBE and WBE shall be assured by balanced and equitable contract involvement.

The **subcontracting participation goals** for County public procurements are:

- to award 7% of the total dollar value of the contract to a certified MBE.
- to award 5% of the total dollar value of the contract to a certified WBE.

The **workforce goals** for County public procurements are as follows:

- 7% of the total workforce should be minorities.
- 5% of the total workforce should be women.

• CONTRACTOR'S RESPONSIBILITIES

The Contractor's responsibilities include, but are not limited to, the following. The Contractor **must**:

- 1) Submit to the Division of Affirmative Action a completed Schedule of MBE/WBE and Labor Performance or Request for Waiver within **fifteen (15) days** of receiving the Notice of Award.
- 2) Prior to being issued a Notice to Proceed, submit evidence of MBE/WBE contracts proposed to the Division of Affirmative Action.
- 3) Submit monthly utilization reports to the Division of Affirmative Action for review.
- 4) Immediately notify the Division of Affirmative Action of any changes during the project, especially if the change affects the Schedule of MBE/WBE and Labor Performance submitted for the project.
- 5) Make good faith efforts to replace an MBE/WBE subcontractor that is unable to perform successfully with another MBE/WBE.
- 6) Notify the Division of Affirmative Action of any suspected instances of companies fraudulently claiming MBE/WBE status.
- 7) If possible, provide any needed technical assistance to MBE/WBE firms under subcontract.
- 8) If possible, design payment schedules to minimize cash flow problems faced by MBEs/WBEs.
- 9) Maintain for three years such records as are necessary to determine compliance with MBE/WBE obligations and to submit regular reports to enable the Albany County MBE Officer to monitor this compliance.

• DEVELOPING A SCHEDULE OF MBE/WBE AND LABOR PERFORMANCE

The Schedule of MBE/WBE and Labor Performance must detail:

1. The contractor's name, address, phone number, federal identification number and the total dollar value of the contract.
2. Whether the contract is a joint venture.
3. The MBE and WBE goal for the contract.
4. A brief description of each proposed subcontractor, including the name, address, phone number, federal identification number and the total dollar amount of each subcontractor.
5. An estimate of the total number of hours to be worked on the project.

• COMPLIANCE

Each contractor must furnish monthly utilization reports while working on the project. The reports must detail the total number of hours worked, total minority /female labor hours and payments made to MBE and WBE firms.

- **WAIVER REQUEST FOR SUBCONTRACTING AND/OR LABOR PERFORMANCE**

Contractors which determine that the subcontracting and/or labor participation goals must cannot be achieved **must** request a waiver within **fifteen (15) days** of receiving the Notice of Award. The request must justify why the firm cannot accomplish the subcontracting and/or labor participation goals established for the project. The justification must detail actions taken to solicit MBE/WBE subcontractors, minority or female labor participation and the impediments encountered. Each waiver request will be evaluated individually. Submission of the request for waiver does **not** guarantee the requirements will be waived. Additional information or supporting documentation may be required to determine a contractor's good faith effort.

- **MBE/WBE RESPONSIBILITIES**

Each Minority Business Enterprise/Woman Business Enterprise shall:

1. Establish through certification that the company is a bona fide MBE/WBE. The Division of Affirmative Action reviews MBE/WBE eligibility status for contractors and subcontractors.
2. Exhibit an interest in bidding a particular project by attending pre-bid conferences and/or by responding timely to contract solicitations for bid quotations prior to bid date.
3. Be responsible for entering into all necessary contractual agreements.
4. Arrange for and supervise contract performance.
5. Secure equipment, materials and crew sufficient to complete their contract or subcontract.
6. Provide bonding, insurance and collateral as required for surety in contract performance.
7. Authorize payrolls, payments and reports as required for routine compliance.

The County will accept MBE/WBE Certifications made by other governmental agencies which are in compliance with our DBE policy.

SANCTIONS

SC-19.5.1

If **CONTRACTOR** cannot meet the WBE/MBE participation goals, he must document to the Albany County MBE Officer, that he has made all positive efforts to achieve it. Failure to meet the goals or to document that all positive efforts have been made to achieve it may result in the County invoking any legal or equitable remedy available to the County for breach of contract including withholding future payments under the **CONTRACT** involved; disqualification of the **CONTRACTOR** from future contracting opportunities for a period not to exceed two years; and cancellation of the contract and declaration of forfeiture of the **PERFORMANCE BOND**.

A decision by the Albany County MBE Officer to invoke the above sanctions shall be issued in writing by registered mail. The **CONTRACTOR** shall have ten (10) days from receipt of the decision to appeal the MBE Officer's decision to the Grievance committee of the Albany County Legislature. Both sides of the dispute shall have the opportunity to be heard at a meeting of the Grievance Committee to be held within ten (10) days of the receipt of an appeal, and the Committee shall send a final decision to both sides within ten (10) days by registered mail (or hand delivery in the case of the MBE Officer's copy).

STANDARDS

A **Minority Business Enterprise (MBE)** shall be any business enterprise which is at least fifty-one percent (51%) owned or in that case of a publicly-owned business, at least fifty-one percent (51%) of the common stock of which is owned, by a minority person(s), and such ownership interest is real, substantial and continuing. The minority ownership must have and exercise the authority to independently control the business decisions of the entity.

A **Woman Business Enterprise (WBE)** shall be any business enterprise which is at least fifty-one percent (51%) owned or in the case of a publicly-owned business, at least fifty-one percent (51%) of the common stock of which is owned, by a woman (women), and such ownership interest is real, substantial and continuing. The woman ownership must have and exercise the authority to independently control the business decisions of the entity. WBEs shall not be considered as MBEs unless 51% of the assets of the company is held by a minority person(s).

A **Disadvantaged Business Enterprise (DBE)** mean a business enterprise controlled by one or more socially or economically disadvantaged individuals and whose management and daily business operations are controlled by one or more socially and economically disadvantaged individuals who own it. Such disadvantaged may arise from cultural, racial, chronic economic circumstances or background or other similar cause. Such persons include, but are not limited to citizens of the United States (or lawfully admitted permanent residents) and who are African Americans, Puerto Ricans, Hispanic Americans, Asian-Pacific Americans, American Indians, Eskimos, Aleuts, Asian Indians and Women.

Minority: A person who is a member of one or more of the following groups:

- A) Black (not of Hispanic origin) – a person having origins in any of the Black racial group of Africa.
- B) Hispanic -- a person of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish culture or origin, regardless of race.
- C) Asian or Pacific Islander – a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands. This area includes, for example, China, Japan, Korea, the Philippine Islands and Samoa.
- D) Native American or Alaskan Natives – a person having origins in any of the original peoples of North America, and who maintains cultural identification through tribal affiliation or community recognition.

Woman: A person who is of the feminine gender who are not otherwise classified as a minority. For

assistance or additional information, contact

County of Albany

Division of Affirmative Action

112 State Street, Room 900, Albany, NY 12207

Phone: (518) 447-7010

Fax: (518) 447-5586

County of Albany
Division of Affirmative Action
MBE/WBE Compliance Forms



Daniel P. McCoy
Albany County Executive

County of Albany
Schedule of MBE/WBE and Labor Performance

The Division of Affirmative Action monitors subcontracting and labor participation for contracts let by agencies and authorities of Albany County. The Schedule of MBE/WBE and Labor Performance must be completed and submitted within 15 days of receiving the Notice of Award. The figures represent the contractor's best estimate of workforce needs and minority/female representation of that workforce.

Questions regarding completion of this form can be directed to the County of Albany, Division of Affirmative Action at (518) 447-7010.

Contractor: _____ Address: _____

City: _____ State: _____ Zip: _____

Telephone: _____ Fax Number: _____ Federal ID No.: _____

Project Name: _____ Project Cost: _____ Completion Date: _____

Contract Description: _____

Bidder is an approved ☐ MBE ☐ WBE

If yes, specify agency: _____

Joint Venture

MBE/WBE participation is broken down into Joint Ventures with Bidder, Subcontracting Construction, Trucking or Services, and Materials or Supplies. Joint ventures between the Prime Bidder and MBE/WBE firms are shown below. Joint Ventures with Bidder (check one):

No MBE/WBE joint ventures
with Bidder on this Contract.

Bidder is joint venturing with the following firm(s)
(Attach a copy of joint venture agreements to this form)

Name: _____ Address: _____

City: _____ State: _____ Zip: _____

Telephone: _____ Federal ID No.: _____

MBE Share of Joint Venture: _____ % x Total Bid Amount = \$ _____

WBE Share of Joint Venture: _____ % x Total Bid Amount = \$ _____

Sub-contractor Performance

MBE Goal: 7% x Total Bid Amount = \$ _____

WBE Goal: 5% x Total Bid Amount = \$ _____

Please provide the information requested for **all** subcontractors participating on this project (include MBE/WBE firms).

Sub-contractor Name, Address, Phone	MBE, WBE or N/A	Amount of Sub- contract & Award Date	Description of Work (Trade)	Start Date Completion Date	Contracted Payment Schedule
	Select				
	Select				
	Select				
	Select				
	Select				
	Select				
	Select				
	Select				
	Select				
	Select				

I, _____, representative of _____
declare that the information provided is true and represents accurately my firm’s efforts to comply with the Affirmative Action Policy. We shall continue to make every effort to ensure that MBE/WBE firms have the maximum opportunity to compete for, and perform contracts let by the County of Albany.

SUBMIT MONTHLY**County of Albany MBE/WBE and
Labor Performance
Monthly Utilization Report**

This report must be completed by each firm working on the site and submitted to the General Contractor on a monthly basis. The General Contractor forwards the reports to the County of Albany, Division of Affirmative Action, 112 State Street, Room 900, Albany, NY 12207. Fax (518) 447-5560. For assistance, call (518) 447-7010.

Contractor:_____ Address:_____

City:_____ State:_____ Zip:_____

Telephone:_____ Fax Number:_____ Federal ID No.:_____

Project Name:_____ Project Cost:_____ Completion Date:_____

Reporting Period: _____ Month _____ Year

Trade	Number of Hours Worked by Minorities	Number of Hours Worked by Women	Number of Hours Worked by Non-Minorities	Total Hours Worked
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
Total(s):	0.00	0.00	0.00	0.00

Information Provided By _____

Date _____

MBE/WBE Payments

MBE/WBE Firm(s) Participating on the Project	Payments Made this Month	Payments Made to Date

INSTRUCTIONS

This form must be completed and submitted by the Contractor/Vendor by the **10th** of each month for the duration of the contract. The form must be accompanied by copies of checks (front and back) made payable to MBE/WBE subcontractor and suppliers.

This form is required pursuant to the contract specifications. Failure to submit will result in non-compliance.

County of Albany
Department of Human Resources Division of
Affirmative Action
112 State Street, Room 900, Albany, NY 12207
Phone:(518) 447-7010

NOTE: IF THERE IS NO ACTIVITY FOR THE REPORTING PERIOD, PLEASE NOTE ACCORDINGLY.

County of Albany
Waiver Request for MBE/WBE Subcontracting and/or Labor Performance

If your firm has determined that it is not feasible to meet the subcontracting and/or labor performance goals specified in the contract, complete and return this form within fifteen days of the Intent to Award. The request must identify reasons why the firm cannot reach the labor and subcontractor goals applicable. The Division of Affirmative Action will evaluate each waiver individually. Please be advised that sub- mission of this request does not guarantee waiver of the requirements. Attach additional sheets if necessary. Please refer to the County of Albany Criteria for Establishing Good Faith Effort.

Contractor:_____ Address:_____

City:_____ State:_____ Zip:_____

Telephone:_____ Fax Number:_____ Federal ID No.:_____

Contract Type/Number:_____ Project Cost:_____

(☐) **Request Waiver of Minority/Women Labor Participation Goal. Please explain:**

Actions taken to include minority/women labor _____

(☐) **Request Waiver of Minority Subcontractor Participation Goal. Please explain:**

Actions taken to include MBE and/or WBE Subcontractor(s) _____

Signature

Name (Printed)

Title

County Of Albany
Criteria for Establishing Good Faith Effort

The following list of the good faith efforts criteria complies with NYS Executive Law, Article 15-A which should be considered for determining whether a contractor has documented good faith efforts:

1. Was a completed, acceptable utilization plan submitted in accordance with applicable requirements to meet goals for participation of certified minority and women-owned business enterprises established in the same contract?
2. Were advertisements placed in appropriate trade, general circulation and minority and women- oriented publications in a timely fashion?
3. Were written solicitations made in a timely fashion of certified minority and women-owned business enterprises listed in the directory of certified business?
4. Were timely responses to any such advertisements and solicitations provided by certified minority and women-owned business enterprises?
5. Did the contractor attend pre-bid, pre-award, or other meetings, if any, scheduled by the agency awarding the contract, with certified minority or women-owned business enterprises which the State or County agency determined were capable of performing the contract scope of work, for purposes of complying with goal requirements?
6. What efforts were undertaken by the contractor to reasonably structure the contract scope of work for purposes of subcontracting with certified minority and women-owned business enterprises?
7. How many minority and women-owned business enterprises in the directories of certified businesses could perform work required by the contract scope of work in your region?
8. What actions were taken to contact and assess the financial ability of certified minority and women- owned businesses enterprises to participation on the contract, and which enterprises are located out- side of the region in which the contract scope of work was or will be performed?
9. Were relevant plans, specification or terms and conditions of the contract, necessary to prepare an informed response to a contractor solicitation, provided in a timely fashion to certified minority or women-owned business enterprises?
10. What subcontract terms and conditions were offered to certified minority and women- owned business enterprises, and how do those subcontract terms and conditions compare to those offered in the ordinary course of the contractor's business and to other subcontractors of the contractor?
11. Has the contractor made payments for work performed by certified minority and women- owned business enterprises in a timely fashion so as to facilitate continued performance by certified minority or women-owned business enterprises?
12. Has the contractor offered to make up any inability to comply with the minority and women-owned business enterprise goals established in a contract, in other contracts being performed or to be awarded to the contractor?

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provision of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings, and details to determine type and extent of work there if affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 FORM OF AGREEMENT AND GENERAL CONDITIONS

- A. The following form of Owner/Contractor Agreement and form of the General Conditions shall be used for Project:
 - 1. AIA Document A101-2017 "Standard Form of Agreement between Owner and Contractor Where the Basis of Payment is a Stipulated Sum."
 - a. The General Conditions for Project are AIA Document A201-2017 "General Conditions of the Contract for Construction."
 - 2. The General Conditions are included in the Project Manual.
 - 3. Owner's document(s) bound following this Document.

1.3 ADMINISTRATIVE FORMS

- A. Administrative Forms: Additional administrative forms are specified in Division 01 General Requirements.
- B. Copies of AIA standard forms may be obtained from the American Institute of Architects;
www.aiacontractdocsaiacontracts.org ; (800) 942-7732.
- C. Preconstruction Forms:
 - 1. Form of Certificate of Insurance: AIA Document G715-2017 "Supplemental Attachment for ACORD Certificate of Insurance 25."
- D. Information and Modification Forms:
 - 1. Form for Requests for Information (RFIs): AIA Document G716-2004 "Request for Information (RFI)."
 - 2. Form of Request for Proposal: AIA Document G709-2018 "Proposal Request."

3. Change Order Form: AIA Document G701-2017 "Change Order."
4. Form of Architect's Memorandum for Minor Changes in the Work: AIA Document G710-2017 "Architect's Supplemental Instructions."
5. Form of Change Directive: AIA Document G714-2017 "Construction Change Directive."

E. Payment Forms:

1. Schedule of Values Form: AIA Document G703-1992 "Continuation Sheet."
2. Payment Application: AIA Document G702-1992/703-1992 "Application and Certificate for Payment and Continuation Sheet."
3. Form of Contractor's Affidavit: AIA Document G706-1994 "Contractor's Affidavit of Payment of Debts and Claims."
4. Form of Affidavit of Release of Liens: AIA Document G706A-1994 "Contractor's Affidavit of Payment of Release of Liens."
5. Form of Consent of Surety: AIA Document G707-1994 "Consent of Surety to Final Payment."

PART- 2 PRODUCTS (NOT USED)

PART- 3 EXECUTION (NOT USED)

END OF SECTION 00 6000



AIA[®] Document A312[™] – 2010

Performance Bond

CONTRACTOR:

(Name, legal status and address)

SURETY:

(Name, legal status and principal place of business)

OWNER:

(Name, legal status and address)

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONSTRUCTION CONTRACT

Date:

Amount:

Description:

(Name and location)

BOND

Date:

(Not earlier than Construction Contract Date)

Amount:

Modifications to this Bond: ☐ None ☐ See Section 16

CONTRACTOR AS PRINCIPAL

Company: (Corporate Seal)

SURETY

Company: (Corporate Seal)

Signature: _____ Signature: _____
 Name Name
 and Title: and Title:
 (Any additional signatures appear on the last page of this Performance Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:

OWNER'S REPRESENTATIVE:

(Architect, Engineer or other party:)

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

- .1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;
- .2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
- .3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

- .1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
- .2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

- .1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
- .2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and
- .3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 **Balance of the Contract Price.** The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 **Construction Contract.** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 **Contractor Default.** Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 **Owner Default.** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 **Contract Documents.** All the documents that comprise the agreement between the Owner and Contractor.

§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

Sample

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

SURETY

Company:

(Corporate Seal)

Company:

(Corporate Seal)

Signature: _____

Name and Title: _____

Address _____

Signature: _____

Name and Title: _____

Address _____



AIA[®] Document A312[™] – 2010

Payment Bond

CONTRACTOR:

(Name, legal status and address)

SURETY:

(Name, legal status and principal place of business)

OWNER:

(Name, legal status and address)

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONSTRUCTION CONTRACT

Date:

Amount:

Description:

(Name and location)

BOND

Date:

(Not earlier than Construction Contract Date)

Amount:

Modifications to this Bond: ☐ None ☐ See Section 18

CONTRACTOR AS PRINCIPAL

Company: (Corporate Seal)

SURETY

Company: (Corporate Seal)

Signature: _____

Name

and Title:

(Any additional signatures appear on the last page of this Payment Bond.)

Signature: _____

Name

and Title:

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:

OWNER'S REPRESENTATIVE:

(Architect, Engineer or other party:)

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

- .1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
- .2 have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- .1 the name of the Claimant;
- .2 the name of the person for whom the labor was done, or materials or equipment furnished;
- .3 a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- .4 a brief description of the labor, materials or equipment furnished;
- .5 the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- .6 the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- .7 the total amount of previous payments received by the Claimant; and
- .8 the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 Claimant. An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

§ 16.4 **Owner Default.** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 16.5 **Contract Documents.** All the documents that comprise the agreement between the Owner and Contractor.

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

SURETY

Company:

(Corporate Seal)

Company:

(Corporate Seal)

Signature: _____

Name and Title: _____

Address _____

Signature: _____

Name and Title: _____

Address _____

Application and Certificate for Payment

TO OWNER: PROJECT: APPLICATION NO: DISTRIBUTION TO:
PERIOD TO: OWNER ☐
CONTRACT FOR: ARCHITECT ☐
CONTRACT DATE: CONTRACTOR ☐
PROJECT NOS: / / FIELD ☐
OTHER ☐

FROM CONTRACTOR: VIA ARCHITECT:

CONTRACTOR'S APPLICATION FOR PAYMENT
Application is made for payment, as shown below, in connection with the Contract.
AIA Document G703®, Continuation Sheet, is attached.

1. ORIGINAL CONTRACT SUM \$
2. NET CHANGE BY CHANGE ORDERS \$
3. CONTRACT SUM TO DATE (Line 1 ± 2) \$
4. TOTAL COMPLETED & STORED TO DATE (Column G on G703) \$
5. RETAINAGE:
a. % of Completed Work (Columns D + E on G703) \$
b. % of Stored Material (Column F on G703) \$
Total Retainage (Lines 5a + 5b, or Total in Column I of G703) \$

6. TOTAL EARNED LESS RETAINAGE (Line 4 minus Line 5 Total) \$
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT (Line 6 from prior Certificate) \$
8. CURRENT PAYMENT DUE \$
9. BALANCE TO FINISH, INCLUDING RETAINAGE (Line 3 minus Line 6) \$

CHANGE ORDER SUMMARY		ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	\$	\$	\$
Total approved this month	\$	\$	\$
TOTAL	\$	\$	\$
NET CHANGES by Change Order	\$		

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:
By: _____ Date: _____
State of: _____
County of: _____
Subscribed and sworn to before me this _____ day of _____
Notary Public: _____
My commission expires: _____

ARCHITECT'S CERTIFICATE FOR PAYMENT
In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED \$
(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

ARCHITECT:
By: _____ Date: _____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.



AIA[®]

Document G716[™] – 2004

Request for Information (RFI)

TO:

FROM:

PROJECT:

ISSUE DATE:

RFI No.:

REQUESTED REPLY DATE:

PROJECT NUMBERS:

COPIES TO:

RFI DESCRIPTION: *(Fully describe the question or type of information requested.)*

REFERENCES/ATTACHMENTS: *(List specific documents researched when seeking the information requested.)*

SPECIFICATIONS

DRAWINGS

OTHER

SENDER'S RECOMMENDATION: *(If RFI concerns a site or construction condition, the sender may provide a recommended solution, including cost and/or schedule considerations.)*

RECEIVER'S REPLY: *(Provide answer to RFI, including cost and/or schedule considerations.)*

By: _____ Date: _____ Copies to: _____

NOTE: This reply is not an authorization to proceed with work involving additional cost, time or both. If any reply requires a change to the Contract Documents, a Change Order, Construction Change Directive or a Minor Change in the work must be executed in accordance with the Contract Documents.

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020711ACD44



AIA® Document G714™ – 2017

Construction Change Directive

PROJECT: (name and address)

CONTRACT INFORMATION:

Contract For:

Date:

CCD INFORMATION:

Directive Number:

Date:

OWNER: (name and address)

ARCHITECT: (name and address)

CONTRACTOR: (name and address)

The Contractor is hereby directed to make the following change(s) in this Contract:
(Insert a detailed description of the change and, if applicable, attach or reference specific exhibits.)

PROPOSED ADJUSTMENTS

1. The proposed basis of adjustment to the Contract Sum or Guaranteed Maximum Price:

- ☐ Lump Sum (increase) (decrease) of \$
- ☐ Unit Price of \$ per
- ☐ Cost, as defined below, plus the following fee:
(Insert a definition of, or method for determining, cost)

☐ As follows:

2. The Contract Time is proposed to (be adjusted) (remain unchanged). The proposed adjustment, if any, is (an increase of days) (a decrease of days).

NOTE: The Owner, Architect and Contractor should execute a Change Order to supersede this Construction Change Directive to the extent they agree upon adjustments to the Contract Sum, Contract Time, or Guaranteed Maximum price for the change(s) described herein.

When signed by the Owner and Architect and received by the Contractor, this document becomes effective IMMEDIATELY as a Construction Change Directive (CCD), and the Contractor shall proceed with the change(s) described above.

Contractor signature indicates agreement with the proposed adjustments in Contract Sum and Contract Time set forth in this CCD.

ARCHITECT (Firm name)

OWNER (Firm name)

CONTRACTOR (Firm name)

SIGNATURE

SIGNATURE

SIGNATURE

PRINTED NAME AND TITLE

PRINTED NAME AND TITLE

PRINTED NAME AND TITLE

DATE

DATE

DATE



AIA®

Document G709™ – 2018

Proposal Request

PROJECT: *(name and address):*

CONTRACT INFORMATION:

Contract For:
Date:

Architect's Project number:
Proposal Request Number:
Proposal Request Date:

OWNER: *(name and address):*

ARCHITECT: *(name and address):*

CONTRACTOR: *(name and address):*

The Owner requests an itemized proposal for changes to the Contract Sum and Contract Time for proposed modifications to the Contract Documents described herein. The Contractor shall submit this proposal within _____ () days or notify the Architect in writing of the anticipated date of submission.

(Insert a detailed description of the proposed modifications to the Contract Documents and, if applicable, attach or reference specific exhibits.)

THIS IS NOT A CHANGE ORDER, A CONSTRUCTION CHANGE DIRECTIVE, OR A DIRECTION TO PROCEED WITH THE WORK DESCRIBED IN THE PROPOSED MODIFICATIONS.

REQUESTED BY THE ARCHITECT:

PRINTED NAME AND TITLE

**AIA**[®]**Document G701[™] – 2017****Change Order****PROJECT:** *(name and address)***CONTRACT INFORMATION:**

Contract For:

Date:

CHANGE ORDER INFORMATION:

Change Order Number:

Date:

OWNER: *(name and address)***ARCHITECT:** *(name and address)***CONTRACTOR:** *(name and address)***THE CONTRACT IS CHANGED AS FOLLOWS:***(Insert a detailed description of the change and, if applicable, attach or reference specific exhibits. Also include agreed upon adjustments attributable to executed Construction Change Directives.)*

The original (Contract Sum) (Guaranteed Maximum Price) was \$ _____

The net change by previously authorized Change Orders \$ _____

The (Contract Sum) (Guaranteed Maximum Price) prior to this Change Order was \$ _____

The (Contract Sum) (Guaranteed Maximum Price) will be (increased) (decreased) (unchanged) by this Change Order in the amount of \$ _____

The new (Contract Sum) (Guaranteed Maximum Price), including this Change Order, will be \$ _____

The Contract Time will be (increased) (decreased) (unchanged) by () days.

The new date of Substantial Completion will be

NOTE: This Change Order does not include adjustments to the Contract Sum or Guaranteed Maximum Price, or the Contract Time, that have been authorized by Construction Change Directive until the cost and time have been agreed upon by both the Owner and Contractor, in which case a Change Order is executed to supersede the Construction Change Directive.

NOT VALID UNTIL SIGNED BY THE ARCHITECT, CONTRACTOR AND OWNER.**ARCHITECT** *(Firm name)***CONTRACTOR** *(Firm name)***OWNER** *(Firm name)***SIGNATURE****SIGNATURE****SIGNATURE****PRINTED NAME AND TITLE****PRINTED NAME AND TITLE****PRINTED NAME AND TITLE****DATE****DATE****DATE**



AIA®

Document G704™ – 2017

Certificate of Substantial CompletionPROJECT: *(name and address)*

CONTRACT INFORMATION:

Contract For:

Date:

CERTIFICATE INFORMATION:

Certificate Number:

Date:

OWNER: *(name and address)*ARCHITECT: *(name and address)*CONTRACTOR: *(name and address)*

The Work identified below has been reviewed and found, to the Architect's best knowledge, information, and belief, to be substantially complete. Substantial Completion is the stage in the progress of the Work when the Work or designated portion is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. The date of Substantial Completion of the Project or portion designated below is the date established by this Certificate.

(Identify the Work, or portion thereof, that is substantially complete.)

ARCHITECT *(Firm Name)*

SIGNATURE

PRINTED NAME AND TITLE

DATE OF SUBSTANTIAL COMPLETION

WARRANTIES

The date of Substantial Completion of the Project or portion designated above is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below:

(Identify warranties that do not commence on the date of Substantial Completion, if any, and indicate their date of commencement.)

WORK TO BE COMPLETED OR CORRECTED

A list of items to be completed or corrected is attached hereto, or transmitted as agreed upon by the parties, and identified as follows:

(Identify the list of Work to be completed or corrected.)

The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Unless otherwise agreed to in writing, the date of commencement of warranties for items on the attached list will be the date of issuance of the final Certificate of Payment or the date of final payment, whichever occurs first. The Contractor will complete or correct the Work on the list of items attached hereto within () days from the above date of Substantial Completion.

Cost estimate of Work to be completed or corrected: \$

The responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work, insurance, and other items identified below shall be as follows:

(Note: Owner's and Contractor's legal and insurance counsel should review insurance requirements and coverage.)

The Owner and Contractor hereby accept the responsibilities assigned to them in this Certificate of Substantial Completion:

CONTRACTOR *(Firm Name)*

SIGNATURE

PRINTED NAME AND TITLE

DATE

OWNER *(Firm Name)*

SIGNATURE

PRINTED NAME AND TITLE

DATE

AIA[®] Document G706A[™] – 1994

Contractor's Affidavit of Release of Liens

PROJECT: *(Name and address)*

ARCHITECT'S PROJECT NUMBER:

OWNER ☐

CONTRACT FOR:

ARCHITECT ☐

CONTRACTOR ☐

TO OWNER: *(Name and address)*

CONTRACT DATED:

SURETY ☐

OTHER ☐

STATE OF:

COUNTY OF:

The undersigned hereby certifies that to the best of the undersigned's knowledge, information and belief, except as listed below, the Releases or Waivers of Lien attached hereto include the Contractor, all Subcontractors, all suppliers of materials and equipment, and all performers of Work, labor or services who have or may have liens or encumbrances or the right to assert liens or encumbrances against any property of the Owner arising in any manner out of the performance of the Contract referenced above.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.
2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.

CONTRACTOR: *(Name and address)*

BY:

(Signature of authorized representative)

(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:

My Commission Expires:

CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.

PART- 1 GENERAL

1.1 POLICY

- A. As a service to Contractor, subcontractors, vendors, material suppliers and others needing electronic copies of Drawings, the Architect will provide CAD files electronically in accordance with the following policy:
1. By acceptance it is understood and agreed that the data and medium being supplied is to be used only for the project referenced.
 2. It is further understood and agreed that the undersigned will hold Angerame Architects, P.C. and/or its consultants harmless and indemnify Angerame Architects, P.C. and/or its consultants from all claims, liabilities, losses, and so forth, including attorney's fees arising out of the use or misuse of the transferred files.
 3. It is understood and agreed that the files transmitted are prepared from CAD files current at the time of preparation. All files are AutoCAD Architecture version 2019 dwg files.
 4. This information does not waive the need to verify and review current field conditions and the status of Addenda and/or Bulletin documentation.
 5. As a record of information to be transmitted, Angerame Architects, P.C. and/or its consultants will prepare a duplicate electronic back-up for its record.
 6. Compensation Fee for providing this material will be as follows:
 - a. Base Fee of \$250 for 1 to 2 Drawings.
 - b. Base Fee of \$500 for 3 to 5 Drawings.
 - c. For each additional Drawing after 5, the fee is \$75 per Drawing.
 - i. Example: 8 Drawings = \$725.
 - d. A signed copy of the Release Form and Fee must be provided before the files will be released.

1.2 REQUEST PROCEDURE

- A. To receive Drawing CAD files the Release Form must be completed in full and submitted to Angerame Architects, P.C.
1. A signed copy of the Release Form must be submitted.
 - a. Emailed copies will be accepted.

2. Upon remittance of the signed Release Form and Fee, allow five working days for processing.
3. Transmission of Drawings will be provided electronically after the receipt of Fee.

1.3 RELEASE FORM

- A. A. Release Form is located immediately after this Section. Refer to Section 00 8200.01 Electronic Files Release Form.

PART- 2 PRODUCTS (NOT USED)

PART- 3 EXECUTION

END OF SECTION 00 8200

A n g e r a m e

A r c h i t e c t s • P . C .

Architecture
Planning
Interior Design

RE: Authorization Form for CAD File Transfers

Project Name: Albany County Shaker Place Rehabilitation & Nursing Center Café Renovation

Dear Sir / Madame

At your request, Angerame Architects, P.C. will provide electronic files for your use, subject to the following terms and conditions:

1. Angerame Architects, P.C.'s electronic files are compatible with AutoDesk Architecture 2019. Angerame Architects, P.C. makes no representation as to the compatibility of these files with your hardware or your software beyond the specified release of the referenced specifications.
2. Data contained on these electronic files is part of Angerame Architects, P.C.'s instruments of service and shall not be used by you or anyone else receiving this data through or from you for any purpose other than for the referenced project. Any other use or reuse by you or by others will be at your sole risk and without liability or legal exposure to Angerame Architects, P.C. You agree to make no claim and hereby waive, to the fullest extent permitted by law, any claim or cause of action of any nature against Angerame Architects, P.C., its officers, directors, employees, agents or sub-consultants which may arise out of or in connection with your use of the electronic files.
3. Furthermore, you shall, to the fullest extent permitted by law, indemnify and hold harmless Angerame Architects, P.C. from all claims, damages, losses and expenses, including attorney's fees arising out of or resulting from your use of these electronic files.
4. These electronic files are not Contract Documents. Significant differences may exist between these electronic files and corresponding hard copy Contract Documents due to addenda, charge orders or other revisions. Angerame Architects, P.C. makes no representation regarding the accuracy or completeness of the electronic files you receive. In the event that a conflict arises between the signed documents prepared by Angerame Architects, P.C. and electronic files, the signed Contract Documents shall govern. You are responsible for determining if any conflict exists. By your use of these electronic files, you are not relieved of your duty to fully comply with the Contract Documents, including and without limitation, the need to check, confirm and coordinate all dimensions and details, take field measurements, verify field conditions and coordinate your work with that of other contractors for the project.
5. Because of the potential that the information presented on the electronic files can be modified, unintentionally or otherwise, Angerame Architects, P.C. reserves the right to remove all indicia of its ownership and/or involvement for each electronic display.

6. Under no circumstances shall delivery of the electronic files for use by you be deemed a sale by Angerame Architects, P.C. and Angerame Architects, P.C. makes no warranties, either expressed or implied of merchantability and fitness for any particular purpose. In no event shall Angerame Architects, P.C. be liable for any loss of profit or any consequential damages.

7. Compensation Fee for providing this material will be as follows:

- a. Base Fee of \$250 for 1 to 2 Drawings.
- b. Base Fee of \$500 for 3 to 5 Drawings.
- c. For each additional Drawing after 5, the fee is \$75 per Drawing.
- d. Example: 8 Drawings = \$725.

8. Payment must be provided along with a signed copy of this form before files will be released. Please remit to Angerame Architects, P.C. and allow five working days for processing.

Fee:\$_____ Requested Drawings: _____

Firm Requesting Files: _____

Company: _____

Address: _____

Signed: _____ Date: _____

Printed Name / Title: _____

Phone: _____ Email: _____

To Be Completed By Angerame Architects, P.C.

Released (signed by): _____ Angerame Architects, P.C.

Printed Name/Title: _____ Date: _____

COUNTY OF ALBANY

REQUEST FOR BIDS SHAKER PLACE NURSING AND REHABILITATION CENTER



RFB #2024-150

SHAKER PLACE CAFÉ PROJECT

VOLUME 1

**ALBANY COUNTY DEPARTMENT OF GENERAL SERVICES
PURCHASING DIVISION
PAMELA O NEILL, PURCHASING AGENT
112 STATE STREET, ROOM 1000
ALBANY, NY 12207**

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provision of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings, and details to determine type and extent of work there if affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. Section Includes:
- B. Project information.
- C. Work covered by Contract Documents.
- D. Work by Owner.
- E. Work under separate contracts.
- F. Access to site.
- G. Work restrictions.
- H. Specification and drawing conventions.
- I. Miscellaneous provisions.
- J. Related Requirements: 1. Section 01 5000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

- A. Project Identification: RFB #2024-150 SHAKER PLACE CAFÉ PROJECT.
 - 1. Project Location: Albany County Shaker Place Rehabilitation & Nursing Center, Albany, NY 12211.
- B. Owner: Shaker Place Rehabilitation & Nursing Center, Albany, NY 12211.
 - 1. Owner's Representative: Albany County Division of Facilities Engineering (ACFE); Michael Martin, Deputy Commissioner, 518-447-7032, Michael.Martin@albanycountyny.gov .
- C. Architect: Angerame Architects P.C., James R. Glenn, AIA, Vice President; 518-454-9300; jim@angeramearchitects.com .

- D. Architect's Consultants: The Architect has retained the following design professionals who have prepared designated portions of the Contract Documents:

1. STRUCTURAL ENGINEER: MRH Engineering, P.C.
20 Bayberry Drive
Queensbury, New York 12804
(518) 792-4042
2. MECHANICAL/PLUMBING/
ELECTRICAL ENGINEER Engineered Solutions
646 Plank Road, #104
900 Route 146
Clifton Park, New York 12065
(518) 280-2410

1.4 GENERAL NOTES ABOUT THE CONTRACT DOCUMENTS

- A. The title and location of the Work is printed on the cover of this Project Manual.
- B. Type of Contract: Lump Sum for a Single Prime Contract.
- C. The term "Owner's Representative" appears many times in these specifications. Wherever it appears, it shall be understood to mean either the Architect, Architect's Sub-Consultants, Construction Manager, the Albany County, or designated representatives.
- D. The term "Substantial Completion" appears many times in the contract Documents. It shall be understood by the standard AIA (American Institute of Architects) definition: "Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use."
- E. During the bidding process, all correspondence and requests for information are to be forwarded to the Albany County Purchasing Department and copied to the Construction Manager (refer to General Instructions to Bidders article 14 for further detail). Only questions or requests for information will be answered by the Architect. If the Architect determines that a clarification is necessary, an addendum will be issued. If not, no addendum will be issued. Note that no requests for information will be reviewed and/or answered within 72 hours of a bid due date. Please request information early in the bid process

1.5 WORK CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:
 3. The project is a renovation of an existing space within the Albany County Shaker Place Rehabilitation & Nursing Center for the construction of a new Café to serve staff, visitors, and residents.
- B. Type of Contract:
 1. The work of this project will be the responsibility of a Single Prime contractor to complete.
- C. Please note that work will need to be done while the building is occupied but there are strict work conditions that must be met. See specification Section 01 3200. The work of this project must be substantially complete per

section 01 3200.

D. All products used in this project shall be certified as asbestos free.

E. Owner's Tax Exempt Status

1. The Owner is exempt from payment of Federal Excise Tax, Sales and Compensating Use Taxes of the State of New York and of cities, counties and other subdivisions of the State Owner's Tax Exempt StatusThe Owner is exempt from payment of Federal Excise Tax, Sales and Compensating Use Taxes of the State of New York and of cities, counties and other subdivisions of the State.

1.6 WORK BY OWNER

- A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.
- B. Preceding Work: Owner may perform construction operations at Project site. Those operations are scheduled to be substantially complete before work under this Contract begins.
- C. Concurrent Work: Owner may perform construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.

1.7 WORK UNDER SEPARATE CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.
- B. Concurrent Work: Owner may award separate contract(s) for construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.

1.8 ACCESS TO SITE

- A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- B. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
- C. Limits: Confine construction operations to areas within the Contract limits indicated.
- D. Limits: Limit site disturbance, including earthwork and clearing of vegetation, to 30 feet beyond building perimeter; 10 feet beyond surface walkways, patios, surface parking, and utilities less than 12 inches in diameter; 15 feet beyond primary roadway curbs and main utility branch trenches; and 25 feet beyond constructed areas with permeable surfaces (such as pervious paving areas, stormwater detention facilities, and playing fields) that require additional staging areas in order to limit compaction in the constructed area.
- E. Driveways, Walkways and Entrances: Keep driveways and entrances serving premises clear and available to

Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

- F. Schedule deliveries to minimize use of driveways and entrances by construction operations.
- G. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- H. Site Utilization Plan: Prepare and submit a site utilization plan demonstrating the requirements provided by the Owner's Project representative. Do not commence mobilization on the Project site prior to written approval of the site utilization plan.

1.9 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
- B. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- C. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated.
- D. Weekend Hours: 7:00 a.m. to 5:00 p.m.
- E. Hours for Utility Shutdowns: Notify and coordinate with Owner.
- F. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
- G. Notify Director of Physical Plant/Maintenance, Andy Lucarelli at 518-869-2231 ext. 8938 not less than 7 (seven) days in advance of proposed utility interruptions.
- H. Obtain Owner's Representative written permission before proceeding with utility interruptions.
- I. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
- J. Notify Director of Physical Plant/Maintenance not less than 2 (two) days in advance of proposed disruptive operations.
- K. Tobacco-Free Campus: Smoking is prohibited, including e-cigarettes. Do not smoke or vape within the building or on the roof, anywhere on the construction site, or anywhere on the surrounding campus.
- L. Controlled Substances: Use of controlled substances is similarly prohibited.
- M. Employee Identification: Owner will provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.
- N. Employee Screening: Comply with the Owner's requirements for screening of Contractor personnel working on Project site.

- O. Maintain list of approved screened personnel with Owner's representative.

1.10 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
- B. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
- C. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- D. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.
- E. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- F. Drawing Coordination: Requirements for materials and products identified on Drawings may be described in detail in the Specifications.

1.11 CONSTRUCTION DOCUMENTS

- A. The Prime Contractor will receive digital copies of a complete set of construction documents after award. The Prime Contractor is responsible for distribution of drawings and drawing updates to their respective sub-contractors.
- B. The Prime Contractor shall keep one complete set of the latest contract drawings and specifications, with all Addenda, available on the job site until the work is accepted, and shall keep these documents up to date. The Prime Contractor shall maintain the set in both digital and paper format.

PART- 2 PRODUCTS (NOT USED)

PART- 3 EXECUTION (NOT USED)

END OF SECTION 01 1000

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provision of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings, and details to determine type and extent of work there if affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
- B. Types of allowances include the following:
 - 1. Contingency allowances.

1.3 RELATED SECTIONS:

- A. Section 01 3300 "Submittal Procedures" for procedures for using Submittals for the selection and purchase of materials in the contract.
- B. Divisions 2 through 16 Sections for items of Work covered by allowances.

1.4 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

1.5 INFORMATIONAL SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.6 CONTINGENCY ALLOWANCES

- A. Use the contingency allowance only as directed by Architect/Engineer for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.
- B. Contractor's overhead, profit, and related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, insurance, equipment rental, and similar costs.
- C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit.
- D. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

1.7 COORDINATION

- A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.8 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection, or purchase and delivery, of each product or system described by an allowance must be completed by the Owner to avoid delaying the Work.
 - B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
 - C. Purchase products and systems selected by Architect/Engineer from the designated supplier
- CONTINGENCY ALLOWANCES**
- D. Use the contingency allowance only as directed by Architect for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.
 - E. Contractor's overhead, profit, and related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.
 - F. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.
 - G. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

1.9 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
 - 1. Include installation costs in purchase amount only where indicated as part of the allowance.
 - 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other markups.
- B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.
 - 1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of Work has changed from what could have been foreseen from information in the Contract Documents.
 - 2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART- 2 PRODUCTS (NOT USED)

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

- A. Contingency Allowance: Include a contingency allowance of a stipulated sum/price based on a percentage of each Contract Base Bid as follows:
 - 1. GC – General Construction – 25%

- B. This allowance includes material cost receiving, handling, and installation and Contractor overhead and profit.

END OF SECTION 01 2100

PART- 1 GENERAL

1.1 SECTION INCLUDES

- A. Drawings and general provision of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings, and details to determine type and extent of work there if affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract, including the General Conditions for Albany County Construction and other Division 01 specification sections, apply to this section.
- C. Section 01 3000 - Administrative Requirements: Submittal procedures, coordination.
- D. Section 01 6000 - Product Requirements: Fundamental product requirements, product options, delivery, storage, and handling.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
 - a. Unavailability.
 - b. Regulatory changes.
 - c. Compatibility relating to Proprietary vs Sole Source
 - 2. Substitutions to improve project performance: Proposed due to possibility of offering substantial advantage to the Project.
 - 3. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use form that is part of web-based Project management software acceptable to Architect.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

- a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
 - b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project, from ICC.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within fourteen (14) days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within twenty-one (21) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.

- a. Forms of Acceptance: Change Order, Construction Change Directive, Submittal Approval of final documentation after submission for Substitution, or Architect's Supplemental Instructions for minor changes in the Work.
- b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.7 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than fifteen (15) days prior to time required for preparation and review of related submittals.
 - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Architect will consider requests for substitution if received within sixty (60) days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - b. Requested substitution does not require extensive revisions to the Contract Documents.
 - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - d. Substitution request is fully documented and properly submitted.
 - e. Requested substitution will not adversely affect Contractor's construction schedule.
 - f. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - g. Requested substitution is compatible with other portions of the Work.
 - h. Requested substitution has been coordinated with other portions of the Work.
 - i. Requested substitution provides specified warranty.
 - j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved

PART- 2 PRODUCTS (NOT USED)

PART- 3 EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
 2. Agrees to provide the same warranty for the substitution as for the specified product.
 3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
 4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.

5. Has informed the Prime Contractor of any/all changes or impacts to other trades and construction, and all potential costs impacts have been fully addressed without cost impact to the Owner.
 6. Waives claims for additional costs or time extension that may subsequently become apparent.
 7. Agrees to reimburse Owner for review or redesign services associated with re-approval, through a deductive COP and then an amendment to the A/E.
- B. A Substitution Request for specified installer, constitutes a representation that the submitter:
1. Has acted in good faith to obtain services of specified installer.
- C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
1. Note explicitly any non-compliant characteristics.
- D. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
1. Forms indicated are adequate for this purpose and must be used.
 2. All requests for substitution shall be accompanied by the fully completed Substitution Request Form. Failure to fully complete or sign the form will result in rejection of substitution without review.
- E. Limit each request to a single proposed substitution item.
1. Submit samples where aesthetics or materials are different than those specified.

3.2 SUBSTITUTION PROCEDURES DURING PROCUREMENT

- A. Submittal (before award of contract):
1. Owner will consider requests for substitutions only if submitted at least 15 working days prior to the date for receipt of bids.
 - a. Substitutions are reviewed in the order they are received and pending the available time of the A/E design team. Every effort will be made to address substitutions requests received but are not guaranteed.
 - b. Acceptance will be acknowledged through Addendum only, and to include review time. Rejected requests will not be noted.

3.3 SUBSTITUTION PROCEDURES DURING CONSTRUCTION

- A. Submittal Form (after award of contract):
1. Submit request for Substitution for Cause within 14 days of discovery of need for substitution, but not later than 14 days prior to time required for review and approval by A/E, in order to stay on approved project schedule.

2. Submit request for Substitution for Convenience immediately upon discovery of its potential advantage to the project, but not later than 14 days prior to time required for review and approval by A/E, in order to stay on approved project schedule.
 - a. In addition to meeting general documentation requirements, document how the requested substitution benefits the Owner through cost savings, time savings, greater energy conservation, or in other specific ways.
 - b. Document means of coordinating of substitution item with other portions of the work, including work by affected subcontractors.
 - c. Bear the costs engendered by proposed substitution of:
 - i. Owner's compensation to the A/E for any required redesign, time spent processing and evaluating the request.
 - ii. Other construction by Owner.
 - iii. Other unanticipated project considerations.
3. Substitutions will not be considered under one or more of the following circumstances:
 - a. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval. Substitution request does not replace approval of shop drawings.
 - b. Without a separate written request.
 - c. When acceptance will require revisions to Contract Documents.

3.4 RESOLUTION

- A. A/E may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
- B. A/E will notify Contractor in writing of decision to accept or reject request.
 1. A/E's decision following review of proposed substitution will be noted on the submitted form.
 2. Review with Owner and DES PM before approving.

3.5 ACCEPTANCE

- A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

3.6 CLOSEOUT ACTIVITIES

- A. See Section 01 7800 - Closeout Submittals and Procedures, for closeout submittals.
 1. Include completed Substitution Request Forms as part of the Project record.

END OF SECTION 01 2500

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.
2. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

1. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.
2. Provisions of this Section apply to the Work of the Contractor.

1.3 PROPOSAL REQUESTS

1. Owner-Initiated Proposal Requests: Owner and its representatives will issue a detailed description of proposed changes (Proposed Change Order – P.C.O.) in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
2. Proposal Requests issued by Owner and its representatives are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
3. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
4. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
5. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.
6. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship.
7. Proposal Request Form: Use AIA Document G709 for Proposal Requests.

1.4 CHANGE ORDER PROCEDURES

1. On Owner's approval of a Proposal Request, Architect will issue Change Order for signatures of Owner and Contractor on AIA Document G701.
2. All quotations shall be accompanied by a complete itemization of costs, including labor (type, quantity and unit cost per hour), materials (type, quantity and unit cost) and copies of written quotations from subcontractors and suppliers itemized in the same manner.

3. Overhead and profit shall include costs for insurance, administrative, supervision, truck deliveries, safety, cleanup, guarantee, estimating and record document revisions when calculating change order pricing.
4. Indicate applicable delivery charges, equipment rental and amounts of trade discounts.
5. The combined overhead and profit included in the total cost to the Contractor shall be based on the following schedule:
6. CHANGES IN THE WORK
 - a. The allowance for the combined overhead and profit included in the total cost to Owner shall be based on the following schedule:
 - i. For the Contractor, for any work performed by their own forces, 15% of the actual cost;
 - ii. For each Subcontractor involved, work performed by their own forces, 15% of the actual cost;
 - iii. For the Contractor, for work performed by their Subcontractors, 5% of the amount due the Subcontractor.
7. Cost shall be limited to the following:
 - a. Cost of materials, including cost of delivery, cost of labor, including Social Security and Unemployment Insurance, Workmen's Compensation Insurance, rental value of power tools and equipment.
 - b. Overhead shall include the following: Bond Premiums, supervisions, superintendent's wages to time keepers, watchmen, clerks, small tools, incidental, general office expenses and all other expenses not included in "Cost".
 - c. If the net value of change results in a credit from the Contractor or Subcontractor the credit given shall be the net cost without overhead and profit.
 - d. The cost as used herein shall include all items of labor, materials and equipment.
8. Not more than three percentages, the aggregate allowed shall not exceed 8% regardless of the number of their Subcontractors, i.e., the markup on work Subcontractor by a Subcontractor will be limited to one overhead percentage and one profit percentage.
9. Performance and Payment Bond Adjustments: Do not itemize increased bond premiums for each individual Change Order per General Conditions of the Contract.

1.5 UNIT PRICES

1. On Owner's approval of a Contract quantity change, Architect will issue a Change Order for signatures of Contractor and Owner on AIA Document G701.
2. All quotations shall be accompanied by a complete itemization of costs, including labor (type, quantity and unit cost per hour), materials (type, quantity and unit cost) and copies of written quotations from subcontractors and suppliers itemized in the same manner.
3. Indicate applicable delivery charges, equipment rental and amounts of trade discounts.
4. Markups: Overhead and profit markups are same as for Change Order schedule as indicated.

1.6 PHOTOGRAPHS

1. Each month the Construction Manager shall furnish color prints to the Architect, 6 views, 3 prints of each, 8" x 10" mounted for inclusion into loose leaf binder. Each photo to include information of view, date, job, Architect and Contractor.

1.7 HOISTING EQUIPMENT

1. Contractor shall:
2. Provide material hoists as required for performance of own work and shall employ skilled operators. Provide all necessary guards, signals, safety devices, etc., required for safe operation, and suitable runways from hoists to each floor level and roof. Construction and operation of material hoists shall conform to all applicable requirements of the "American Standard Safety Code for Building Construction" published by the American Standard Association and the "Manual of Accident Prevention in Construction of the Association General Contractors of America OSHA Standards for the Construction Industry", and to all state and municipal codes. The Contractor shall prohibit the use of hoists for transporting personnel.
3. Provide temporary ladders, ramps, scaffolding and runways as required for performance of own work. All of above facilities shall be constructed and maintained in accordance with applicable requirements of all codes as set forth above in paragraph a. "Material Hoists" and shall be removed after they have served their purpose or when directed.

1.8 PROJECT SIGN

1. The Contractor shall furnish, erect and maintain, at the site of the work (the location determined by Architect), a construction sign 4' x 8' containing the title of the project, the Owner's name, project number, financing agency, names of the Architect and his Consultants and Contractor.

1.9 DEFECTIVE WORK AND MATERIALS

1. Any material or work found on inspection to be defective or not in strict conformance with requirements of Drawings and Specifications, or defaced or injured through the acts of fire or elements or any other cause shall be removed immediately from the premises and satisfactory materials or work or both, substituted therefore without delay.
2. If the Contractor does not remove such work or materials condemned by the Architect within the time limit fixed by written notice, the Owner may cause the same to be done and may store all materials at the expense of the Contractor. If the Contractor does not pay the expense of such removal within ten (10) days thereafter, the Owner may upon ten (10) days written notice, sell such materials at auction or at a private sale and shall account for the net proceeds thereof, after deducting all costs and expenses that should have been borne by the Contractor.
3. No previous inspection or certificates of payment shall be held as an acceptance of defective work or materials, or relieve the Contractor from the obligations to furnish sound materials and perform satisfactory work in accordance with Contract Documents.

1.10 RESPONSIBILITY FOR DAMAGE

1. The Contractor shall be responsible for all damages to life and property due to his operations. He shall be responsible for all parts of his work, both temporary and permanent, until the work under this Contract is accepted by the Owner.
2. He shall protect, indemnify, save harmless and defend the Owner from suits, actions, damages and costs of every name and description, resulting from the work, under this Contract, and the Owner may retain sufficient monies from the amount due or to become due the Contractor as may be necessary to satisfy any claim or damages filed against the Owner.
3. He shall be responsible for damages to work of other Contractors which are the result of his operations. Should the Contractor believe that the work shown by the drawings or specifications is not calculated when executed to procure safe and substantial results, or if any discrepancy appears, it is his duty to immediately notify the Architect in writing, stop work on same, and await the written instructions of the Architect.

END OF SECTION 01 2500

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provision of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings, and details to determine type and extent of work there if affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections:
 - 1. Division 1 Section "Allowances" for procedural requirements governing the handling and processing of allowances.
 - 2. Division 1 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 3. Division 1 Section "Unit Prices" for administrative requirements governing the use of unit prices.
 - 4. Division 1 Section "Submittal Procedures" for administrative requirements governing the preparation and submittal of submittal schedule.

1.3 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Correlate line items in the schedule of values with other required administrative forms and schedules, including the following:

- a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's construction schedule.
 - 2. Submit the schedule of values to ACFE at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
 - 3. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values correlated with each phase of payment.
 - 4. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide subschedules showing values correlated with each element.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
- 1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 - 2. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
 - h. Labor.

- i. Materials.
 - j. Equipment.
- 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of Contract Sum.
 - a. Include separate line items under Contractor and principal subcontracts for project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
- 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
- 5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
- 6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
- 7. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
- 8. Purchase Contracts: Provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate owner payments or deposits, if any, and balance to be paid by Contractor.
- 9. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
- 10. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by ACFE and paid for by Owner.
 - 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
1. Submit draft copy of Application for Payment fourteen days prior to due date for review by ACFE.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 and an **Albany County Claim Form** as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. ACFE will return incomplete applications without action.
1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 3. Provide summary documentation for stored materials indicating the following:
 4. Materials previously stored and included in previous Applications for Payment.
 5. Work completed for this Application utilizing previously stored materials.
 6. Additional materials stored with this Application.
 7. Total materials remaining stored, including materials with this Application.
- F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to ACFE by a method ensuring receipt. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
 5. Products list (preliminary if not final).
 6. Schedule of unit prices.
 7. Submittal schedule (preliminary if not final).
 8. List of Contractor's staff assignments.
 9. List of Contractor's principal consultants.
 10. Copies of building permits.
 11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 12. Initial progress report.
 13. Report of preconstruction conference.
 14. Certificates of insurance and insurance policies.
 15. Performance and payment bonds.
 16. Data needed to acquire Owner's insurance.
- H. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

- I. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
 1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 6. Evidence that claims have been settled.
 7. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 8. Final liquidated damages settlement statement.

PART- 2 PRODUCTS (NOT USED)

PART- 3 EXECUTION (NOT USED)

END OF SECTION 0 12900

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes a summary of work The Prime Contract. One set of documents is being issued covering the work of the entire Project. The Prime Contractor is responsible to review all drawings and specifications for specific requirements indicated and is responsible for the work no matter what drawing on which the work appears.

1.3 DEFINITIONS

- A. Permanent Enclosure: As determined by Architect and CM, the condition at which roofing is insulated and weather tight; exterior walls are insulated and weather tight; and all openings are closed with permanent construction or substantial temporary closures equivalent in weather protection to permanent construction.

1.4 CONSTRUCTION MANAGER

- A. The Construction Manager shall facilitate coordination with the Prime Contractor. The Prime Contractor and all sub-tier Contractors shall cooperate to the fullest extent in this regard to achieve a successful project for the Owner.

1.5 GENERAL REQUIREMENTS OF THE PRIME CONTRACTOR

- A. Extent of Contract: Unless the Agreement contains a more specific description of the Work for the Prime Contract, requirements indicated on the Drawings and in Specification Sections determines the Project Scope of Work.

The following is not intended to limit the scope of work, but to provide clarification and/or amplification of the work described in the drawings and specifications. All work described by the documents must be performed, in addition to any work not shown but inherently necessary to achieve the intent complete and/or operable systems.

Unless otherwise indicated, the work described in this Section shall be complete systems and assemblies, including products, components, accessories, and installation required by the Contract Documents. No such labor, materials, services, supervision, scaffolding, tools, equipment, or other things necessary to provide or fully complete systems in accordance with the contract documents shall for any reason be considered additional work.

- B. The following temporary facilities as required by project will be the responsibility of the Prime Contractor; barricades, partitions, doors, stairs, landings, ramps, fencing, screens, signage; egress, directional, and safety, pedestrian overhead protection and fire extinguishers, as shown but not limited to the ones indicated on the construction drawings. The items referenced above shall be provided and or installed by the Prime Contractor, unless specifically noted otherwise in the construction documents.

- C. Trenches and other excavation for the work of the contract shall be the work of The Prime Contractor, unless specifically noted otherwise in the contract documents.
- D. Blocking, backing panels, sleeves, and metal fabrication supports for the work of each contract shall be the work of the Prime Contractor, unless specifically noted otherwise in the contract documents.
- E. Access Panels: The Prime Contractor shall identify access doors and panels required to access inaccessible installations.
- F. Access Panel types shall be the same as the Prime Contractor's approved submittal, shall match the fire rating of the assemblies of which they are installed and be provided in sizes adequate for easy access and/or replacement of the installation.
- G. The Prime Contractor shall take care to furnish the access panels in a timely fashion to allow installation during the scheduled installation of the work.
- H. Equipment pads for new work shall be provided by the Prime Contractor, unless specifically noted otherwise in the contract documents. The Prime Contractor shall install the equipment pads in a timely fashion for the work to progress according to the Project schedule.
- I. Roof-mounted equipment curbs for the work of The Prime Contract shall be furnished for work installed by the Prime Contractor.
- J. Roof penetrations shall be cut and patched in by the Prime Contractor as it pertains to the projects scope of work. The Prime Contractor shall also provide metal supporting frame as necessary under the perimeter of the opening in the roof deck. Penetrations shall be coordinated by the Prime Contractor in advance to allow for efficient installation in accordance with the project schedule.
- K. Roof penetrations created by the removal of existing equipment shall be patched in by the Prime Contractor. Removals which create open penetrations shall be coordinated in advance to allow for efficient installation of patches in accordance with the project schedule. All work shall be completed with existing roof warranties.
- L. Cutting and Patching: Prime Contractor to coordinate the cutting and patching of removed equipment and materials as shown on the drawings to ensure a complete building envelope.
- M. Through-penetration fire-stopping for the work required is the responsibility of the Prime Contractor to provide a complete fire rated system.
- N. The Prime Contractor shall be responsible for caulking and/or sealing all non-fire rated penetrations.
- O. Unless specifically excluded within the contract documents, the Prime Contractor is responsible for all sections of Divisions 00 and 01.
- P. All significant equipment mounted above the ceiling, which require periodic maintenance, shall be identified with a stick-on tag on the ceiling below. The tag shall contain identifying information, to be coordinated with the CM, A/E and Owner. This requirement is in addition to the Identification requirements delineated in the Contract Documents.

- Q. As applicable, The Prime Contractor shall offset all water and /or liquid containing piping around electrical equipment rooms, food preparation areas, telephone, data, and equipment and elevator rooms, as applicable to the work. Provide drip pans with piping to drains where re-routing is not feasible. Provide drip pans with drains in elevator machine rooms under roof drain and piping as required.
- R. The Prime Contractor shall coordinate all structural, mechanical, electrical, plumbing and fire protection shop drawings prior to fabrication/installation. The coordination conducted by the Prime Contractor shall be submitted to the Construction Manager for comment.
- S. The Prime Contractor shall be advised that there are sensitive existing and proposed mechanical, electrical, plumbing, fire protection and low voltage work on this project. Coordination is required with Prime Contractors Sub Contractors and the Construction Manager regarding embedment, penetrations and built-in items. Participation by each appropriate sub-tier Contractor is required to complete the coordination process.
- T. Any permitting required by the Local Authorities must be obtained by the Prime Contractor pertaining to the scope of work. Albany County is the Authority Having Jurisdiction for the Building Permit. There will be no fee associated with the Building Permit. Costs for all other permitting fees shall be the responsibility of the Prime Contractor.
- U. Any holes or openings created by the demolition or removal of equipment or materials (excluding roof penetrations) must be infilled by the Prime Contractor in respect to the scope of work.
- V. Contractor and vendor company signage and displays will not be allowed on site.
- W. Temporary Facilities and Controls: In addition to specific responsibilities for temporary facilities and controls indicated in this Section and in Division 01 Section "Temporary Facilities and Controls," The Prime Contractor is responsible for the following:
 - X. Installation, operation, maintenance, and removal of each temporary facility necessary for its own normal construction activity, and costs and associated with each facility, except as otherwise provided for in this Section.
 - Y. Plug-in electric power cords and extension cords, supplementary plug-in task lighting, and special lighting necessary exclusively for its own activities.
 - Z. The Prime Contractor shall provide a field office (refer to section "Temporary Facilities & Controls" for further detail). It is the Prime Contractors responsibility to coordinate additional field offices and storage with their Sub Contractors and the Construction Manager.
- AA. All temporary enclosures shall be coordinated with the Construction Manager and provided by the Prime Contractor.
- BB. Staging and scaffolding for construction activities.
- CC. All hoisting and rigging of tools, equipment and materials for construction activities.

- DD. Waste disposal facilities, including collection and legal disposal of its own hazardous, dangerous, unsanitary, or other harmful waste materials. If the Prime Contractor requires dumpsters for waste removal, the locations shall be coordinated in advance with the CM.
- EE. Progress cleaning of work areas affected by its operations on a daily basis.
- FF. Secure lockup of tools, materials, and equipment.
- GG. Construction aids and miscellaneous services and facilities necessary exclusively for construction activities.

END OF SECTION 01 3010

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General project coordination procedures
 - 2. Coordination drawings
 - 3. Administrative and supervisory personnel
 - 4. Project meetings

1.3 COORDINATION

- A. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
 - 2. Make adequate provisions to accommodate items scheduled for later installation.
- B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities included, but are not limited to, the following:

1. Installation and removal of temporary facilities and controls.
 2. Delivery and processing of submittals.
 3. Progress meetings.
 4. Pre-installation conferences.
 5. Project closeout activities.
- C. Drawings are diagrammatic; utilize spaces efficiently to maximize headroom and accessibility for installation, maintenance, or replacement of construction elements. It shall be this Contractor's responsibility to coordinate his work. It is the intention of the drawings and specifications for the Contractor to provide a complete system whether shown or not.
- D. Owner will furnish copies of approved shop drawings to each Contractor whose work is connected to this contract. Resolve all problems of connected, adjacent or otherwise related work with Contractor.
- E. Should conflicts and problems occur, Contractor and those subcontractors, sub-subcontractors and trades who might be affected, are to consult and cooperate in resolution of the problem, whether or not they are at fault and whether or not their work is directly involved.
- F. When a problem occurs with no readily discernible cause, Contractor and those subcontractors, sub-subcontractors and trades who might be affected are to consult, investigate and test as necessary, until cause is found or problem resolved.
- G. No extra costs will be allowed for any investigations, testing and/or consultations or extra work which may be necessary under the terms of this Article.
- H. The plans and these specifications are complimentary each to the other and what is called for in one shall be as binding as if called for by both. Should there be a conflict between drawings and specifications regarding a material shown, scope of work, described work, or detailed work; the Contractor shall figure in his base bid the more expensive system of the two. Architect shall be notified immediately prior to the start of any work in conflict.
- I. Contractor shall coordinate layout of all electrical and mechanical devices, fixtures, and equipment in finished spaces with all Architectural features (panel and wainscot designs, ceiling tile type, grid location, etc.) Locate devices equally spaced horizontally within panel layout. Where mounting height or equipment locations are not indicated, contact Architect prior to installation for decision.
- J. Contractor shall coordinate and verify all dimensions prior to start of work. If conflict occurs as a result of coordination, contractor shall be responsible to correct conditions at no additional cost.

1.4 COORDINATION DRAWINGS

- A. Composite Coordination Base Drawing:

1. Drawings shall identify each building layout at 1/4 inch equals 1 foot and includes walls, doors, windows, ceiling and roof elevations, soffit elevations, beam elevations and other items.
2. Contractor shall sign-off on Base Drawings for acknowledgement of review including accuracy and resolving conflicts.
3. HVAC sub-contractor shall add to this drawing exact locations and elevations of where the following items are proposed to be installed:
 - a. Registers
 - b. Grilles
 - c. Diffusers
 - d. Dampers
 - e. Turning valves
 - f. Damper operator
 - g. VAV boxes
 - h. Ducts
 - i. Duct access doors
 - j. Sensors
 - k. Unit heaters
 - l. Air handling units
 - m. Exhaust fans
 - n. Relief fans
 - o. Chiller
 - p. Air compressor
 - q. Boilers
 - r. Pumps
 - s. HVAC piping
 - t. HVAC supports

B. Plumbing sub-contractor shall add to the drawing after HVAC sub-contractor, the location of the following:

- a. Hot water boilers
- b. Hot water tanks
- c. Pumps
- d. Water meters
- e. Gas meters
- f. Location and routing of gas and water piping

C. Sprinkler sub-contractor shall add to the drawing after Plumbing sub-contractor the location of the following:

- a. Pumps
- b. Entrance riser
- c. Piping

D. Electrical sub-contractor shall add to the drawing after Sprinkler sub-contractor the location of the following:

- a. Location and routing of electrical equipment
- b. Distribution panels

- c. Lights
 - d. Fire alarm system components
 - e. Security system components and controls
- E. General Construction Contractor shall add to the drawing after Electrical Contractor, any architectural components provided by building trade, which must be coordinated with other trades.

1.5 SUBMITTALS

- A. Staff Names: At Preconstruction Conference submit a list of principal staff assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list business addresses and telephone numbers, including business office, field office, cellular and facsimile. List Manager's and Superintendent emergency telephone numbers.

1.6 OWNERSHIP OF DRAWINGS

- A. All drawings, specifications, and copies thereof, furnished to the Contractor, with the exception of the signed Contract set, are to be returned to the Owner at the completion of the work. All Drawings remain the property of the Architect.
- B. Duplication of Architect's Drawings is prohibited and violates Architect's copyright protection.

1.7 UTILITY SHUTDOWNS AND CUTOVERS

- A. Except as otherwise expressly provided in the Contract Documents, the Contractor shall be responsible for submitting to the Owner and its representatives for their approval a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the project; said schedule should contain a minimum of two (2) weeks advance notice prior to the time of the proposed shutdown and cutover.
- B. The contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the Contractor to complete the shutdowns or cutovers.

1.8 SITE ACCESS

- A. As determined by Owner and its representatives.

1.9 PARKING

- A. Parking for trailers, etc. shall be as designated by the Owner and its representatives. Comply with requirements of Albany County.

1.10 SALES TAX

- A. This project is exempt from sales tax and compensating use tax on labor and materials, which are incorporated into the final finished project. Owner shall furnish tax identification number at Contractor's request.

END OF SECTION 01 3100

PART- 1 GENERAL

1.1 INITIAL JOB MEETING

- A. The Owner's Representative will notify all parties concerned of the time and place of the initial kick off job meeting. ATTENDANCE IS MANDATORY. FAILURE TO ATTEND WILL RESULT IN A PENALTY OF \$1,000.00 in the form of a deduct change order.
- B. The Contractor must be in attendance.
- C. The meeting will be conducted by the Owner and its representatives.

1.2 BI-WEEKLY JOB MEETINGS

- A. Unless otherwise directed, job meetings will be held once every two weeks at a time and place agreed upon by the Owner's Representative, Contractor, and the Architect. Other interested parties may attend when needed, e.g., subcontractors and representatives from suppliers, public utilities, and local government. Bi-Weekly meetings will be titled "Job Progress Meetings".
- B. Attendance at progress meetings is MANDATORY for the Contractor in order to create seamless coordination and work within the tight construction schedules and budgets set forth by the Owner. For each progress meeting that the Contractor misses, without written consent from the Owner or its representatives, the Contractor will be charged a penalty fee of \$500.00. This amount will be deducted from the next applicable application for payment by change order. NO EXCEPTIONS TO THIS RULE WILL BE MADE.
 - 1. In addition, an unexcused absence from a progress meeting or a failure of a Contractor's employee(s) to work in accordance with the project schedule will subject the Contractor to Albany County's Vendor Complaint process, which may result in a non-responsible contractor determination.
- C. The meetings will be conducted by the Owner and its representatives for the following purposes:
 - 1. Review job progress, quality of Work, and approval and delivery of materials.
 - 2. Identify and resolve problems which impede planned progress.
 - 3. Coordinate the efforts of all concerned so that the project progresses on schedule to on time completion.
 - 4. Maintain a sound working relationship between the Contractor and the Owner and its representatives and a mutual understanding of the project requirements.
 - 5. Maintain sound working procedures.
 - 6. Review and approve minutes of previous meetings.
 - 7. Discuss work completed in the last two weeks since the last meeting. Contractor to provide a two week look ahead at each Job Progress Meeting outlining the work to be conducted two weeks in advance.

8. Discuss the work scheduled in the next two weeks up to the next meeting.
9. Review shop drawings and submittal schedules.
10. Review change order status.
11. Coordinate occupancy arrangements and access requirements with Owner and its representatives.
12. Discuss temporary exits and construction safety with the Architect.

1.3 PRIME CONTRACTOR WEEKLY SUBCONTRACTOR MEETING

- A. The Contractor is to hold at a minimum a weekly sub-contractor meeting to discuss items pertaining to the project. The Owner and its representatives reserves the right to attend the weekly subcontractor meeting and review meeting minutes for meetings not attended by the Owner and its representatives.

THE CONTRACTOR SHALL WRITE MINUTES OF ALL MEETINGS AND DISTRIBUTE THEM TO ALL PARTIES PRESENT AND TO THOSE ON THE DISTRIBUTION LIST GIVEN OUT AT THE KICK-OFF MEETING WITHIN 3 BUSINESS DAYS OF THE MEETING.

PART- 2 PRODUCTS (NOT USED)

PART- 3 EXECUTION (NOT USED)

END OF SECTION 01 3119

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provision of the Contract, including General and Supplementary conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Project Scheduling Requirements

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
 - 2. Predecessor activity is an activity that must be completed before a given activity can be started.
- B. Critical Path: The longest continuous chain of activities through the network schedule that establishes the minimum overall Project duration.
- C. Event: The starting or ending point of an activity.
- D. Major Area: A story of construction, a separate building, or a similar significant construction element.
- E. Milestone: A key or critical point in time for reference or measurement.

PART- 2 PRODUCTS (NOT USED)

PART- 3 EXECUTION

3.1 PREPARATION

- A. Preparation of Contractor Construction Schedule: Refer to Division 01 Section "Submittals" for administrative requirements governing preparation and submittal thereof.

- B. Contractor's own preliminary detailed critical path schedule is due at, or prior to the Pre-Construction Conference. The Construction Schedule must be completed and approved prior to commencing the work. No Application for Payment will be processed prior to receipt of approved construction schedule.
- C. Critical Submittals Schedule: Submittals that require expedited submission to facilitate successful project schedule completion.
- D. The Contractor's Construction Schedule shall be submitted, to the Owner and its representatives, for review and acceptance. The approved Contractor's Schedule will be incorporated into the Project Master Schedule which shall be maintained by the Owner and its representatives.
- E. Contractor shall be required to participate with Owner and its representatives in periodic interactive scheduling/pull-planning sessions to coordinate the work to be completed. The approved Project Master Schedule shall supercede all previous schedules. Master Schedule shall be reviewed weekly and updated as required, with each revision taking precedence over previously issued.
- F. The Contractor will be required to support the schedule and phasing plan by providing input to the planning, designing, and installation of temporary systems (walls, protections, M/E/P/FP/Low Voltage requirements) to support the facility and/or project needs during construction.
- G. A two week look ahead schedule will be submitted to the Owner and its representatives on a weekly basis for review which may detail smaller schedule segments or items not shown on the CPM schedule.

END OF SECTION 01 3200

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. One copy of Contractor's Final Submittal Log shall be returned to Construction Manager indicating anticipated dates for submission of each submittal by completing the submittal date column.
- C. Final Submittal Log shall be complete and submitted before first Application for Payment is received.
- D. Application for Payment approval will not occur until Architect has received Final Submittal Log.
- E. Date indicated for each submittal shall account for the lead-time required for ordering and fabricating of each item.
- F. Final Submittal Log shall indicate all submittals to be completed within 45 working days after execution of the Agreement, unless otherwise indicated.
- G. Indicate items requiring more than 45 days with an explanation for the additional time and on what dates that submittal will be submitted.

1.3 DEFINITIONS

- A. Preconstruction Submittals: Submittals which are required prior to issuing contract notice to proceed or starting construction. For example, Certificates of insurance; Surety bonds; Site-specific safety plan; Construction progress schedule; Schedule of values; Submittal register; List of proposed subcontractors.
- B. Shop Drawings: Drawings, diagrams, and schedules specifically prepared to illustrate some portion of the work. Drawings prepared by or for the Contractor to show how multiple systems and interdisciplinary work will be integrated and coordinated.
- C. Product Data: Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions, and brochures, which describe and illustrate size, physical appearance, and other characteristics of materials,

systems, or equipment for some portion of the work. Samples of warranty language when the contract requires extended product warranties.

- D. Samples: Physical examples of materials, equipment, or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged. Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project. Field samples and mock-ups constructed to establish standards by which the ensuing work can be judged.
- E. Design Data: Calculations, mix designs, analyses, or other data pertaining to a part of work.
- F. Test Reports: Report which includes findings of a test required to be performed by the Contractor on an actual portion of the work. Report which includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.
- G. Certificates: Document required of Contractor, or of a manufacturer, supplier, installer, or subcontractor through Contractor. The purpose is to document procedures, acceptability of methods, or personnel qualifications for a portion of the work.
- H. Manufacturer's Instructions: Pre-printed material describing installation of a product, system, or material, including special notices and MSDS concerning impedances, hazards, and safety precautions.
- I. Manufacturer's Field Reports: Documentation of the testing and verification actions taken by manufacturer's representative at the job site on a portion of the work, during or after installation, to confirm compliance with manufacturer's standards or instructions. The documentation must indicate whether the material, product, or system has passed or failed the test.
- J. Operation and Maintenance Data: Manufacturer data that is required to operate, maintain, troubleshoot, and repair equipment, including manufacturer's help, parts list, and product line documentation. This data shall be incorporated in an operations and maintenance manual.
- K. Closeout Submittals: Documentation necessary to properly close out a construction contract. For example, Record Drawings and as-built drawings. Also, submittal requirements necessary to properly close out a phase of construction on a multi-phase contract.

1.4 SUBMITTAL REGISTER

- A. Preparation: Submit register arranged by order of specification sections listed.
- B. The Contractor, immediately after being awarded the Contract and prior to the initial job meeting, promptly submit to Subcontractor a detailed schedule showing the order in which the Contractor proposes to carry out the work, with dates at which he will start the several parts of the work and estimated dates of completion of same. This schedule will fix the respective dates for the submission of all Shop Drawings, product data and samples, the beginning of manufacture, testing and installation of materials, supplies and equipment. A fully developed Submittal Register shall be submitted within 15 working days of the Notice of Award
- C. After development and acceptance of construction schedule, prepare a complete register of submittals.

- D. Updating: At bi-weekly intervals, update schedule to reflect actual submittal activity. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in the construction activity.
- E. The Contractor shall maintain the submittal register at the project site until final acceptance of all work by Contracting Officer.

1.5 SUBMITTAL SCHEDULING

- A. Submittals are to be scheduled, submitted, reviewed, and approved prior to the acquisition of the material or equipment.
- B. Coordinate scheduling, sequencing, preparing, and processing of submittals with performance of work so that work will not be delayed by submittal processing. Allow time for potential resubmittal.
- C. No delay costs or time extensions will be allowed for time lost in late submittals or resubmittals.
- D. All submittals are required to be approved prior to the start of the specified work activity. If material or equipment is installed before it is reviewed, Contractor shall be liable for its removal and replacement at no charge if, in opinion of Architect, material or equipment does not meet intent of drawings and specifications.

1.6 SHOP DRAWINGS, PRODUCT DATA, SAMPLES, AND COLOR SELECTIONS SUBMITTALS

- A. Each submittal is to be complete and in sufficient detail to allow ready determination of compliance with contract requirements.
- B. Collect required data for each specific material, product, unit of work, or system into a single submittal. Prominently mark choices, options, and portions applicable to the submittal. Partial submittals will not be accepted for expedition of construction effort. Submittal will be returned without review if incomplete.
- C. If available product data is incomplete, provide Contractor-prepared documentation to supplement product data and satisfy submittal requirements.
- D. All irrelevant or unnecessary data shall be removed from the submittal to facilitate accuracy and timely processing. Submittals that contain the excessive amount of irrelevant or unnecessary data will be returned with review.
- E. Submit shop drawings, product data and samples to the Architect for items required by contract to be reviewed. Items not requiring review will be returned to Contractor un-reviewed.
- F. All items requiring color selections shall be submitted as a complete package, allowing the Architect to develop a coordinated color scheme for the project; submittals made independently will be held until all items are received. This submittal should be completed within one month after award of contract. Submittals will take eight weeks for approval.
- G. All items shall be submitted with a transmittal form for each submittal with the following information

1. Project title, location and number.
 2. Contractor and Architect's name and address.
 3. Construction contract number.
 4. Date of the drawings and revisions.
 5. Name, address, and telephone number of subcontractor, supplier, manufacturer, and any other subcontractor associated with the submittal.
 6. List paragraph number of the specification section and sheet number of the contract drawings by which the submittal is required.
 7. When a resubmission, add R - # suffix on submittal description. For example, submittal 18 would become 18R-1, to indicate resubmission.
 8. Product identification and location in project.
- H. By approving and submitting Shop Drawings, Product Data and Samples, the Contractor represents that he has determined and verified all materials, field measurements, and field construction criteria related thereto, or will do so, and that he has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.
- I. Shop Drawings, Product Data and Samples submitted for review by the Contractor and shall be clearly marked by the Contractor with a stamp or other device indicating that the Contractor has reviewed the submittal. Submittals, which are not so marked, shall be returned to him for re-submittal.
- J. The Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by the Architect's review of Shop Drawings, Product Data, or Samples unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submission and the Architect has given written approval to the specific deviation. The Contractor shall not be relieved from responsibility for errors or omissions in the Shop Drawings, Product Data or Samples by the Architect's review thereof.
- K. Marked-up prints or other reproductions of Contractor's drawings are not acceptable as shop drawings.
- L. The Contractor shall direct specific attention, in writing, or on resubmitted Shop Drawings, Product Data or Samples, to revisions other than those requested by the Architect on previous submittals.
- M. No portion of the Work requiring submission of a Shop Drawing, Product Data or Sample shall be commenced until the Architect has approved the submittal. All such portions of the Work shall be in accordance with approved submittals.
- N. The Contractor shall prepare a progress chart at suitable scale, which shall indicate the salient features of the work, with suitable symbols to indicate the progress at any time. The above stipulated progress schedule and chart shall be submitted to the Subcontractor for approval before the work is commenced. The Contractor shall bring all progress schedules and charts up to date periodically as required and copies of same shall be delivered in quadruplicate to the Subcontractor.

- O. The Contractor shall review his schedule, and the composite schedule prepared by the Subcontractor, with the other Contractors for this project during the initial job meeting. The Contractor shall coordinate his Work and Schedule with the work and schedules of others and shall, within one week of the initial job meeting, submit to the Architect a revised schedule meeting the requirements of the above paragraph and reflecting the adjustments necessary for the coordination of his work with that of separate Contractors.
- P. The Contractor shall maintain at the site for the Owner, one record copy of all Drawings, Specifications, Addenda, Change Orders, and other Modifications, in good order and marked currently to record all changes made during construction, and approved Shop Drawings, Product Data and Samples. These shall be available to the Contractor and shall be delivered to him for the Owner upon completion of the Work.
- Q. The A/E will review up to two (2) submissions of any single shop drawing. The contractor will be invoiced on an hourly rate basis for the time spent reviewing the same shop drawing in excess of twice.
- R. Coordination of Submittal Times:
 - 1. Prepare and transmit each submittal to Architect sufficiently in advance of performing the related work or other applicable activities, so that the installation will not be delayed by processing times including disapproval and resubmittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery, and similar sequenced activities.
 - 2. No extension of time will be authorized because of the Contractor's failure to transmit submittals to the Subcontractor sufficiently in advance of the work.
- S. Architect 's Review:
 - 1. Allow three (3) weeks for Architect's initial processing of each submittal requiring his review and response, except allow longer period where processing must be delayed for coordination with subsequent submittals.
 - 2. Allow eight (8) weeks for color selections after receipt of all samples for the project.
 - 3. Architect will advise Contractor promptly when it is determined that a submittal being processed must be delayed for coordination.
 - 4. Advise Architect on each submittal, as to whether his processing time is critical to the progress of the work, and therefore the work would be expedited if his processing time could be foreshortened.
 - 5. If Architect review becomes more extensive as a result of Contractor submitting substitutions, then Architect shall be entitled to back-charge Contractor for time expended on review.

1.7 SEQUENCE REQUIREMENTS

- A. As applicable in each instance, do not proceed with purchasing, fabrication, and delivery of a unit of work until submittal procedures have been successfully completed and in a sequence which will not result in the approval being later modified or rescinded by reason of a subsequent submittal which should have been processed earlier or concurrently for coordination.

1.8 GENERAL PROCEDURES

- A. Transmit each submittal from the Contractor to the Subcontractor for review, who in turn will transmit submittal to Architect.
- B. Initial and Final Submittals:
1. The manner of submittal and Contractor's options for certain categories of initial submittals are specified in general in the individual work Sections of the Specifications.
 2. Except as otherwise indicated in individual work Sections, submit the following for each category and type to the Architect:
- C. Shop Drawings:
1. Provide submittals in electronic format, with the exception of material samples. Use PDF as the electronic format, unless otherwise specified or directed by the Contracting Officer at no additional cost to the Owner. Architect will review and return either PDF or hard copy to Construction Manager.
 2. Compile the electronic submittal file as a single, complete document. Name the electronic submittal file specifically according to its contents.
 3. Electronic files must be of sufficient quality that all information is legible. Generate PDF files from original documents so that the text included in the PDF file is both searchable and can be copied. If documents are scanned, Optical Character Resolution (OCR) routines are required.
 4. Samples: Submit the number stated in each specification section.
 5. Colors: One (1) set showing full range of manufacturer's colors.
 6. The Contractor or his consultants will stamp drawings, data and catalog cuts as indicated below and return to Subcontractor who will distribute to Contractor:
 - NO EXCEPTION TAKEN
 - SUBMIT SPECIFIED ITEM
 - MAKE CORRECTIONS NOTED
 - REJECTED
 - REVISE AND RESUBMIT
 7. Checking is only for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Any action shown is subject to the requirements of the plans and specifications.

Contractor is responsible for dimensions which shall be confirmed and correlated at the job site; fabrication processes and techniques of construction; coordination of his work with that of all other trades and the satisfactory performance of his work.

ANGERAME ARCHITECTS, P.C. (or Consultant)

Dated _____ By _____

1.9 SAMPLES

- A. Submit the number stated in each specification section.
- B. Colors: One (1) set showing full range of manufacturer's colors.
- C. Where samples are specified for selection of color, finish, pattern, or texture, submit the full set of available choices for the material or product specified.
- D. When color, texture, or pattern is specified by naming a particular manufacturer and style, include one sample of that manufacturer and style, for comparison.
- E. Before submitting samples, the Contractor is to ensure that the materials or equipment will be available in quantities required in the project. No change or substitution will be permitted after a sample has been approved.
- F. The Architect reserves the right to disapprove any material or equipment which previously has proven unsatisfactory in service.

1.10 MATERIAL SAFETY DATA SHEETS (MSDS)

- A. Contractor shall comply with "Right to Know" requirements of Chapter 551 of Laws of New York, 1980, concerning notification of the use of toxic substances.
- B. Any product or substance used by CONTRACTOR or its subcontractors which is listed in Sub-part Z of OSHA Part 1910 Title 29 of the Code of Federal Regulations entitled "Toxic and Hazardous Substances" shall be identified to the Owner by the contractor's submission of a standard Material Safety Data Sheet.

1.11 CONTRACTOR'S REVIEW

- A. In accord with Paragraph 3.12 of the General Conditions, shop drawings and submissions not properly identified, or which in Architect's opinion are incomplete, contain numerous errors or omissions, or have not been checked or only superficially checked by Contractor, will be returned for re-submissions without review by Architect.

1.12 ELECTRONIC SUBMITTALS

- A. An internet (web-based) service shall be used to provide an on-line database and repository which shall be used to transmit and track project related documents. The intent for using an on-line database and repository is to expedite the construction process by reducing paperwork and improving information flow.
- B. For each submittal, the Prime Contractor shall review and apply electronic stamp certifying that the submittal complies with the requirements of the Contract Documents, including verification of manufacturer/product, dimensions and coordination of information with other parts of the work.

- C. It is the Prime Contractor's responsibility to provide the submittals in a PDF format. The contractor may use any of the following options:
1. Subcontractors and suppliers provide electronic submittals in PDF format to the Contractor via the Submittals Website.
 2. Subcontractors and suppliers provide paper submittals to the Contractor, who electronically scans and converts them to PDF format.
 3. Contract a Scanning Service, which will allow the Contractor and the Contractor's subcontractors and suppliers to provide paper submittals to the Scanning Service, which electronically scans and converts them to PDF format. It will be the Prime Contractor's responsibility to transmit the scanned submittals to the Submittals Website.

D. Image Quality:

1. Image resolution: The PDF files shall be created at a minimum resolution of 200 dots per inch utilizing the original document size. The Prime Contractor will be responsible to increase the resolution of the scanned file or images being submitted as required to adequately present the information.
2. Image Color Rendition: When information represented requires color to convey the intent and compliance, provide full color PDF reproduction.

E. Internet Service and Equipment Requirements:

1. The Prime Contractor will be required to have an Email address and Internet access at the Prime Contractor's main office.
2. Unless the Prime Contractor will exclusively be using a Scanning Service to create all PDF documents, the Prime Contractor will be required to own a PDF reviewing, creating and editing software, such as Adobe Acrobat (www.adobe.com), Bluebeam PDF Revu (www.bluebeam.com), or other similar PDF reviewing, creating and editing software for applying electronic stamps and comments.

F. Training and Support:

1. Contractor shall provide orientation and training to the Owner, Architect and design team members, project personnel and Subcontractors at no cost to the Owner or its representatives. The Contractor is responsible to complete the training within 2 weeks of contract award. The Contractor shall have the project team participate in this training at no additional cost to the Owner or representatives.

G. Paper prints (hard copies) of reviewed submittals:

1. Record Copy: Within 14 days of receipt of submittals marked "Approved", "Approved As Noted", or meeting the requirements of Article 1.05 of this specification section, the Prime Contractor shall provide two paper copies of each approved submittal to the Construction Manager.
 - a. Paper copies shall be printed in a size format equal to the original document.
 - b. Scaled Shop Drawings shall be printed to the scale noted on the drawings.
 - c. The resolution of the printed copy shall be equal to that of the PDF file that it is being printed from.
 - d. The Record Copy shall be used by the Owner's Representative during the construction of the project and shall be retained as a turn-over item to the Owner at the end of the project as required section 017100 Contract Closeout.
2. Contractor Copies: The Contractor will be responsible for making copies, for the Contractors own use and for use by its subcontractors and suppliers.

PART- 2 PRODUCTS

2.1 PRODUCT DATA

- A. Collect manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts and other standard descriptive data into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for submittal because standard printed data is not suitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Modify each copy of each submittal to show which products and options are not applicable.
 - 3. Supplement Standard to provide additional information applicable to project.
 - 4. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Standard color charts.
 - e. Manufacturer's catalog cuts.
 - f. Wiring diagrams showing factory-installed wiring.
 - g. Printed performance curves.
 - h. Operational range diagrams.
 - i. Mill reports.
 - j. Standard product operation and maintenance manuals.
 - k. Compliance with recognized trade association standards.
 - l. Compliance with recognized testing agency standards.
 - m. Application of testing agency labels and seals.
 - n. Notation of coordination requirements.
- B. Shop Drawings: Original drawings, prepared by Contractor illustrating some portion of Project-specific information showing fabrication, layout, setting or erection details.
 - 1. Preparation: Include the following information, as applicable:
 - a. Dimensions.
 - b. Fabrication and installation drawings.
 - c. Roughing-in and setting diagrams.
 - d. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - e. Shop work manufacturing instructions.
 - f. Schedules.
 - g. Compliance with specified standards.
 - h. Notation of coordination requirements.
 - i. Notation of dimensions established by field measurement.
 - 2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.

- C. Samples: Prepare physical units of materials or products to illustrate equipment or workmanship establishing standards by which completed work is judged and including the following:
1. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 2. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 3. Preparation: Mount, display or package Samples in manner specified to facilitate review of qualities indicated.
 - a. Office samples to be of sufficient size and quantity to clearly illustrate.
 - i. Functional characteristics of product or material, with related parts and method of attachment.
 - ii. Full range of color samples.
 4. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
 5. Number of Samples for Initial Selection: Submit 2 full sets of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line.
- D. Material Safety Data Sheets (MSDSs): Submit information directly to Contractor.

PART- 3 EXECUTION (NOT USED)

END OF SECTION 01 3300

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether it is clearly or explicitly shown.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner, Construction Manager, or authorities having jurisdiction are not limited by provisions of this Section.

1.3 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced," unless otherwise further described, means having successfully completed a minimum of [5] five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- B. Field Quality-Control Tests and Inspections: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, subcontractor, or sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.
 - 1. Use of trade-specific terminology in referring to a Work result does not require that certain construction activities specified apply exclusively to specific trade(s).
- D. Mockups: Physical assemblies of portions of the Work constructed to establish the standard by which the Work will be judged. Mockups are not Samples.

1. Mockups are used for one or more of the following:
 - a. Verify selections made under Sample submittals.
 - b. Demonstrate aesthetic effects.
 - c. Demonstrate the qualities of products and workmanship.
 - d. Demonstrate successful installation of interfaces between components and systems.
 - e. Perform preconstruction testing to determine system performance.
 2. Product Mockups: Mockups that may include multiple products, materials, or systems specified in a single Section.
 3. In-Place Mockups: Mockups constructed on-site in their actual final location as part of permanent construction.
- E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria. Unless otherwise indicated, copies of reports of tests or inspections performed for other than the Project do not meet this definition.
- F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- G. Source Quality-Control Tests and Inspections: Tests and inspections that are performed at the source (e.g., plant, mill, factory, or shop).
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. The term "testing laboratory" has the same meaning as the term "testing agency."
- I. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work, to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- J. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work, to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect or Construction Manager.

1.4 DELEGATED DESIGN SERVICES

- A. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated Design Services Statement: Submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.5 CONFLICTING REQUIREMENTS

- A. **Conflicting Standards and Other Requirements:** If compliance with two or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, inform the Architect regarding the conflict and obtain clarification prior to proceeding with the Work. Refer conflicting requirements that are different, but apparently equal, to Architect for clarification before proceeding.
- B. **Minimum Quantity or Quality Levels:** The quantity or quality level shown or specified is the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.6 ACTION SUBMITTALS

- A. **Mockup Shop Drawings:**
 - 1. Include plans, sections, elevations, and details, indicating materials and size of mockup construction.
 - 2. Indicate manufacturer and model number of individual components.
 - 3. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

1.7 INFORMATIONAL SUBMITTALS

- A. **Contractor's Quality-Control Plan:** For quality-assurance and quality-control activities and responsibilities.
- B. **Qualification Data:** For Contractor's quality-control personnel.
- C. **Contractor's Statement of Responsibility:** When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:
 - 1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
 - 2. Primary wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.
- D. **Testing Agency Qualifications:** For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- E. **Schedule of Tests and Inspections:** Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Entity responsible for performing tests and inspections.
 - 3. Description of test and inspection.
 - 4. Identification of applicable standards.
 - 5. Identification of test and inspection methods.
 - 6. Number of tests and inspections required.
 - 7. Time schedule or time span for tests and inspections.

- 8. Requirements for obtaining samples.
 - 9. Unique characteristics of each quality-control service.
- F. Reports: Prepare and submit certified written reports and documents as specified.
- G. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.8 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Plan, General: Submit quality-control plan within [10] ten days of Notice of Award, and not less than [5] five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities and to coordinate Owner's quality-assurance and quality-control activities. Coordinate with Contractor's Construction Schedule.
- B. Quality-Control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
- 1. Project quality-control manager may also serve as Project superintendent.
- C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
- D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
- 1. Contractor-performed tests and inspections, including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections. Distinguish source quality-control tests and inspections from field quality-control tests and inspections.
 - 2. Special inspections required by authorities having jurisdiction and indicated on the Statement of Special Inspections.
 - 3. Owner-performed tests and inspections indicated in the Contract Documents.
- E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring the Work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- F. Monitoring and Documentation: Maintain testing and inspection reports, including log of approved and rejected results. Include Work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming Work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.9 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
1. Date of issue.
 2. Project title and number.
 3. Name, address, telephone number, and email address of testing agency.
 4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Record of temperature and weather conditions at time of sample-taking and testing and inspection.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, telephone number, and email address of technical representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement of whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, telephone number, and email address of factory-authorized service representative making report.

2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement of whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

1.10 QUALITY ASSURANCE

- A. Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product.
- F. Specialists: Certain Specification Sections require that specific construction activities be performed by entities who are recognized experts in those operations. Specialists will satisfy qualification requirements indicated and engage in the activities indicated.
 1. Requirements of authorities having jurisdiction supersede requirements for specialists.
- G. Testing and Inspecting Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented in accordance with ASTM E329, and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect, demonstrate, repair, and perform service on installations of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

- J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following Contractor's responsibilities, including the following:
1. Provide test specimens representative of proposed products and construction.
 2. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 3. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 4. Build site-assembled test assemblies and mockups, using installers who will perform same tasks for Project.
 5. When testing is complete, remove test specimens and test assemblies, mockups; do not reuse products on Project.
 6. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, through Construction Manager, with copy to Contractor. Interpret tests and inspections, and state in each report whether tested and inspected Work complies with or deviates from the Contract Documents.
- K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups of size indicated.
 2. Build mockups in location indicated or, if not indicated, as directed by Architect or Construction Manager.
 3. Notify Architect and Construction Manager [7] seven days in advance of dates and times when mockups will be constructed.
 4. Employ supervisory personnel who will oversee mockup construction. Employ workers who will be employed to perform same tasks during the construction at Project.
 5. Demonstrate the proposed range of aesthetic effects and workmanship.
 6. Obtain Architect's and Construction Manager's approval of mockups before starting corresponding Work, fabrication, or construction.
 - a. Allow [7] seven days for initial review and each re-review of each mockup.
 7. Promptly correct unsatisfactory conditions noted by Architect's preliminary review, to the satisfaction of the Architect, before completion of final mockup.
 8. Approval of mockups by the Architect does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 9. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

- C. Specialty Mockups: See Section 014339 "Mockups" for additional construction requirements for integrated exterior mockups and room mockups.

1.11 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
 - 2. Payment for these services will be made from testing and inspection allowances specified in Section 012100 "Allowances," as authorized by Change Orders.
 - 3. Costs for retesting and reinspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be charged to Contractor.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
 - 1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 - 2. Engage a qualified testing agency to perform quality-control services.
 - a. Contractor will not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 - 3. Notify testing agencies at least [24] twenty-four hours in advance of time when Work that requires testing or inspection will be performed.
 - 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 - 5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 - 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- D. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."
- E. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

- F. Contractor's Associated Requirements and Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 - 1. Access to the Work.
 - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 - 3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
 - 4. Facilities for storage and field curing of test samples.
 - 5. Delivery of samples to testing agencies.
 - 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 - 7. Security and protection for samples and for testing and inspection equipment at Project site.
- G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
 - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- H. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's Construction Schedule. Update and submit with each Application for Payment.
 - 1. Schedule Contents: Include tests, inspections, and quality-control services, including Contractor- and Owner-retained services, commissioning activities, and other Project-required services paid for by other entities.
 - 2. Distribution: Distribute schedule to Owner, Architect, Construction Manager, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.12 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, as indicated in the Statement of Special Inspections attached to this Section, and as follows:
 - 1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
 - 2. Notifying Architect, Construction Manager, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 - 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect, through Construction Manager, with copy to Contractor and to authorities having jurisdiction.
 - 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.

5. Interpreting tests and inspections and stating in each report whether tested and inspected Work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected Work.

PART- 2 PRODUCTS (NOT USED)

PART- 3 EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
 1. Date test or inspection was conducted.
 2. Description of the Work tested or inspected.
 3. Date test or inspection results were transmitted to Architect.
 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's, Construction Manager's and authorities' having jurisdiction reference during normal working hours.
 1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, sample-taking, and similar services, repair damaged construction and restore substrates and finishes.
 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 4000

STATEMENT OF SPECIAL INSPECTIONS

Project:

Location:

Owner:

Design Professional in Responsible Charge:

This *Statement of Special Inspections* is submitted as a condition for permit issuance in accordance with the Special Inspection and Structural Testing requirements of the Building Code. It includes a schedule of Special Inspection services applicable to this project as well as the name of the Special Inspection Coordinator and the identity of other approved agencies to be retained for conducting these inspections and tests. This *Statement of Special Inspections* encompass the following disciplines:

☐ Structural

☐ Mechanical/Electrical/Plumbing

☐ Architectural

☐ Other: _____

The Special Inspection Coordinator shall keep records of all inspections and shall furnish inspection reports to the Building Official and the Registered Design Professional in Responsible Charge. Discovered discrepancies shall be brought to the immediate attention of the Contractor for correction. If such discrepancies are not corrected, the discrepancies shall be brought to the attention of the Building Official and the Registered Design Professional in Responsible Charge. The Special Inspection program does not relieve the Contractor of his or her responsibilities.

Interim reports shall be submitted to the Building Official and the Registered Design Professional in Responsible Charge.

A *Final Report of Special Inspections* documenting completion of all required Special Inspections, testing and correction of any discrepancies noted in the inspections shall be submitted prior to issuance of a Certificate of Use and Occupancy.

Job site safety and means and methods of construction are solely the responsibility of the Contractor.

Interim Report Frequency:

or ☐ per attached schedule.

Prepared by:

(type or print name)

Signature

Date

Design Professional Seal

Owner's Authorization:

Building Official's Acceptance:

Signature

Date

Signature

Date

Schedule of Inspection and Testing Agencies

This Statement of Special Inspections / Quality Assurance Plan includes the following building systems:

- | | |
|--|--|
| ☐ Soils and Foundations | ☐ Spray Fire Resistant Material |
| ☐ Cast-in-Place Concrete | ☐ Wood Construction |
| ☐ Precast Concrete | ☐ Exterior Insulation and Finish System |
| ☐ Masonry | ☐ Mechanical & Electrical Systems |
| ☐ Structural Steel | ☐ Architectural Systems |
| ☐ Cold-Formed Steel Framing | ☐ Special Cases |

Special Inspection Agencies	Firm	Address, Telephone, e-mail
1. Special Inspection Coordinator		
2. Inspector		
3. Inspector		
4. Testing Agency		
5. Testing Agency		
6. Other		

Note: The inspectors and testing agencies shall be engaged by the Owner or the Owner's Agent, and not by the Contractor or Subcontractor whose work is to be inspected or tested. Any conflict of interest must be disclosed to the Building Official, prior to commencing work.

Quality Assurance Plan

Quality Assurance for Seismic Resistance

Seismic Design Category

Quality Assurance Plan Required (Y/N)

Description of seismic force resisting system and designated seismic systems:

Quality Assurance for Wind Requirements

Basic Wind Speed (3 second gust)

Wind Exposure Category

Quality Assurance Plan Required (Y/N)

Description of wind force resisting system and designated wind resisting components:

Statement of Responsibility

Each contractor responsible for the construction or fabrication of a system or component designated above must submit a Statement of Responsibility.

Qualifications of Inspectors and Testing Technicians

The qualifications of all personnel performing Special Inspection and testing activities are subject to the approval of the Building Official. The credentials of all Inspectors and testing technicians shall be provided if requested.

Key for Minimum Qualifications of Inspection Agents:

When the Registered Design Professional in Responsible Charge deems it appropriate that the individual performing a stipulated test or inspection have a specific certification or license as indicated below, such designation shall appear below the *Agency Number* on the Schedule.

PE/SE Structural Engineer – a licensed SE or PE specializing in the design of building structures
 PE/GE Geotechnical Engineer – a licensed PE specializing in soil mechanics and foundations
 EIT Engineer-In-Training – a graduate engineer who has passed the Fundamentals of Engineering examination

American Concrete Institute (ACI) Certification

ACI-CFTT Concrete Field Testing Technician – Grade 1
 ACI-CCI Concrete Construction Inspector
 ACI-LTT Laboratory Testing Technician – Grade 1&2
 ACI-STT Strength Testing Technician

American Welding Society (AWS) Certification

AWS-CWI Certified Welding Inspector
 AWS/AISC-SSI Certified Structural Steel Inspector

American Society of Non-Destructive Testing (ASNT) Certification

ASNT Non-Destructive Testing Technician – Level II or III.

International Code Council (ICC) Certification

ICC-SMSI Structural Masonry Special Inspector
 ICC-SWSI Structural Steel and Welding Special Inspector
 ICC-SFSI Spray-Applied Fireproofing Special Inspector
 ICC-PCSI Prestressed Concrete Special Inspector
 ICC-RCSI Reinforced Concrete Special Inspector

National Institute for Certification in Engineering Technologies (NICET)

NICET-CT Concrete Technician – Levels I, II, III & IV
 NICET-ST Soils Technician - Levels I, II, III & IV
 NICET-GET Geotechnical Engineering Technician - Levels I, II, III & IV

Exterior Design Institute (EDI) Certification

EDI-EIFS EIFS Third Party Inspector

Other

Soils and Foundations

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Item	Agency # (Qualif.)	Scope
1. Shallow Foundations	PE/GE	<i>Inspect soils below footings for adequate bearing capacity and consistency with geotechnical report.</i> <i>Inspect removal of unsuitable material and preparation of subgrade prior to placement of controlled fill</i>
2. Controlled Structural Fill	PE/GE	<i>Perform sieve tests (ASTM D422 & D1140) and modified Proctor tests (ASTM D1557) of each source of fill material.</i> <i>Inspect placement, lift thickness and compaction of controlled fill.</i> <i>Test density of each lift of fill by nuclear methods (ASTM D2922)</i> <i>Verify extent and slope of fill placement.</i>
3. Deep Foundations	PE/GE	<i>Inspect and log pile driving operations. Record pile driving resistance and verify compliance with driving criteria.</i> <i>Inspect piles for damage from driving and plumbness.</i> <i>Verify pile size, length and accessories.</i> <i>Inspect installation of drilled pier foundations. Verify pier diameter, bell diameter, lengths, embedment into bedrock and suitability of end bearing strata.</i>
4. Load Testing		
4. Other:		

Cast-in-Place Concrete

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Item	Agency # (Qualif.)	Scope
1. Mix Design	ACI-CCI ICC-RCSI	Review concrete batch tickets and verify compliance with approved mix design. Verify that water added at the site does not exceed that allowed by the mix design.
2. Material Certification		
3. Reinforcement Installation	ACI-CCI ICC-RCSI	Inspect size, spacing, cover, positioning and grade of reinforcing steel. Verify that reinforcing bars are free of form oil or other deleterious materials. Inspect bar laps and mechanical splices. Verify that bars are adequately tied and supported on chairs or bolsters
4. Post-Tensioning Operations	ICC-PCSI	Inspect placement, stressing, grouting and protection of post-tensioning tendons. Verify that tendons are correctly positioned, supported, tied and wrapped. Record tendon elongations.
5. Welding of Reinforcing	AWS-CWI	Visually inspect all reinforcing steel welds. Verify weldability of reinforcing steel. Inspect preheating of steel when required.
6. Anchor Rods		Inspect size, positioning and embedment of anchor rods. Inspect concrete placement and consolidation around anchors.
7. Concrete Placement	ACI-CCI ICC-RCSI	Inspect placement of concrete. Verify that concrete conveyance and depositing avoids segregation or contamination. Verify that concrete is properly consolidated.
8. Sampling and Testing of Concrete	ACI-CFTT ACI-STT	Test concrete compressive strength (ASTM C31 & C39), slump (ASTM C143), air-content (ASTM C231 or C173) and temperature (ASTM C1064).
9. Curing and Protection	ACI-CCI ICC-RCSI	Inspect curing, cold weather protection and hot weather protection procedures.
10. Other:		

Item	Agency # (Qualif.)	Scope
1. Plant Certification / Quality Control Procedures ☐ Fabricator Exempt	ACI-CCI ICC-RCSI	Review plant operations and quality control procedures.
2. Mix Design	ACI-CCI ICC-RCSI	Inspect concrete batching operations and verify compliance with approved mix design
3. Material Certification		
4. Reinforcement Installation	ACI-CCI ICC-RCSI	Inspect size, spacing, position and grade of reinforcing steel. Verify that reinforcing bars are free of form oil or other deleterious materials.
5. Prestress Operations	ICC-PCSI	Inspect placement, stressing, grouting and protection of prestressing tendons
6. Connections / Embedded Items		
7. Formwork Geometry		
8. Concrete Placement	ACI-CCI ICC-RCSI	Inspect placement of concrete. Verify that concrete conveyance and depositing avoids segregation or contamination. Verify that concrete is properly consolidated .
9. Sampling and Testing of Concrete	ACI-CFTT ACI-STT	Test concrete compressive strength (ASTM C31 & C39), slump (ASTM C143), air-content (ASTM C231 or C173) and temperature (ASTM C1064).
10. Curing and Protection	ACI-CCI ICC-RCSI	Inspect curing, cold weather protection and hot weather protection procedures.
11. Erected Precast Elements	PE/SE	Inspect erection of precast concrete including member configuration, connections, welding and grouting.
12. Other:		

Masonry

Required Inspection Level: ☐ 1 ☐ 2

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Item	Agency # (Qualif.)	Scope
1. Material Certification		
2. Mixing of Mortar and Grout	ICC-SMSI	<i>Inspect proportioning, mixing and retempering of mortar and grout.</i>
3. Installation of Masonry	ICC-SMSI	<i>Inspect size, layout, bonding and placement of masonry units.</i>
4. Mortar Joints	ICC-SMSI	<i>Inspect construction of mortar joints including tooling and filling of head joints.</i>
5. Reinforcement Installation	ICC-SMSI AWS-CWI	<i>Inspect placement, positioning and lapping of reinforcing steel.</i> <i>Inspect welding of reinforcing steel.</i>
6. Prestressed Masonry	ICC-SMSI	<i>Inspect placement, anchorage and stressing of prestressing bars.</i>
7. Grouting Operations	ICC-SMSI	<i>Inspect placement and consolidation of grout. Inspect masonry clean-outs for high-lift grouting.</i>
7. Weather Protection	ICC-SMSI	<i>Inspect cold weather protection and hot weather protection procedures. Verify that wall cavities are protected against precipitation.</i>
9. Evaluation of Masonry Strength	ICC-SMSI	<i>Test compressive strength of mortar and grout cube samples (ASTM C780).</i> <i>Test compressive strength of masonry prisms (ASTM C1314).</i>
10. Anchors and Ties	ICC-SMSI	<i>Inspect size, location, spacing and embedment of dowels, anchors and ties.</i>
11. Other:		

Item	Agency # (Qualif.)	Scope
1. Fabricator Certification/ Quality Control Procedures ☐ Fabricator Exempt	AWS/AISC- SSI ICC-SWSI	Review shop fabrication and quality control procedures.
2. Material Certification	AWS/AISC- SSI ICC-SWSI	Review certified mill test reports and identification markings on wide-flange shapes, high-strength bolts, nuts and welding electrodes
3. Open Web Steel Joists		Inspect installation, field welding and bridging of joists.
4. Bolting	AWS/AISC- SSI ICC-SWSI	Inspect installation and tightening of high-strength bolts. Verify that splines have separated from tension control bolts. Verify proper tightening sequence. Continuous inspection of bolts in slip-critical connections.
5. Welding	AWS-CWI ASNT	Visually inspect all welds. Inspect pre-heat, post-heat and surface preparation between passes. Verify size and length of fillet welds. Ultrasonic testing of all full-penetration welds.
6. Shear Connectors	AWS/AISC- SSI ICC-SWSI	Inspect size, number, positioning and welding of shear connectors. Inspect studs for full 360 degree flash. Ring test all shear connectors with a 3 lb hammer. Bend test all questionable studs to 15 degrees.
7. Structural Details	PE/SE	Inspect steel frame for compliance with structural drawings, including bracing, member configuration and connection details.
8. Metal Deck	AWS-CWI	Inspect welding and side-lap fastening of metal roof and floor deck.
9. Other:		

Cold-Formed Steel Framing

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Item	Agency # (Qualif.)	Scope
1. Member Sizes		
2. Material Thickness		
3. Material Properties		
4. Mechanical Connections		
5. Welding		
6. Framing Details		
7.		
8.		
9. Other:		

Item	Agency # (Qualif.)	Scope
1. Material Specifications		
2. Laboratory Tested Fire Resistance Design	ICC-SFSI	Review UL fire resistive design for each rated beam, column, or assembly.
3. Schedule of Thickness	ICC-SFSI	Review approved thickness schedule.
4. Surface Preparation	ICC-SFSI	Inspect surface preparation of steel prior to application of fireproofing
5. Application	ICC-SFSI	Inspect application of fireproofing.
6. Curing and Ambient Condition	ICC-SFSI	Verify ambient air temperature and ventilation is suitable for application and curing of fireproofing.
7. Thickness	ICC-SFSI	Test thickness of fireproofing (ASTM E605). Perform a set of thickness measurements for every 1,000 SF of floor and roof assemblies and on not less than 25% of rated beams and columns.
8. Density	ICC-SFSI	Test the density of fireproofing material (ASTM E605).
9. Bond Strength	ICC-SFSI	Test the cohesive/adhesive bond strength of fireproofing ASTM E736). Perform not less than one test for each 10,000 SF.
10. Other:		

Wood Construction

Page of

Item	Agency # (Qualif.)	Scope
1. Fabricator Certification/ Quality Control Procedures ☐ Fabricator Exempt		<i>Inspect shop fabrication and quality control procedures for wood truss plant.</i>
2. Material Grading		
3. Connections		
4. Framing and Details		
5. Diaphragms and Shearwalls		<i>Inspect size, configuration, blocking and fastening of shearwalls and diaphragms. Verify panel grade and thickness.</i>
6.		<i>Inspect the fabrication of wood trusses.</i>
7.		
8. Other:		

Exterior Insulation & Finish Systems (EIFS)

Page of

Item	Agency # (Qualif.)	Scope
1. Material Submittals		
2. Condition of Substrate		
3. Application of Foam Plastic Board		
4. Application of Coatings		
5. Application of Mesh		
6. Ambient Condition and Curing		
7. Flashing and Joint Details		
8. Sealants/Caulks		
9. Other:		

Mechanical & Electrical Systems

Page of

Item	Agency # (Qualif.)	Scope
1. Smoke Control		
2. Mechanical, HVAC & Piping		
3. Electrical System		
4. Other:		

Architectural Systems

Page of

Item	Agency # (Qualif.)	Scope
1. Wall Panels & Veneers		
2. Suspended Ceilings		
3. Access Floors		
4. Other:		

Special Cases

Item	Agency # (Qualif.)	Scope

Instructions – Preparation of the Statement of Special Inspections

1. Who Prepares the Form:

The program of inspection and testing for a project should be prepared by the Registered Design Professional (RDP) that is in responsible charge of the building system requiring inspections and testing. The Structural Engineer of Record (SER) should prepare the sections required for the structural elements such as foundations, concrete, structural steel, etc. The Architect and MEP Engineer of Record should prepare the corresponding sections of the SSI for the building systems that they are responsible for. For further explanation, please refer to the “Guide to Special Inspections and Quality Assurance”.

2. The Front Page:

2-1 At the top of the page indicate the project name and location as they appear on the Contract Documents, provide the Owner’s name (individual, private company, municipality, government agency, etc.), and indicate the Design Professional In Responsible Charge. This should be the RDP in responsible charge of the building systems for which this Statement of Special Inspections is being prepared. See explanation in item 1 above.

2-2. Next, read the first paragraph and check the box below indicating the discipline(s) that this SSI will encompass (Structural, Architectural, Mechanical/Electrical/Plumbing, or Other).

2-3. After reading the remaining paragraphs, the RDP must indicate the frequency of “Interim Reports” required from the Special Inspection Coordinator for the project. This can be indicated directly on the page, i.e. “weekly”, or the adjacent box can be checked to attach a more specific schedule.

2-4. Near the bottom of the page, the RDP must print, sign, and date the form, and stamp the form with their professional seal in the box provided.

2-5. The Owner or Owner’s agent must sign and date the front page after the SSI has been completed by the RDP.

2-6. The Building Official must sign and date the form upon acceptance.

3. Page 2 – Schedule of Inspection and Testing Agencies:

3-1. The top of the page lists all of the categories of building systems with a box next to each. The RDP must check the boxes for only the building systems that are going to be covered in this SSI. A completed inspection program page must be attached for each building system that is checked off. (See instruction #5 below.)

3-2. The chart below is where the members of the Special Inspection Program are listed. Their names, addresses, telephone numbers, and emails should be filled out in the appropriate boxes. If the Inspectors and Testing Agencies have not been determined yet, the RDP can fill in the boxes with “To Be Determined”.

4. Page 3 – Quality Assurance Plan:

4-1. The RDP must review sections 1705 and 1706 in Chapter 17 of the IBC to determine if the project requires a Quality Assurance Plan for the seismic force and wind force resisting systems and components.

4-2. The RDP must indicate whether or not a Quality Assurance Plan is required by filling in the information requested on the page. It is only necessary to provide descriptions of the seismic and wind force resisting systems if it is determined that a Quality Assurance Plan is required.

5. Inspection Program Pages For Each Building System:

5-1. There is a page attached for each building system where the RDP identifies the inspection requirements of each system. Fill out the pages for only the building systems included in this SSI. Do not include blank pages for building systems not covered under this SSI.

5-2. Indicate the inspection or testing firm (Agency #) that will perform each inspection task. The Agency # is the number listed next to the Inspector or Testing Laboratory on the chart on page 2 of the SSI.

5-3. Indicate the required qualifications of the Inspector for each inspection. A list of qualifications of Inspectors and testing technicians is provided on page 4 of the SSI for reference. The RDP may require additional qualifications beyond the ones listed if they feel it is appropriate. Suggested qualifications have been included for consideration. The RDP must determine what qualifications are appropriate for the particular project and confirm that the selected agency employs individuals with the specified qualifications.

5-4. The scope of each inspection must be filled in by the RDP. The editable text provided in italics reflects the code mandated minimum inspection requirements designated in section 1704 of IBC Chapter 17. The editable text does not include the inspections requirements for seismic and wind resisting systems listed in sections 1705 through 1708. The RDP must determine if the project falls under the requirements of sections 1705 to 1708 and add the required inspections to the building systems. The final scope of the inspections required for the project must be determined by the RDP.

5-5. Descriptions of all inspections must include the required frequency of each inspection or test.

PART- 1 GENERAL

1.1 SCOPE OF WORK

- A. To enable the Owner to compare and total cost where alternate materials and methods might be used, alternates have been established as described on the drawings and in this Section of these Specifications.
- B. If the Owner elects to proceed on the basis of the described alternate, make all modification to the work required in furnishing and installing the selected alternative no additional cost to the Owner other than as proposed on the Bid Form.

1.2 COMPLIANCE

- A. Comply with applicable regulatory requirements and various codes referenced in these specifications. Where conflicts exist between local, State, and/or Federal regulatory requirements, codes, or these specifications advise the Director's Representative. The Director's Representative will assist in resolving the conflicts to the satisfaction of the regulatory agencies prior to commencing the Work.

1.3 CODES

- A. All Work shall comply with OSHA (site specific safety plans are required on all projects), the New York State Uniform Fire Prevention and Building Code (the "Uniform Code"), which includes the current editions (see Subparagraph 1.a below) of Part 1220 (Residential Code), Part 1221 (Building Code), Part 1222 (Plumbing Code), Part 1223 (Mechanical Code), Part 1224 (Fuel Gas Code), Part 1225 (Fire Code), Part 1226 (Property Maintenance Code), Part 1227 (Existing Building Code). And Part 1240 (New York State Energy Conservation Construction Code: see Subparagraph 1.b below) and their referenced standards.
 - 1. The contractor shall be aware of, and comply with, contractor requirements identified in the above referenced codes and standards; for example, but not limited to: OSHA (Occupational Safety and Health Administration) – Building Code of New York State - Chapter 33 Safeguards During Construction, Existing Building Code of New York State - Chapter 15 Construction Safeguards, Fire Code of New York State – Chapter 33 Fire Safety During Construction and Demolition, Fire Code of New York State – Chapter 35 Welding and Other Hot Work (which governs safety during construction).
 - a. The Uniform Code shall consist of the listed codes of the 2015 International Codes and the New York State 2017 Uniform Code Supplement, as documented by the New York State Department of State.
 - b. The New York State Energy Conservation Construction Code shall consist of the 2015 International Energy Conservation Code and the New York State 2016 Supplement to the New York State Energy Conservation Construction Code (REVISED JULY 2017), as documented by the New York State Department of State.
- B. Electrical Work: Conform to the requirements of the National Electrical Code (NEC), as referenced in the Building Code of New York State, unless otherwise shown or specified. The Director will be the sole judge of the interpretation of these rules and requirements.
- C. Elevator Work; conform to:

1. Safety Code for Elevators and Escalators, ASME A17.1, as referenced in the Building Code of New York State, or more recent publication currently referenced and accepted by the NYS Building Code.

1.4 STATE REQUIRED PERMITS AND INSPECTIONS

- A. Obtain a New York Board of Fire Underwriters inspection and certificate.
- B. The Contractor or subcontractor performing site work which disturbs the site shall submit an executed and completed Contractor Certification Statement to the Director's Representative prior to the commencement of work. This required document is found in the Appendix. The failure to execute this required document may result in the Contract being considered for Termination for Cause under the provisions of Article 13 of the General Conditions.

1.5 LISTINGS

- A. Equipment and materials for which Underwriters' Laboratories, Inc. (UL) provides product listing service, shall be listed and bear the listing mark.
 1. Alternately, any product listed and bearing the mark from one of the other Nationally Recognized Testing Laboratories (NRTL – as recognized by OSHA) shall be an acceptable alternative to being UL listed and marked, if the listed product has been tested to the applicable standard.

1.6 FIRE RESISTANT CONSTRUCTION MATERIALS AND ASSEMBLIES

- A. Conform to the fire rating classifications based upon the test methods and acceptance criteria in the Standard, Fire Tests of Building Construction and Materials for which Underwriters' Laboratories, Inc. (UL) provides listings.
 1. Materials and assemblies shall comply with the acceptance criteria, detailed description of the assembly, its performance in the fire test and other pertinent details such as specification of materials, Classification coverage, and alternate assembly details.
 2. Alternatively, fire resistance rating classifications by other issuing organizations listed in the New York State Uniform Fire Prevention and Building Code are acceptable.

1.7 UTILITIES

- A. Underground Utilities:
 1. Locate existing underground utilities prior to commencing excavation work. Conform to all requirements of NYCRR 16 Part 753, including the following:
 - a. Notify Dig Safely New York at least 48 hours in advance not counting the date of contact.
 - i. Statewide: 800-962-7962.
 - ii. Website: www.digsafelynewyork.com
 - b. Refer to Section 023313 Underground Utility Locator Service of the Project Manual to locate all utilities on facility and/or private property.

- c. Determine exact utility locations by hand excavated test pits. Contractor will be responsible for the proper support and protection of all utilities to remain in service.
- B. Coordination with Electric Utility Company:
 1. Comply with utility company requirements for new or modified electric service. If a meter is required to complete the Work, arrange installation with utility company.
 2. Comply with the utility company requirements for the incoming electric service. Pay the utility company's charges in connection with the installation of the incoming service.
- C. Coordination with Gas Utility Company:
 1. Comply with utility company's requirements for new or modified gas service. If a meter is required to complete the Work, arrange installation with the utility's Energy Services Department.
 2. Comply with the gas utility company requirements including inspection for the incoming gas service. Pay the utility company's charges in connection with the installation and inspection of the incoming service.
- D. Coordination with Telecommunications Organization:
 1. Contact the onsite telecommunications coordinator at the facility and arrange for the removal and relocation of existing telephone/telecommunication equipment.
- E. Utility Work Within State Highway Right-Of-Way:
 1. Utility Work, either overhead or underground, within the boundaries of the state highway right-of-way, shall conform to procedures set forth in the following Department of Transportation publications:
 - a. "Department Rules and Regulations Governing the Accommodation of Utilities Within State Highway Right-of-Way" (Part 131 - Title 17 Transportation).
 - b. Manual of Administrative Procedures - "Issuance of Highway Work Permits" 7.12-2.

1.8 FIRE ALARM AND SECURITY WORK

- A. Work to install, modify, repair, or service Fire Alarm Systems and/or Security Systems shall be performed in accordance with the requirements of Article 6-D (Business of installing Security or Fire Alarm System) of the New York State General Business Law.
 1. Fire Alarm Work: New York State Fire Alarm License is required for installation.

PART- 2 PRODUCTS (NOT USED)

PART- 3 EXECUTION (NOT USED)

END OF SECTION 01 4100

PART- 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary sanitary facilities.
- B. Temporary Controls: Barriers, enclosures, and fencing.
- C. Security requirements.
- D. Waste removal facilities and services.
- E. Project identification sign.
- F. Field offices.
- G. Construction trailers.

1.2 RELATED REQUIREMENTS

- A. Section 01 5100 - Temporary Utilities.
- B. Section 01 5500 - Vehicular Access and Parking.

1.3 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- B. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.

1.4 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. NUMBER OF EMPLOYEES MINIMUM NUMBER OF FACILITIES
- C. 20 or less 1 toilet
- D. 20 or more 1 toilet and 1 urinal per 40 employees
- E. 200 or more 1 toilet and 1 urinal per 50 employees
- F. Maintain daily in clean and sanitary condition.

1.5 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.
- D. Provide temporary dust barriers to prevent the spread of dust from the work areas. Construct the dust barriers of wood framing sheathed with 6 mil polyethylene film. Secure the dust barriers in place without damaging existing construction.
- E. Scaffolding, Hoist, and Equipment Barriers: Provide temporary fence enclosures as required to prevent unauthorized persons from coming in contact with ground supported scaffolding, hoists, and equipment.
- F. All materials for use in this project shall be stored in a safe and secure manner and location, either within a lockable construction trailer, lockable containers, or within a lockable chain link fenced area.

1.6 FENCING

- A. Construction: Commercial grade chain link fence.
- B. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks. Provide and maintain full height screening on all temporary construction fencing.

1.7 INTERIOR ENCLOSURES

- A. Provide temporary partitions and ceilings as indicated or as required, to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.
- B. Construction: Framing and reinforced polyethylene sheet materials with closed joints and sealed edges at intersections with existing surfaces:
- C. Provide other methods, such as negative pressure exhaust air to prevent the migration of construction dust to occupied areas.

1.8 PROTECTION OF WORK AND EXISTING PROPERTY

- A. Protect installed Work and existing construction and finishes during performance of the Work.
- B. Building is to remain watertight throughout construction through the use of permanent or temporary means.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at wall projections, jambs, sills, and soffits of openings.

- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, and movement of heavy objects by covering them with durable sheet materials.
- F. Protect smoke detectors from airborne dust and debris.
 - 1. At the beginning of each workday, provide protective coverings over smoke detectors in areas where airborne dust and debris will be generated by the Work.
 - 2. At the end of the workday, clean the areas in which the smoke detectors are located by whatever means necessary to assure that airborne dust and debris will not contaminate the smoke detectors, then remove protective coverings.
 - 3. Provide signs, instructions and alternate methods for reporting a fire during the periods that the smoke detectors are covered.
 - 4. Notify the Owner's Representative and have procedures approved.
- G. Prohibit traffic or storage upon waterproofed and roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- H. Protect existing trees and plants during performance of the Work unless otherwise indicated. Box trees and plants within the grading limit lines. Do not deposit excavated materials or store building materials around trees or plants. Do not attach guy wires to trees.
- I. Prohibit traffic from landscaped areas.

1.9 FIRE PREVENTION

- A. Take precautions necessary to prevent fires.
- B. Fuel for cutting and heating torches shall be gas only and shall be contained in Underwriters Laboratory approved containers.
- C. Furnish and maintain a currently inspected 20-pound capacity multi-class A B C fire extinguisher in the immediate vicinity where welding tools or torches are in use.
- D. Furnish and maintain a currently inspected fire extinguisher of the appropriate class and size whenever the temporary storage of materials changes that areas classification of fire load or life safety.
- E. Do not use flammable liquids, other than those specified, within a building without written approval from the Director's Representative.
- F. Tarpaulins shall be flameproof and shall be securely anchored when attached to scaffolding or when used to enclose any portion of a building.
- G. Hot work permits are to be filled out as required for scopes of work that utilize torches or welders.

1.10 ACCESS ROADS

- A. Routes of ingress and egress on the premises to the location of the Work shall coordinated with the logistics and phasing plan and as directed.

- B. Keep designated access roads clear of dirt and debris resulting from the Work.
- C. Provide means of removing mud from vehicle wheels before entering paved roads.
- D. General Site, access roads, staging and work areas snow removal will be by the Prime Contractor. Snow removal in areas outside of the construction zone will be the responsibility of the Owner.

1.11 PARKING

- A. Keep designated parking areas clear of dirt and debris resulting from the Work.
- B. Remove ignition key from unattended vehicles and lock doors.

1.12 SECURITY

- A. The Contractors are responsible for the security of their own equipment, materials and tools and project site.

1.13 WASTE REMOVAL

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- B. Provide containers with lids. Remove trash from site periodically.
- C. If materials are to be recycled or re-used on the project they must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.
- E. Clean up and containerize the rubbish (refuse, debris, waste materials, and removed materials and equipment) resulting from the Work at the end of each workday and leave work areas broom clean, except where more stringent cleaning is specified. Locate containerized rubbish where directed.
- F. Remove rubbish from property at least once a week and more often if the rubbish presents a hazard. Properly dispose of rubbish.
- G. Burning of rubbish will not be permitted.

1.14 RELOCATION AND REMOVALS

- A. Should a change in location of any construction facilities and temporary controls be necessary in order to progress the Work properly, remove and relocate such items as directed.
- B. Remove the construction facilities and temporary controls when they are no longer required. Restore permanent facilities used for or connected to temporary facilities to their original condition or better.

1.15 PROJECT IDENTIFICATION

- A. Project Identification and Temporary Signs: Contractor is to provide (2) 4' x 8' project identification signs. Install sign where directed by the Construction Manager to inform public and persons seeking entrance to the Project. Do not permit installation of unauthorized signs.
1. Engage an experienced signage vendor to apply graphics provided by the Owner and Construction Manager for the Project identification sign. Project Identification sign to be printed in color for text and graphics.
 2. Graphics may include logos, as well as, a color graphic depiction of the subject project.
 3. Text may include names, titles and addresses of all or some of the identified parties or individuals.
 4. Prepare temporary signs as required to provide directional information to construction personnel and visitors.
 5. Construct signs of exterior-type Grade B-B high-density concrete form overlay plywood in sizes and thicknesses indicated. Support on posts or framing of preservative-treated wood or steel.
 6. No other signs are allowed without Owner permission except those required by law.

1.16 TEMPORARY FIELD OFFICES AND STORAGE SHEDS

- A. The Prime Contractor shall provide a field office and is responsible for the coordination of additional trailers and storage with their subcontractors and the Construction Manager.

PART- 2 PRODUCTS

2.1 TEMPORARY FIELD OFFICES

- A. General:
1. Portable or mobile buildings, or buildings constructed with floors raised above ground, securely fixed to foundations, with steps and landings at entrance doors.
 2. Construction: Structurally sound, secure, weather tight enclosures for office and storage spaces. Maintain during progress of work; remove at completion of work or as directed by Owner's Representative.
 3. Temperature transmission resistance of floors, walls and ceilings: Compatible with occupancy and storage requirements
 4. Exterior materials: Weather resistant, finished in color acceptable to Owner.
 5. Interior materials in offices: Sheet type materials for walls and ceilings, pre-finished or painted, resilient floors and bases.
 6. Fire extinguishers: Appropriate type fire extinguisher at each office and each storage area. (minimum 2).
 7. Interior Materials in storage shed: As required to provide specified conditions for storage of products.

PART- 3 EXECUTION

3.1 CONSTRUCTION TRAILERS

A. General:

1. The trailer will be located within the staging area in a location to be approved by the Construction Manager. A trailer must comply with tie down roll over protection. The trailer is to be identified by signage denoting the Contractor by name. No other site signage is permitted.
2. The Contractor is responsible for his own site trailer, its cleanliness and maintenance. The Owner, Owner's Representative, or Architect take no responsibility for maintenance and safety or security of any trailer or storage facility.
3. The Contractor is responsible for snow removal for that trailer if such removal is necessary.
4. Temporary Electric to the trailer will be coordinated, installed and paid for by the Contractor. Payment for such work will be the responsibility of the contractor.

B. Site Preparation

1. The Contractor shall fill and grade sites for temporary structures to provide drainage away from buildings in keeping with notes on the site plan.

C. Installation and Setup:

1. The Contractor shall install office spaces ready for occupancy 15 days after date fixed in Notice to Proceed.
2. Employee residential occupancy: Not allowed on Owner's property.
3. The Contractor will be responsible to set up, block, level and secure construction trailer. Provide steps and platforms at each entry location.

D. Maintenance and Cleaning:

1. Clean up and policing of the job area will be the responsibility of each prime contractor. Said clean-up will take place daily. If the Contractor does not clean and maintain their area and the area of general construction, the owner shall have the right to direct another Contractor to clean the area and back charge the offending contractor.

E. Removal:

1. At completion of work, each Contractor shall remove buildings, foundations, utility services, and debris. The Contractor shall restore areas as noted in the site section of the plans and specs or as outlined in this section.

3.2 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated. If not indicated, return grade to pre-construction condition. Coordinate with the Construction Manager.

- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing facilities used during construction to original condition.
- E. Refer to Division 02 for surface restoration and repair requirements.

END OF SECTION 01 5000

PART- 1 **GENERAL**

1.1 CIRCULATION

- A. The Prime Contractor shall maintain vehicular and pedestrian traffic safety throughout the construction project. The Prime Contractor shall furnish all equipment, materials and labor necessary to provide safe and uninterrupted pedestrian and vehicular circulation (as required) during the duration of the project, within the immediate and adjoining areas of the project limits as it pertains to the scope of work.

1.2 MATERIALS

- A. Materials required for maintaining pedestrian and vehicular safety include but are not limited to construction fencing and supports, wooden barriers, warning signs and temporary asphalt.

1.3 TRENCHING

- A. Any trenching or other work which interrupts the pedestrian or vehicular passages shall be temporarily bridged by a wood or steel platform with safety railings and must be constructed in a manner which will accommodate wheelchair use. All surfaces must be stable and have a non-slip texture.

1.4 CONTRACTOR REQUIREMENTS

- A. It shall be the Prime Contractor's responsibility to establish and maintain safe pedestrian passage and to make any modifications to such routes as may be requested by the CM, Owner or AHJ, during the duration of this contract. Any temporary pedestrian or vehicular road closures must be approved by the CM prior to the permitting process. The Prime Contractor shall be responsible for any permitting required by the AHJ at no additional cost to the Owner.

PART- 2 **PRODUCTS (NOT USED)**

PART- 3 **EXECUTION (NOT USED)**

END OF SECTION 01 5010

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether it is clearly or explicitly shown.

1.2 DEFINITIONS

- A. General Explanation: A substantial amount of specification language constitutes definitions for terms found in other contract documents, including drawings which must be recognized as diagrammatic in nature and not completely descriptive of requirements indicated thereon. Certain terms used in contract documents are defined generally in this article. Definitions and explanations contained in this section are not necessarily complete, but are general for the work to the extent that they are not stated more explicitly in another element of the contract documents.
- B. General Requirements: The provisions or requirements of Division-1 sections apply to entire work of Contract and, where so indicated, to other elements which are included in project.
- C. Indicated: The term "Indicated" is a cross reference to details, notes or schedules on drawings, to other paragraphs or schedules in the specifications, and to similar means of recording requirements in contract documents. Where terms such as "shown", "note", "scheduled", and "specified" are used in lieu of "indicated", it is for the purpose of helping the reader locate cross-reference, and no limitation of location is intended except as specifically noted.
- D. Directed, Requested, Etc.: Where not otherwise explained, terms such as "directed", "requested", "authorized", "selected", "approved", "required", "accepted", and "permitted" mean "directed by Architect", "requested by Architect", etc. However, no such implied meaning will be interpreted to extend Architect's responsibility into Contractor's area of construction supervision.
- E. "Approve": Where used in conjunction with the Architect's or Engineer's response to submittals, requests, applications, inquires, report and claims by the Contractor, the meaning of term "Approved" will be held to the limitations of the Architect's responsibilities and duties as specified in the general and special conditions. In no case, will Approval by the Architect be interpreted as an assurance to the Contract that the requirements of the Contract Documents have been fulfilled.

- F. Furnish: Except as otherwise defined in greater detail, the term "furnish" is used to mean supply and deliver to project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.
- G. Install: Except as otherwise defined in greater detail, the term "install" is used to describe operations at project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations, as applicable in each instance.
- H. "Replace": remove designated, damaged, rejected, defective, unacceptable, or non-conforming work from the project and providing new work meeting the requirements of the contract documents in place thereof.
- I. The term "Specifications" and "Project Manual" are interchangeable.
- J. "Concealed": where exposed in connection with insulation, painting of piping, conduits, ducts and accessories, shall mean that they are hidden from sight, as in trenches chases and shafts, furred paces, walls, slabs, or hung ceilings: also, where they are not hidden from sight in the following locations: in partly excavated spaces or crawl spaces, or in-service tunnels and used solely for repairs or maintenance.
- K. "Exposed": where used in connection with insulation, painting of piping, piping, conduit, ducts, accessories, shall mean that they are not "concealed" as defined herein above.
- L. "Piping": includes in addition to pipe, also fittings, valves, hangers, and other accessories that comprise the system.
- M. "Testing Laboratory": An independent entity engaged to perform specific inspections or tests of the work, either at the project site or elsewhere; and to report, and (if required) interpret the results of those inspections or tests.
- N. "Project Site": The space available to Contractor for the performance of the work, either exclusively or in conjunction with others performing other work as part of the project. The extent of the project site is noted on the drawings, and may, or may not be identical with the description of the land upon which the project is to be build.
- O. "Typical": The term "typical" is a cross reference to details, notes or schedules on the drawings or specifications which is shown in one location but is representative of similar work required in other locations.
- P. "Not in Contract (NIC)": Work to be performed by Owner or under separate contact.
- Q. "Owners Representative": Architect, or other person formally authorized by Owner to make decisions regarding the project.
- R. Provide: Except as otherwise defined in greater detail, the term "provide" means furnish and install, complete and ready for intended use, as applicable in each instance.

- S. Installer: The entity (person or firm) engaged by Contractor or its subcontractor or sub-subcontractor for performance of a particular unit of work at project site, including installation, erection, application and similar required operations. It is a general requirement that such entities (Installers) be experts in operations they are engaged to perform.
- T. Or Equal: The Architect shall be the sole determination of the equality of manufacturers.
- U. Minimum Quality/Quantity: In every instance, quality level or quantity shown or specified is intended as minimum for the work to be performed or provided. Except as otherwise specifically indicated, actual work may either comply exactly with that minimum (within specified tolerances), or may exceed that minimum within reasonable limits. In complying with requirements, indicated numeric values are either minimums or maximums as noted or as appropriate for context of requirements. Refer instances of uncertainty to Architect for decision before proceeding.
- V. Abbreviations: The language of specifications and other contract documents is of the abbreviated type in certain instances, and implies words and meanings which will be appropriately interpreted. Actual word abbreviations of a self-explanatory nature have been included in texts. Specific abbreviations have been established, principally for lengthy technical terminology and primarily in conjunction with coordination of specification requirements with notations on drawings and in schedules. These are frequently defined in the section at first instance of use. Trade association names and titles of general standards are frequently abbreviated. Singular words will be interpreted as plural and plural words will be interpreted as singular where applicable and where full context of the contract documents so indicates.

1.3 INDUSTRY STANDARDS

- A. General Applicability of Standards: Applicable standards of the construction industry have the same force and effect (and are made a part of contract documents by reference) as if copied directly into contract documents, or as if published copies were bound herewith.
- B. Publication Dates: Except as otherwise indicated, where compliance with an industry standard is required, comply with standard in effect as of date of contract documents.
- C. Copies of Standards: Provide where needed for proper performance of the work; obtain directly from publication sources.
- D. Abbreviations and Names: The following acronyms or abbreviations as referenced in contract documents are defined to mean the associated names. Both names and addresses are subject to change, and are believed to be, but are not assured to be, accurate and up to date as of date of contract documents.
 - 1. ACI American Concrete Institute
Box 19150 Redford Stat.; Detroit, MI 48219; 313-532-2600
 - 2. ADC Air Diffusion Council
435 N. Michigan Ave.; Chicago, IL 60611; 312-527-5494

3. AGA American Gas Association
1515 Wilson Blvd.; Arlington, VA 22209; 703-841-8400
4. AIA American Institute of Architects
1735 New York Ave., NW; Washington, DC 20006; 202-626-7474
5. AISC American Institute of Steel Construction
400 N. Michigan Ave.; Chicago, IL 60611; 312-670-2400
6. AMCA Air Movement and Control Association
30 W. University Dr.; Arlington Heights, IL 60004; 312-394-0150
7. ANSI American National Standards Institute
1430 Broadway; New York, NY 10018; 212-354-3300
8. ARI Air Conditioning and Refrigeration Institute
1815 N. Fort Myer Dr.; Arlington, VA 22209; 703-524-8800
9. ASHRAE American Society of Heating, Refrigerating & Air Conditioning Engineers
1791 Tullie Circle NE; Atlanta, GA 30329; 404-636-8400
10. ASME American Society of Mechanical Engineers
345 E. 45th Street; New York, NY 10017; 212-744-7722
11. ASPE American Society of Plumbing Engineers
15233 Ventura Blvd.; Sherman Oaks, CA 91403; 213-783-4845
12. ASSE American Society of Sanitary Engineering
P.O. Box 9712; Bay Village, OH 44140; 216-835-3040
13. ASTM American Society for Testing and Materials
1916 Race St.; Philadelphia, PA 19103; 215-299-5400
14. AWI American Woodworking Institute
13924 Braddock Rd., Suite 100, Centreville, VA 22022; 703-222 -1100
15. AWS American Welding Society
550 LeJune Rd., Miami, FL 33135; 305-642-7090
16. AWWA American Water Works Association
6666 W. Quincy Ave.; Denver, CO 80235; 303-794-7711
17. CISPI Cast Iron Soil Pipe Institute
1499 Chain Bridge Rd.; McLean, VA 22101; 793-827-9177
18. CRSI Concrete Reinforcing Steel Institute
180 N. LaSalle St.; Chicago, IL 60601; 312-372-5059
19. CS Commercial Standard of NBS (U.S. Dept. of Commerce)

Government Printing Office, Washington, DC 20402

- 20. MCAA Mechanical Contractors Association of America
5530 Wisconsin Ave.; Washington, DC 20015; 202-654-7960
- 21. MSS Manufacturers' Standardization Society of the Valve and Fittings Industry
5203 Leesburg Pike; Falls Church, VA 22041; 702-998-7996
- 22. NEC National Electric Code
- 23. NECA National Electrical Contractors Association
7315 Wisconsin Ave.; Washington, DC 20037; 202-457-8400
- 24. NFPA National Fire Protection Association
470 Atlantic Ave.; Boston, MA 02210; 617-482-8755
- 25. NSF National Sanitation Foundation
3475 Plymouth Rd.; Ann Arbor, MI 48106; 313-587-2204
- 26. OSHA Occupational Safety Health Administration (US Dept. of Labor)
Government Printing Office; Washington, DC 20402
- 27. PDI Plumbing and Drainage Institute
5342 Blvd. Pl.; Indianapolis, IN 46208; 317-251-5298
- 28. SMACNA Sheet Metal & Air Conditioning Contractors' National Assoc.
- 29. UL Underwriters Laboratories
333 Pfingsten Rd.; Northbrook, IL 60062; 312-272-8800

1.4 PERMITS, LICENSES, AND CERTIFICATES

- A. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, certifications, judgments, and similar documents, correspondence and records established in conjunction with compliance with standards and regulations bearing upon performance of the work. It shall be the Contractors responsibility to obtain and pay for all permits.

1.5 TRADESPERSONS AND WORKMANSHIP STANDARDS

- A. General: The Prime Contractor shall instigate and maintain procedures to ensure that persons performing work are skilled and knowledgeable in methods and craftsmanship needed to produce superior quality levels for workmanship in completed work. Remove and replace work which does not comply with workmanship standards as specified and as recognized in the construction industry for applications indicated. Remove and replace other work damaged or deteriorated by faulty workmanship or its replacement.

1.6 GENERAL INSTALLATION PROVISIONS

- A. Manufacturer's Instructions: Where installations include manufactured products, comply with manufacturer's applicable instructions and recommendations for installation, to extent these are more explicit or more stringent than requirements indicated in contract documents.
 - B. Provide attachment and connection devices and methods for securing work properly as it is installed, true to line and level, and within recognized industry tolerances if not otherwise indicated. Allow for expansions and building movements. Provide uniform spacing and appearance in exposed work, organized for best possible visual effect. Refer questionable visual effect choices to Architect for final decision.
 - C. Mounting Heights: Where mounting heights are not indicated, mount individual units of work at industry recognized standard mounting heights for application indicated. Refer mounting height choices to Architect for final decision.
 - D. Fixture Locations: Where fixture locations are not dimensioned, refer to Architect for final decision.
- DO NOT SCALE DRAWINGS.**

1.7 ELECTRICAL CONNECTIONS

- A. The Contractor shall furnish and install the wiring except: (1) temperature control wiring; (2) equipment control wiring; and (3) interlock wiring, unless indicated otherwise herein. The Contractor shall furnish and install the power wiring complete from power source to motor or equipment junction box, including power wiring through starters, line voltage air and water thermostats, speed and timer switches, and other line voltage control devices. The Contractor shall provide starters and controls specified to be factory mounted and wired to mechanical equipment. The Contractor shall provide the starters that are not factory wired or mounted on mechanical equipment, unless indicated otherwise.
- B. The Contractor shall, regardless of voltage, furnish and install the temperature control wiring, and the interlock wiring, and equipment control wiring for the equipment that the Contractor furnishes, unless indicated otherwise herein. The Contractor shall furnish the starters to the Contractor.
- C. The Contractor shall perform the control wiring only where this work is indicated on the Electrical Drawings. Where an electrical control device (thermostat, switch, etc.) is indicated on both the Mechanical and Electrical Drawings, the Contractor shall mount the device and install the wiring.
- D. After circuits are energized and completed, the Contractor shall be responsible for the power wiring. The control wiring shall be the responsibility of the Contractor that installed the wiring.
- E. The Contractor shall provide the wiring to shut down the HVAC system in connection with the Fire Alarm System.

1.8 TRANSFER OF ELECTRONIC FILES

- A. Angerame Architects, P.C. will provide electronic files for the Contractor's use in the preparation of record drawings as related to the project, subject to a \$50.00 charge per drawing file and the following terms and conditions.
1. The Contractor shall submit a formal request for electronic drawing files on the Angerame Architects, P.C.
 2. Angerame Architects, P.C.'s electronic files will be exported from Architectural Desktop 2005 into DWG/DXF files that are compatible with Auto Cad as requested. Angerame Architects, P.C. makes no representation as to the compatibility of these files with the Contractor's hardware or the Contractor's software beyond the specific release of the referenced specifications.
 3. Data contained on these electronic files is part of Angerame Architects, P.C.'s instruments of service shall not be used by the Contractor or anyone else receiving data through or from the Contractor for any purpose other than as convenience in the preparation of shop drawings for the referenced project. Any other use or reuse by the Contractor or by others will be at the Contractor's sole risk and without the liability or legal exposure to Angerame Architects, P.C. The Contractor agrees to make no claims and hereby waive, to the fullest extent permitted by the law, any claim or cause of action of any nature against Angerame Architects, P.C., its officers, directors, employees, agents or sub-consultants which may arise out of or in connection with the Contractor's use of the electronic files.
 4. Furthermore, the Contractor shall, to the fullest extent permitted by law, indemnify and hold harmless, Angerame Architects, P.C. from claims, damages, losses and expenses, including attorney's fees arising out of or resulting from the Contractor's use of these electronic files.
 5. These electronic files are not contract documents. Significant difference may arise between these electronic files and corresponding hard copy contract documents due to addenda, change orders or other revisions. Angerame Architects, P.C. makes no representation regarding the accuracy or completeness of the electronic files the Contractor receives. In the event that a conflict arises between the signed contract documents prepared by Angerame Architects, P.C. and electronic files, the signed contract documents shall govern.
 6. The Contractor is responsible for determining if any conflicts exist. By the Contractor's use of these electronic files the Contractor is not relieved of the Contractor's duty to comply with the contract documents, including and without limitation, the need to check, confirm and coordinate all dimensions and details, take field measurements, field verify conditions and coordinate the Contractor's work with that of other contractors for the project.

1.9 ASBESTOS/LEAD FREE

- A. All building materials on this project shall be lead and asbestos free. If a product specified contains the above advise Architect immediately.

1.10 MOCK-UP AREAS

- A. Provide a mock-up room of each type of resident bathroom, and bedroom, new and existing, complete with gypsum board, walls, windows, swing doors, sliding door, outlets, switches, light fixtures, toilet accessories, vanity tops, wall finishes, plumbing fixtures, diffusers and grilles.
- B. Provide a mock-up of a typical resident wing corridor, at the resident room door, minimum of ten feet in length for both new and existing corridors. Corridor shall be complete with handrail, wall surface panels, trim, ceiling, bulletin board and memory boxes.
- C. The above is for the Owner to approve all built-in equipment and approve the complete room set-up.
- D. This work must be completed prior to the start of roughing-in the remaining rooms for mechanical/electrical.

PART- 2 (NOT USED)

PART- 3 (NOT USED)

END OF SECTION 01 5080

PART- 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary Utilities: Electricity, lighting, heat, ventilation, and water.

1.2 RELATED REQUIREMENTS

- A. Section 01 5000 - Temporary Facilities and Controls: temporary sanitary facilities required by law.

1.3 TEMPORARY ELECTRICITY

- A. Cost of Electricity Used: By Owner.
- B. Connect to Owner's existing power service.
 - 1. Do not disrupt Owner's need for continuous service.
 - 2. Exercise measures to conserve energy.
- C. Provide temporary electric feeder from existing building electrical service at location as required.
- D. Complement existing power service capacity and characteristics as required.
- E. Provide power outlets for construction operations, with branch wiring and distribution boxes located as required.
- F. Permanent convenience receptacles may be utilized during construction.
- G. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.
- H. Provide a 480-single phase – 120/208V single phase 45 KVA transformer to be used for temporary power from existing 480V distribution panels.
- I. Verify power sources with construction manager. Utilize distribution panels near the work site. Each phase of work will be serviced from different existing distribution panels.

1.4 TEMPORARY SUB-FEED FROM EXISTING BUILDING TO WORK AREAS

- A. Provide a temporary power from existing building panels to each construction area. Refer to phasing plans for requirements.
- B. Route temporary power through existing ceilings to work site.
- C. Verify power sources with construction manager. Utilize distribution panels near the work site. Each phase of work will be serviced from different existing distribution panels.
- D. Provide a 480-single phase – 120/208V single phase 45 KVA transformer to be used for temporary power from existing 480V distribution panels.
- E. Provide a main circuit breaker load center to service the temporary power called for.

1.5 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

- A. Provide adequate lighting levels to complete construction activities as well as providing safe ingress and egress throughout the construction area.
- B. Existing lighting levels in non-construction areas are to be maintained at all times.
- C. Provide lighting for temporary structures, walkways and other temporary construction in order to provide adequate lighting for safe pedestrian ingress and egress.

1.6 TEMPORARY HEAT FOR CONSTRUCTION PURPOSES

- A. Provide adequate temporary heat measures and thermal protection to complete construction activities as needed throughout the project schedule. Cost of temporary heat or equipment to maintain temperatures needed for a construction activity will not be an additional cost to the owner

1.7 TEMPORARY WATER SERVICE

- A. Cost of Water Used: By Owner.
- B. Provide and maintain suitable quality water service for construction operations at time of project mobilization.
- C. Connect to existing water source.
 - 1. Exercise measures to conserve water.

PART- 2 PRODUCTS - NOT USED

PART- 3 EXECUTION - NOT USED

END OF SECTION

PART- 1 GENERAL

1.1 SECTION INCLUDES

- A. Access roads.
- B. Parking.
- C. Existing pavements and parking areas.
- D. Permanent pavements and parking facilities.
- E. Construction parking controls.
- F. Haul routes.
- G. Maintenance.
- H. Removal, repair.
- I. Mud from site vehicles.

1.2 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary: access to site, work sequence, and occupancy.

PART- 2 PRODUCTS

2.1 MATERIALS

- A. Materials for Permanent Construction: As specified in product specification sections, including earthwork, paving base, and topping.

2.2 SIGNS, SIGNALS, AND DEVICES

- A. Stock Post Mounted and Wall Mounted Traffic Control and Informational Signs:
- B. Products:
 - 1. Brimar Industries, Inc.; www.safetysign.com.

PART- 3 EXECUTION

3.1 PREPARATION

- A. Clear areas, provide surface and storm drainage of road, parking, area premises, and adjacent areas.

3.2 ACCESS ROADS

- A. Provide unimpeded access for emergency vehicles. Maintain 20-foot width driveways with turning space between and around combustible materials.
- B. Provide and maintain access to fire hydrants free of obstructions.

3.3 PARKING

- A. There will be no Owner provided Prime and or Sub Contractor Parking on the project.

3.4 PERMANENT PAVEMENTS AND PARKING FACILITIES

- A. Prior to Substantial Completion the base for permanent roads and parking areas may be used for construction traffic.
- B. Avoid traffic loading beyond paving design capacity. Tracked vehicles not allowed.
- C. Contractors shall be responsible for the repair or replacement of existing or new permanent surfaces located within or adjacent to the contract limit lines damaged by the Contractor.

3.5 HAUL ROUTES

- A. Consult with authority having jurisdiction, establish public thoroughfares to be used for haul routes and site access.
- B. Confine construction traffic to designated haul routes.
- C. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.

3.6 MAINTENANCE

- A. Maintain traffic and parking areas in a sound condition free of excavated material, construction equipment, Products, mud, snow, and ice.
- B. Maintain existing paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.

3.7 REMOVAL, REPAIR

- A. Remove equipment and devices when no longer required.
- B. Repair damage caused by installation.

- C. Remove post settings to a depth of 2 feet.

3.8 MUD FROM SITE VEHICLES

- A. Provide means of removing mud from vehicle wheels before entering streets.

END OF SECTION 01 5500

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.

1.3 DEFINITIONS

- A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility (except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise]. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

- C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

1.4 SUBMITTALS

- A. Product List: Submit a list, in tabular form, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.
 - 1. Coordinate product list with Schedule and the Submittals Schedule.
 - 2. Form: Tabulate information for each product under the following column headings:
 - a. Specification Section number and title.
 - b. Generic name used in the Contract Documents.
 - c. Proprietary name, model number, and similar designations.
 - d. Manufacturer's name and address.
 - e. Supplier's name and address.
 - f. Installer's name and address.
 - g. Projected delivery date or time span of delivery period.
 - h. Identification of items that require early submittal approval for scheduled
- B. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use standard form.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified material or product cannot be provided.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Contractor and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.

- d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and Contractor.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
 - i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time.
 - j. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
 - k. Cost information, for substitution in comparison with product or method specified.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
- a. Form of Acceptance: Change Order.
 - b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.
- C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 1 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more selected, even if previously selected products were also options.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturers written instructions.
- B. Delivery and Handling:
 - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - 4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
 - 5. Store products to allow for inspection and measurement of quantity or counting of units.
 - 6. Store materials in a manner that will not endanger Project structure.
 - 7. Store products that are subject to damage by the elements, under cover in a weather tight enclosure above ground, with ventilation adequate to prevent condensation.
 - 8. Store cementitious products and materials on elevated platforms.
 - 9. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 - 10. Comply with product manufacturers written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 - 11. Protect stored products from damage and liquids from freezing.
 - 12. Provide a secure location and enclosure at Project site for storage of materials and equipment by Contractor's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 - 1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Contractor.

2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Contractor.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
 3. Refer to Divisions 2 through 16 Sections for specific content requirements and requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures."

PART-2 PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Architect reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 3. Where products are accompanied by the term "as selected," Architect will make selection.
 4. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
 5. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in Part 2 "Comparable Products" Article to obtain approval for use of an unnamed product.
- B. Product Selection Procedures:
1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.

3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that comply with requirements.
4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
5. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
6. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
7. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
8. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.
9. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches Contractor's sample. Contractor's decision will be final on whether a proposed product matches.
 - a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.
10. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.
11. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Contractor will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
12. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Contractor will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 PRODUCT SUBSTITUTIONS

- A. Conditions: If three manufacturers are not specified for a product, Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
1. Requested substitution offers Contractor a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Contractor must assume.
 2. Contractor's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Contractor, and similar considerations.
 3. Requested substitution does not require revisions to the Contract Documents (maximum two (2) reviews).
 4. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 5. Substitution request is fully documented and properly submitted.
 6. Requested substitution will not adversely affect Contractor's Construction Schedule.
 7. Requested substitution has received necessary approvals of authorities having jurisdiction.
 8. Requested substitution is compatible with other portions of the Work.
 9. Requested substitution has been coordinated with other portions of the Work.
 10. Requested substitution provides specified warranty.
 11. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
 12. The equipment or material must fit the space available for it in the building. No item will be considered if alteration of building structure or space is made necessary by a proposed substitution.
- B. In making request for substitution, Contractor represents:
1. Contractor shall provide a comparison chart to establish the substitute product is equal to the specified product. The chart shall highlight any and all comparable values as related to specified product type.
 2. The Contractor has personally investigated the proposed substitute product and determined that it is equal to or superior in all respects to the specified project.
 3. The Contractor will provide the same warranty for the substitution that is required for the specified product;

4. Certifies that the substitution will not result in a cost disadvantage to the Contractor; that all cost data presented is complete and that the Contractor waives all claims for additional costs related to the substitution which subsequently become apparent; and
 5. Will coordinate the installation of the substitution, if accepted, making such changes as may be required to make the Work complete in all respects.
 6. Contractor requesting substitution shall bear additional costs to all parties due to his substitution including Architect redesigns and costs; associated but under separate contract.
- C. Contractor's submittal and Contractor's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.

PART- 3 EXECUTION (NOT USED)

END OF SECTION 01 6000

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SECTION INCLUDES

- A. Requirements for Indoor-Emissions-Restricted products.
- B. Requirements for VOC-Content-Restricted products.

1.3 RELATED REQUIREMENTS

- A. Section 013000 for Submittal Procedures.

1.4 DEFINITIONS

- A. Indoor-Emissions-Restricted Products: All products in the following product categories, whether specified or not:
 - 1. Interior paints and coatings.
 - 2. Interior adhesives and sealants, including flooring adhesives.
 - 3. Flooring.
 - 4. Composite wood.
 - 5. Products making up wall and ceiling assemblies.
 - 6. Thermal and acoustical insulation.
- B. VOC-Content-Restricted Products: All products in the following product categories, whether specified or not:
 - 1. Interior paints and coatings.
 - 2. Interior adhesives and sealants, including flooring adhesives.

- C. Interior of Building: Anywhere inside the exterior weather barrier.
- D. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.
- E. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.
- F. Inherently Non-Emitting Materials: Products composed wholly of minerals or metals, unless they include organic-based surface coatings, binders, or sealants; and specifically, the following:
 - 1. Concrete.
 - 2. Clay brick.
 - 3. Metals that are plated, anodized, or powder-coated.
 - 4. Glass.
 - 5. Ceramics.
 - 6. Solid wood flooring that is unfinished and untreated.

1.5 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings; 2005 (Reapproved 2013).
- C. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board; 2007.
- D. SCAQMD 1113 - South Coast Air Quality Management District Rule No.1113; current edition.
- E. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition.

1.6 SUBMITTALS

- A. See Section 013300 for Submittal Procedures.
- B. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.

1.7 QUALITY ASSURANCE

- A. VOC Content Test Method: 40 CFR 59, Subpart D (EPA Method 24), or ASTM D3960, unless otherwise indicated.

1. Evidence of Compliance: Acceptable types of evidence are:
 - a. Report of laboratory testing performed in accordance with requirements.
- B. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

PART- 2 PRODUCTS

2.1 MATERIALS

- A. All Products: Comply with the most stringent of federal, State, and local requirements, or these specifications.
- B. VOC-Content-Restricted Products: VOC content not greater than required by the following:
 1. Adhesives, Including Flooring Adhesives: SCAQMD 1168 Rule.
 2. Joint Sealants: SCAQMD 1168 Rule.
 3. Paints and Coatings: Each color; most stringent of the following:
 - a. 40 CFR 59, Subpart D.
 - b. SCAQMD 1113 Rule.
 - c. CARB (SCM).

PART- 3 EXECUTION

3.1 FIELD QUALITY CONTROL

- A. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.
- B. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Construction Manager.

END OF SECTION 01 6116

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. General installation of products.
 - 2. Coordination of Contractor-installed products.
 - 3. Progress cleaning.
 - 4. Starting and adjusting.
 - 5. Protection of installed construction.
 - 6. Correction of the Work.

PART- 2 PRODUCTS (NOT USED)

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work. Before construction, verify the location and points of connection of utility services.

- B. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - a. Description of the Work.
 - b. List of detrimental conditions, including substrates.
 - c. List of unacceptable installation tolerances.
 - d. Recommended corrections.
 - 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

3.3 INSTALLATION

- A. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.

3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
 1. Allow for building movement, including thermal expansion and contraction.
 2. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.4 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
 1. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.
 2. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 1. Remove liquid spills promptly.

2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Vacuum clean interior building areas when ready to receive finish painting, and continue vacuum cleaning on an as-needed basis until building is ready for Substantial Completion or occupancy.
- J. Handle materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights.
- K. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.
- L. Excess concrete, block, mortar, or grout is the responsibility of the Contractor to remove from the site.

3.5 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section "Quality Requirements."

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Contractor shall be responsible for protection of all his work at the end of each working day.

- B. All equipment shall be covered and protected from dust, moisture or physical damage by others.
- C. All costs for this protection shall be borne by Contractor.
- D. Contractor shall make good all damage, which may occur to his work prior to the date of final acceptance by the Contractor.
- E. Protect finished surfaces, including jambs, wall corners, and soffits of openings used as passageways, through which equipment and materials are handled.
- F. Protect finished floor surfaces prior to allowing equipment or materials to be moved over such surfaces.
- G. Maintain finished surfaces clean, unmarred, and suitably protected until accepted by the Architect.
- H. In event of damage, promptly make replacements and repairs to the approval of the Architect and at no additional cost.
- I. Comply with manufacturers written instructions for temperature and relative humidity.

3.7 CORRECTION OF THE WORK

- A. All work shall be first-quality workmanship approved by the Contractor, executed by skilled labor forces.
- B. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 1 Section "Cutting and Patching."
- C. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- D. Restore permanent facilities used during construction to their specified condition.
- E. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- F. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- G. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 7000

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Project record document submittal.
 - 3. Operation and maintenance manual submittal.
 - 4. Submittal of warranties.
 - 5. Final cleaning.
- B. Multiple Prime Contracts: Provisions of this Section apply to the construction activities of each prime Contractor.
- C. Closeout requirements for specific construction activities are included herein.

1.3 PUNCH LIST PROCEDURES

- A. Construction Manager shall prepare a detailed, space-by-space, system-by-system punch list of work remaining to complete, repair, adjust, clean or otherwise leave the contract scope in a condition adhering to the contract documents and ready for the Owner's use.
- B. The Construction Manager's Punch list shall be reviewed on site with the Contractor for general content. At such time as the Construction Manager and Contractor agree that the work is near substantial completion and the Contractor's punch list is generally complete, the Architect shall proceed with completion of the punch list work.

- C. Upon completion of the Architect's punch list, the Contractor shall expeditiously proceed with completion of the work. Upon completion of all punch list items, the Contractor shall provide a copy of the punch list back to the Architect/Engineer with each item noted as the completed or the current status of the item. Upon receipt, the Architect/Engineer will schedule a final inspection.
- D. The Architect's punch list does not, at any time, determine the extent of work remaining under the contract, nor does the absence of any required item from the punch list relieve the Contractor of any responsibilities set forth under the contract documents. The responsibility for completeness of the requirements of the contract lies solely with the Contractor.

1.4 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.
 - 1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete.
 - 2. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
 - 3. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and the reasons the Work is not complete.
 - 4. Advise the Contractor of pending insurance changeover requirements.
 - 5. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.
 - 6. Obtain and submit releases enabling the Contractor unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 7. Submit record drawings, maintenance manuals, final project photographs, damage or settlement surveys, property surveys, and similar final record information.
 - 8. Deliver tools, spare parts, extra stock, and similar items.
 - 9. Make final changeover of permanent locks and transmit keys to the Contractor. Advise the Owner's personnel of changeover in security provisions.
 - 10. Complete startup testing of systems and instruction of the Owner's operation and maintenance personnel. Discontinue and remove temporary facilities from the site, along with mockups, construction tools, and similar elements.
 - 11. Complete final cleanup requirements, including touchup painting.
 - 12. Touch up and otherwise repair and restore marred, exposed finishes.

- B. Inspection Procedures: On receipt of a request for inspection, the Contractor will either proceed with inspection or advise the Contractor of unfilled requirements.
- C. The Contractor will repeat inspection when requested and assured that the Work is substantially complete.
- D. Results of the completed inspection will form the basis of requirements for final acceptance.
- E. If construction services of any contract are not completed within ninety (90) days of Substantial Completion of that contract, the Contractor shall be responsible for all Contractor costs incurred as a result of construction activities that extend beyond ninety (90) days of Substantial Completion.

1.5 FINAL ACCEPTANCE

- A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance, complete the following. List exceptions in the request.
 - 1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.
 - 2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
 - 3. Submit a certified copy of the Contractor's final inspection list of items to be completed or corrected, endorsed, and dated by the Construction Manager. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and shall be endorsed and dated by the Contractor.
 - 4. Submit consent of surety to final payment.
 - 5. Submit a final liquidated damages settlement statement.
 - 6. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
- B. Re-inspection Procedure: The Contractor will re-inspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Contractor.
 - 1. Upon completion of re-inspection, the Contractor will prepare a certificate of final acceptance. If the Work is incomplete, the Contractor will advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
 - 2. If necessary, re-inspection will be repeated as many times as is required for acceptance of the work by the Contractor. However, after the second re-inspection and all subsequent re-inspections the Contractor shall be responsible for all Contractor's costs incurred as a result of administering these re-inspections.

1.6 RECORD DOCUMENT SUBMITTALS

- A. General: Do not use record documents for construction purposes. Protect record documents from deterioration and loss in a secure, fire-resistant location. Provide access to record documents for the Contractor's reference during normal working hours.
- B. Certification: Before payment is authorized, Contractor shall certify on their letterhead stationery, in writing to the Contractor, as follows:
 - 1. "Contractor's Letterhead".
 - 2. Certification:

I hereby certify that all work of this contract has been fully completed in accordance with the requirements of the Contract Documents for this contract and that all materials installed are free of classified and/or regulated hazardous materials.

Signature of Officer of the Contractor

- C. Record Drawings: Maintain a clean, undamaged set of blue or black line whiteprints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark which drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
 - 1. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.
 - 2. Mark new information that is important to the Contractor but was not shown on Contract Drawings or Shop Drawings.
 - 3. Note related change-order numbers where applicable.
 - 4. Organize record drawing sheets into manageable sets. Bind sets with durable paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.
- D. Record Specifications: Maintain one complete copy of the Project Manual, including addenda. Include with the Project Manual one copy of other written construction documents, such as Change Orders and modifications issued in printed form during construction.
 - 1. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.
 - 2. Give particular attention to substitutions and selection of options and information on concealed construction that cannot otherwise be readily discerned later by direct observation.

3. Not related record drawing information and Product Data.
 4. Upon completion of the Work, submit record Specifications to the Contractor for their records.
- E. Record Product Data: Maintain one copy of each Product Data submittal. Not related Change Orders and markup of record drawings and Specifications.
1. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site and from the manufacturer's installation instructions and recommendations.
 2. Give particular attention to concealed products and portions of the Work that cannot otherwise be readily discerned later by direct observation.
 3. Upon completion of markup, submit complete set of record Product Data to the Contractor for their records.
- F. Record Sample Submitted: Immediately prior to Substantial Completion, the Contractor shall meet with the Contractor's personnel at the Project Site to determine which Samples are to be transmitted to the Contractor for record purposes. Comply with the Contractor's instructions regarding delivery to the Contractor's Sample storage area.
- G. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order. Identify miscellaneous records properly and bind or file, ready for continued use and reference. Submit to the Contractor for their records.
- H. Maintenance Manuals: Provide two (2) complete sets. Organize operation and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual, heavy-duty, 2-inch, 3-ring, D-ring style, view type, vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Include the following types of information:
1. Emergency instructions.
 2. Spare parts list.
 3. Copies of warranties.
 4. Wiring diagrams.
 5. Recommended "turn-around" cycles.
 6. Inspection procedures.
 7. Shop Drawings and Product Data.
 8. Fixture lamping schedule.

PART- 2 PRODUCTS

2.1 MATERIALS

- A. Cleaning Agent: Use cleaning materials and agents recommend by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
 - 1. Use cleaning products that comply with Green Seal's GS-37 or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART- 3 EXECUTION

3.1 CLOSEOUT PROCEDURES

- A. Operation and Maintenance Instructions: Arrange for each Installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. Provide instruction by manufacturer's representatives if installers are not experienced in operation and maintenance procedures. Include a detailed review of the following items:
 - B. Maintenance manuals.
 - C. Record documents.
 - D. Spare parts and materials.
 - E. Tools.
 - F. Lubricants.
 - G. Fuels.
 - H. Identification systems.
 - I. Control sequences.
 - J. Hazards.
 - K. Cleaning.
 - L. Warranties and bonds.
- M. Maintenance agreements and similar continuing commitments. As part of instruction for operating equipment, demonstrate the following procedures:
 - N. Startup.
 - O. Shutdown.
 - P. Emergency operations.
 - Q. Noise and vibration adjustments.
 - R. Safety procedures.
 - S. Economy and efficiency adjustments.
 - T. Effective energy utilization.

3.2 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
 - B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
 - a. Clean Project site, yard and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Sweep concrete floors broom clean in unoccupied spaces.
 - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap: clean according to manufacturer's recommendations if visible soil or stains remain.
 - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - k. Remove labels that are not permanent.
 - l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

- n. Replace disposable air filter and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
- o. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
- p. Leave Project clean and ready for occupancy.

3.3 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operation equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operation components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
 - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
 - 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restorations.
 - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
 - 3. Replace parts subject to operation conditions during construction that may impede operation or reduce longevity.
 - 4. Replace burned-out bulbs, bulbs noticeable dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 01 7100

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether it is clearly or explicitly shown.

1.2 DESCRIPTION

- A. Work specified in this Section consists of maintaining, annotating and delivering the final As-Built Drawings, Specifications and indexes as defined below. For Shop and Working Drawings refer to Section 01 3000, Submittals.
- B. Definitions
 - 1. As-Built Documents Schedule - List of As-Built Documents including but not limited to Contract Drawings and Contractor Shop Drawings the Contractor is to submit at milestones and final close-out according to Paragraphs 1.3 C. and D.
 - 2. Current Status Documents - A set of full-size reproducible Contract and Shop/Working Drawings and a copy of the Specifications marked and maintained by Contractor to show current As-Built status of construction in progress and current design status. When submitted, these shall be referred to as milestone or final as-built documents as appropriate.
 - 3. Contractor Furnished Drawings - Working Drawings and Shop Drawings produced by the Contractor which become a supplement to the Contract.
 - 4. Project Record Drawings - Contract Record Drawings that reflect actual completed field conditions of Work items depicted on Contractor's latest Contract, Shop and Working Drawings.
 - 5. Drawing Index - List of Contract Drawings and cross-referenced Contractor Shop Drawings, showing the latest drawing number, sheet number, revision number, title of Drawings, attachments, and if the Drawings are revised for final As-Built. The Contractor shall maintain and provide an index for the Contractor furnished drawings. The Contractor shall cross-reference on the Contract Drawing Index, Contractor Shop Drawings which are supplemental to the Contract Drawings.

1.3 QUALITY CONTROL

- A. Contractor quality control personnel shall perform the following:

1. Print legibly and clearly relevant construction changes/data on current print of Current Status Documents to a high standard of quality. Have Work done by a qualified engineer, designer or drafter.
2. Record additional construction information as requested by OWner on As-Built or Current Status Documents.

1.4 REFERENCE STANDARDS

- A. American National Standards Institute (ANSI)
 1. ANSI 14.4M Pictorial Drawings

1.5 SUBMITTALS

- A. Refer to Section 01 3000, Submittals, for submittal procedures.
- B. As-Built Documents Schedule - Within 10 days from acceptance of the Baseline Schedule, submit for acceptance a list of As-Built Contract Drawings to be submitted at completion of each Work milestone package.
 1. The schedule of As-Built documents should reflect the Work scheduled on the accepted Baseline Schedule.
 2. Identify As-Built documents listed in the schedule by drawing, sheet, detail numbers; description of drawing, and other related information that may be required by the Owner.
- C. The Owner will review monthly As-Built along with monthly payment requests. Current Status Documents showing as-built design and construction progress to be kept at Contractor's field office at all times (unless otherwise specified). In the event record documents are not maintained, Owner may defer monthly payment.
- D. Final Close-out Documents - Upon requesting final inspection or within 10 days prior to acceptance, submit remaining As-Built Contract and Shop/Working Drawings, the latest revision of the Drawing Indexes and any previously submitted as-built documents that have been revised.

PART- 2 PRODUCTS

2.1 DOCUMENTS

- A. As-Built Drawings - One D-size (24 inches by 36 inches) set of the latest revisions of Contract Drawings marked in black ink original and one in PDF format to show changes and deviations from the last revision of Drawings and Contractor Shop Drawings that represent As-Built condition submitted at milestone completions and final contract completion.
- B. Drawing Index – Electronic List of Contract Drawings, cross-referenced to Contractor Shop Drawings, showing the latest drawing number, sheet number, revision number, title of Drawings, attachments, and if the Drawing is revised for final As-Built (indicate AB if drawing was revised to show as-built condition). List of Contractor furnished (Shop) Drawings that are supplemental to the Contract Drawings.

- C. As-Built Documents Schedule – Electronic List of As-Built Drawings including Contractor Shop Drawings that Contractor has scheduled to update monthly.

2.2 MEETINGS

- A. Upon receipt of the As-Built Documents Schedule from the Contractor, the Owner may call a meeting with the: Owner, others and the Contractor. Owner will decide with the contract team input, which Contract and Shop Drawings are to be:
 - 1. As-built for project record.
 - 2. Cross-referenced and indexed.

PART- 3 EXECUTION

3.1 SAFE KEEPING OF FIELD DOCUMENTS

- A. During times when the contract documents are not being updated, store drawings and indexes in a fire resistant locked cabinet or provide off-site backup to prevent inadvertent destruction of documents.

3.2 MARKING CURRENT STATUS DOCUMENTS

- A. Stamp each page of Drawings of the Current Status Documents "CURRENT STATUS." Lettering on stamp: 1/2 inch and 1/4 inch for Drawings and Specifications respectively.
- B. Legibly record construction progress information on a weekly basis. Information to include reference of Change Order, Change Notice, RFI responses, Non- Conformance Reports, shop drawings and other related information. Attach to the current status Contract Drawing any markups or sketches received from Metro as a result of design modifications or RFIs. Pertinent information must be shown on the Contract Drawing. Do not cover up Work unless relevant information has been recorded.
- C. Clearly identify Change Order revision by Change Order numbers. Where more than one change is made in an area of a drawing, clearly identify the changes graphically by marking a copy of the preceding changes. Insert these copies into set of Current Status Documents on top of preceding record in a manner to preclude losing or damaging document.
- D. Mark changes. Mark in black ink and bubble the changes on reproducibles.
- E. When a new revision of a document is issued, stamp the superseded document "SUPERSEDED" and keep in Current Status Document set for future reference of previous mark-ups and for use for production of As-Built Drawings. The Contractor need not transfer the data recorded on superseded drawings onto the new revision but shall list all revisions on the drawing index.

3.3 MARKING FOR FINAL AS-BUILT CONDITION

- A. Mark and stamp "AS-BUILT" latest revisions of the Contract Drawings and Specifications for the As-Built condition. Lettering on stamp: 1/2 inch and 1/4 inch high for Drawings and Specifications respectively.

Clearly define revisions in minimum of 1/8 inch letter on a reproducible copy of Drawings and on photocopy of Specifications.

- B. Use bubbles to define extent of the change.
- C. Mark As-Built conditions to the extent they deviate from contract requirements on a reproducible of the latest revision of the Contract Drawings or Specifications. Specific information required on each category of Drawings is specified. If drawing does not facilitate such changes, furnish a Shop Drawing showing the details and cross- reference each drawing.
- D. Mark Drawings not changed by As-Built conditions with the word "UNCHANGED" above the "AS-BUILT" label.

3.4 REQUIRED INFORMATION ON AS-BUILT DRAWINGS

- A. Provide as-built measurements with reference to datums used for dimensioning on appropriate contract drawings. For underground utilities, measure and record exposed existing and installed lines and conduits. Locate by offset and elevation the centerline and the top elevation of the line at each grade break with surveying equipment. Locations of appurtenances of the line such as the valves, tees, bends etc. may be located in relation to offset lines and elevation. **Accuracy shall be to within 0.5 feet horizontally and to within 0.1 feet vertically.** Coordinate this Work to the satisfaction of utility owners.

3.5 CONTRACTOR FURNISHED DRAWINGS

- A. Contractor Furnished Drawings - Drawings provided by Contractor and used for construction of permanent facilities. Prepare drawings to a high standard of quality, as specified, or other relevant lower tier standards defining equal drafting quality for microfilming. **Contractor furnished drawings include as-built drawings.**
- B. Produce drawings on D size (24 inches by 36 inches). Provide company logo on drawing and have drawing complete with drafter's name, full signature and date.
- C. Drawing numbers will be distinct to avoid duplication with Contract Drawings. Do subsequent revisions to these drawings. Include bubbles, triangles and description of the revision in the revision block and if initiated by Contractor.
- D. Include these drawings in the Current Status Documents. Update for changes as specified in other parts of these Specifications.
- E. Revise these drawings to show the As-Built conditions as indicated.
- F. Upon completion of construction or as directed by the Metro, submit updated Drawing Index and revised original reproducible of these drawings (see Definitions).

END OF SECTION 01 7200

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether it is clearly or explicitly shown.

1.2 DESCRIPTION

- A. Purpose of Manuals:
 - 1. Operation and maintenance manuals will be used for training of, and use by, Owner's personnel in operation and maintenance of mechanical and electrical systems and equipment. A separate manual or chapter within a manual shall be prepared for each class of equipment or system.
 - 2. For additional requirements refer to various specification Sections.
- B. Required Manuals: Manuals are required for all systems and equipment.
- C. Content of Manuals: Each manual or chapter shall include:
 - 1. Table of Contents.
 - 2. Description of system or equipment.
 - 3. Operating sequence and procedures.
 - 4. Safety instructions.
 - 5. Maintenance instructions and requirements, including preventative and corrective maintenance.
 - 6. Spare parts list.
- D. Shop Drawings: Shop Drawings of the system or equipment as installed shall accompany each manual.

E. Copies of Manuals:

1. Submit 3 copies of manuals to Contractor for review.

F. Instructions of Owner's Personnel:

1. Fully instruct Owner's designated operating and maintenance personnel in operating, adjustments and maintenance of all mechanical and electrical systems and equipment as required by respective and pertinent sections, after all final inspection, tests and repairs have been completed.
2. Operating and maintenance manuals shall constitute the basis of instructions. Contents of manual shall be reviewed in full detail, explaining all aspects of operations and maintenance.
3. Prepare and include additional data when need for such data becomes apparent during instruction and training sessions.
4. Training sessions shall be jointly arranged with Owner during Contractor's normal week and daily hours. The Owner shall have the responsibility of scheduling its shift work personnel accordingly.
5. Owner and Contractor shall coordinate and cooperate to keep training sessions to a reasonable minimum.
6. Contractor shall video tape session and turn tape over to Contractor.

1.3 INSTRUCTIONS FOR MAINTENANCE OF SURFACES

- A. Purpose: To instruct Owner's maintenance personnel in proper methods and materials to use in the proper care of all exposed surfaces.

B. Content:

1. Recommended cleaning materials.
2. Recommended preventative maintenance.
3. Recommended methods and procedures.

C. Copies:

1. Submit 3 copies of Instructions for Maintenance to Contractor for acceptance prior to final payment.

PART- 2 NOT USED

PART- 3 NOT USED

END OF SECTION 01 7300

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether it is clearly or explicitly shown.

1.2 GENERAL

- A. The Contractor is solely responsible for any and all claims for job injuries, and shall hold the Owner, Architect and their assigns harmless from litigation.
- B. The Contractor shall provide the necessary safeguards to prevent accidents, to avoid all necessary hazards and protect the public, the staff, the work and property at all times, including Saturdays, Sundays, holidays and other times when no work is being done.
- C. The Contractor shall erect, maintain, and remove appropriate barriers or other devices, as required by the conditions of the work for the protection of users of the project area, the protection of the work being done, or the containment of dust and debris. All such barriers or devices shall be provided in conformance with all applicable codes, laws and regulations, including OSHA.

1.3 SUMMARY

- A. This Section requires compliance with applicable Safety codes, standards and regulations, including but not limited to OSHA, Building Code of New York State, Fire Code of New York State, and Facility Regulations.

1.4 RELATED WORK SPECIFIED ELSEWHERE

- A. Regulatory Requirements: Section 014100.

1.5 DEFINITIONS AND ABBREVIATIONS

- A. OSHA: Occupational Safety and Health Administration.
- B. BCNYS: Building Code of New York State.
- C. EBCNYS: Existing Building Code of New York State.
- D. FCNYS: Fire Code of New York State.
- E. NFPA: National Fire Protection Association.

- F. NFPA 70E: National Fire Protection Association Standard for Electrical Safety in the Workplace.

1.6 APPLICABLE PUBLICATIONS

- A. Latest publications listed below form part of this Article to extent referenced. Publications are referenced in text by basic designations only.

- B. American Society of Safety Engineers (ASSE):

A10.1-2011.....Pre-Project & Pre-Task Safety and Health Planning
A10.34-2012.....Protection of the Public on or Adjacent to Construction Sites
A10.38-2013.....Basic Elements of an Employer's Program to Provide a Safe and Healthful
Work Environment American National Standard Construction and
Demolition Operations

- C. American Society for Testing and Materials (ASTM):

E84-2013.....Surface Burning Characteristics of Building Materials

- D. The Facilities Guidelines Institute (FGI):

FGI Guidelines-2014 Guidelines for Design and Construction of Healthcare Facilities

- E. National Fire Protection Association (NFPA):

10-2013Standard for Portable Fire Extinguishers
30-2012Flammable and Combustible Liquids Code
51B-2014.....Standard for Fire Prevention During Welding, Cutting and Other Hot Work
70-2014National Electrical Code
70B-2013.....Recommended Practice for Electrical Equipment Maintenance
70E-2015Standard for Electrical Safety in the Workplace
99-2012Health Care Facilities Code
241-2013Standard for Safeguarding Construction, Alteration, and Demolition
Operations

- F. The Joint Commission (TJC)

TJC ManualComprehensive Accreditation and Certification Manual

- G. U.S. Occupational Safety and Health Administration (OSHA):

29 CFR 1904Reporting and Recording Injuries & Illnesses
29 CFR 1910Safety and Health Regulations for General Industry
29 CFR 1926Safety and Health Regulations for Construction Industry
CPL 2-0.124Multi-Employer Citation Policy

1.7 SUBMITTALS

- A. Provide a SITE SPECIFIC SAFETY PLAN (aka Construction Safety & Health Plan) no later than 15 days after approval of the Contract by the Comptroller.
- B. The plan must include at a minimum:
 - 1. Written in English by a qualified person who is employed by the Prime Contractor articulating the specific work and hazards pertaining to the contract (model language can be found in ASSE A10.33).
 - 2. Address both the Prime Contractors and the subcontractors work operations.
 - 3. Provide a copy of current corporate/company Safety and Health Policy Statement, detailing commitment to providing a safe and healthful workplace for all employees. The Contractor's written safety program goals, objectives, and accident experience goals for this contract should be provided.
 - 4. Provide the following:
 - a. A statement of the employer's ultimate responsibility for the implementation of his SOH program;
 - b. Identification and accountability of personnel responsible for safety at both corporate and project level. Contracts specifically requiring safety or industrial hygiene personnel shall include a copy of their resumes.
 - c. The names of Competent and/or Qualified Person(s) and proof of competency/qualification to meet specific OSHA Competent/Qualified Person(s) requirements must be attached.;
 - d. Requirements that no work shall be performed unless a designated competent person is present on the job site;
 - e. Requirements for pre-task Activity Hazard Analysis (AHAs);
 - f. Lines of authority;
 - g. Policies and procedures regarding noncompliance with safety requirements (to include disciplinary actions for violation of safety requirements) should be identified;
 - 5. If applicable, provide procedures for coordinating SOH activities with other employers on the job site:
 - a. Identification of subcontractors and suppliers (if known);
 - b. Safety responsibilities of subcontractors and suppliers.
 - 6. A program providing 100% hard hats and safety glasses, as well as other personal protective equipment (PPE), i.e. dust protection, noise protection, safety vests, etc.

7. A program for assuring employees have proper work attire, i.e. substantial sole safety toed footwear, long pants, shirts with minimum 4" sleeves, etc.
8. A 100% 6-foot conventional fall protection program which provides full body harnesses, lanyards, and guardrails when applicable.
9. A program for training employees.
10. A program for Confined Space, including procedures for entry, when applicable.
11. A program for High Hazard Assessment including procedures for all high hazard work activities, i.e. critical lifts involving cranes or material handling equipment, scaffolding, demolition, excavations, hot work activities, steel erection, and roofing. A pre-task meeting is required to verify all hazards will be addressed.
12. A list of the names of all competent and/or qualified persons, including their qualifications, for each activity requiring a competent person, i.e. excavations, scaffolding, rigging, fall protection, etc.
13. The name and contact information of the Company Safety Representative.
14. A program for project safety inspections, with a minimum of one documented safety inspection per week during the course of construction. Submit copies of all resultant inspection reports to the Director's Representative on a weekly basis.
15. Accident/Incident Investigation & Reporting. The Contractor shall conduct mishap investigations of all Moderate and Major as well as all High Visibility Incidents.

The Accident notification requirements are:

- a. Full accident/injury reports **required** within 24 hours for:
 - i. Any type of accident.
 - ii. Property damage.
 - iii. Near misses.
 - iv. Environmental spills.
 - v. Bomb threats.
 - vi. Public demonstration.
- b. Results of the accident investigations and recommendations for preventive action shall be documented within five (5) work days of the incident

16. Plans (Programs, Procedures) Required. Based on a risk assessment of contracted activities and on mandatory OSHA compliance programs, the Contractor shall address all applicable occupational, patient, and public safety risks in site-specific compliance and accident prevention plans. These Plans shall include but are not be limited to procedures for addressing the risks associates with the following:

- a. Emergency response;
- b. Contingency for severe weather;
- c. Fire Prevention;
- d. Medical Support;
- e. Posting of emergency telephone numbers;
- f. Prevention of alcohol and drug abuse;
- g. Site sanitation (housekeeping, drinking water, toilets);
- h. Night operations and lighting;
- i. Hazard communication program;
- j. Welding/Cutting "Hot" work;
- k. Electrical Safe Work Practices (Electrical LOTO/NFPA 70E);
- l. General Electrical Safety;
- m. Hazardous energy control (Machine LOTO);
- n. Site-Specific Fall Protection & Prevention;
- o. Excavation/trenching;
- p. Asbestos abatement;
- q. Lead abatement;
- r. Crane Critical lift;
- s. Respiratory protection;
- t. Health hazard control program;
- u. Radiation Safety Program;
- v. Abrasive blasting;
- w. Heat/Cold Stress Monitoring;

- x. Crystalline Silica Monitoring (Assessment);
 - y. Demolition plan (to include engineering survey);
 - z. Formwork and shoring erection and removal;
 - aa. Precast Concrete;
 - bb. Public (Mandatory compliance with ANSI/ASSE A10.34-2012).
- 17. A program for providing potable water and sanitary toilet services for all employees.
- 18. A program for record keeping per OSHA 1904.
- 19. A Glove Policy that requires the use of appropriate hand protection based on the activity. The plan shall also include a policy that gloves are to be worn 100% of the time with level 4 being the minimum level.
- C. Provide safety orientation training for each employee prior to their starting work on site. This orientation shall include but not be limited to; Fitness for Duty (drug and alcohol policies), training on general safety hazards, site specific safety policies and procedures, personal protective equipment, injury reporting and protocols, emergency evacuation and preferred medical providers, and, HAZCOM (GHS Harmonization). Provide documentation of all safety orientation training for each new employee on the site, including all subcontractors, to the Director's Representative.
- D. Provide copies of all employee training and certifications related to the safe performance of activities, i.e. OSHA 10 hour certifications, forklift training, powder actuated tool training, aerial lift training, etc., to the Director's Representative.
- E. Provide an Emergency Action and Evacuation Plan, including Fire Protection and Emergency Response, when applicable.
- F. Accident Reporting: the Director's Representative shall be immediately notified of any and all accidents. A copy of a written accident report shall be furnished to the Director's Representative within 24 hours of incidents.
- G. Where Work or related staging, storage, or temporary use of areas outside the boundaries of state property are required, comply with the rules, regulations and all applicable safety codes of the applicable municipality.

1.8 "SITE SAFETY AND HEALTH OFFICER" (SSHO) AND "COMPETENT PERSON" (CP):

- A. The Prime Contractor shall designate a minimum of one SSHO at each project site that will be identified as the SSHO to administer the Contractor's safety program and government-accepted Accident Prevention Plan. Each subcontractor shall designate a minimum of one CP in compliance with 29 CFR 1926.20 (b)(2) that will be identified as a CP to administer their individual safety programs.

- B. Further, all specialized Competent Persons for the work crews will be supplied by the respective contractor as required by 29 CFR 1926 (i.e. Asbestos, Electrical, Cranes, & Derricks, Demolition, Fall Protection, Fire Safety/Life Safety, Ladder, Rigging, Scaffolds, and Trenches/Excavations).
- C. These Competent Persons can have collateral duties as the subcontractor's superintendent and/or work crew lead persons as well as fill more than one specialized CP role (i.e. Asbestos, Electrical, Cranes, & Derricks, Demolition, Fall Protection, Fire Safety/Life Safety, Ladder, Rigging, Scaffolds, and Trenches/Excavations). //However, the SSHO has be a separate qualified individual from the Prime Contractor's Superintendent and/or Quality Control Manager with duties only as the SSHO//
- D. The SSHO or an equally qualified Designated Representative/alternate will maintain a presence on the site during construction operations in accordance with FAR Clause 52.236-6: *Superintendence by the Contractor*. CPs will maintain presence during their construction activities in accordance with above mentioned clause. A listing of the designated SSHO and all known CPs shall be submitted prior to the start of work as part of the APP with the training documentation and/or AHA as listed in Section 1.8 below.
- E. The repeated presence of uncontrolled hazards during a contractor's work operations will result in the designated CP as being deemed incompetent and result in the required removal of the employee in accordance with FAR Clause 52.236-5: Material and Workmanship, Paragraph (c).

1.9 TRAINING:

- A. The designated Prime Contractor SSHO must meet the requirements of all applicable OSHA standards and be capable (through training, experience, and qualifications) of ensuring that the requirements of 29 CFR 1926.16 and other appropriate Federal, State and local requirements are met for the project. As a minimum the SSHO must have completed the OSHA 30-hour Construction Safety class and have five (5) years of construction industry safety experience or three (3) years if he/she possesses a Certified Safety Professional (CSP) or certified Construction Safety and Health Technician (CSHT) certification or have a safety and health degree from an accredited university or college.
- B. All designated CPs shall have completed the OSHA 30-hour Construction Safety course within the past 5 years.
- C. In addition to the OSHA 30 Hour Construction Safety Course, all CPs with high hazard work operations such as operations involving asbestos, electrical, cranes, demolition, work at heights/fall protection, fire safety/life safety, ladder, rigging, scaffolds, and trenches/excavations shall have a specialized formal course in the hazard recognition & control associated with those high hazard work operations. Documented "repeat" deficiencies in the execution of safety requirements will require retaking the requisite formal course.
- D. All other construction workers shall have the OSHA 10-hour Construction Safety Outreach course and any necessary safety training to be able to identify hazards within their work environment.
- E. Submit training records associated with the above training requirements to the // Resident Engineer // Project Manager // and Facility Safety // Manager // Officer // or Contracting Officer Representative // or Government Designated Authority // for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES 15 [fifteen] calendar days prior to the date of the preconstruction conference for acceptance.

- F. Prior to any worker for the contractor or subcontractors beginning work, they shall undergo a safety briefing provided by the SSHO or his/her designated representative. As a minimum, this briefing shall include information on the site-specific hazards, construction limits, VAMC safety guidelines, means of egress, break areas, work hours, locations of restrooms, use of VAMC equipment, emergency procedures, accident reporting etc... Documentation shall be provided to the Resident Engineer that individuals have undergone contractor's safety briefing.
- G. Ongoing safety training will be accomplished in the form of weekly documented safety meeting.

1.10 STOP WORK ACTIVITY AUTHORITY

- A. All Albany County and/or their direct representatives have the authority to stop a work activity that exposes any Contractor employees, consultants, or other visitors to potentially serious injury and/or illness. The responsible Contractor shall immediately cease work, perform an assessment of the activity that is exposing employees to any Immediately Dangerous to Life or Health (IDLH) conditions, and take action necessary to satisfactorily address the unsafe condition(s) at no cost to the County. The activity may only resume when the Owners representative or respective Contractor's Safety Representative verify corrective measures have been satisfactorily completed. Any related impact to time of completion shall be considered within the Contractor's control.
- B. No Work, other than mobilization, shall commence until the Site-Specific Safety Plan is approved.

PART- 2 PRODUCTS (NOT USED)

PART- 3 EXECUTION (NOT USED)

END OF SECTION 01 7310

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether it is clearly or explicitly shown.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Rubbish Removal: Section 01 5000.

1.3 PROJECT CONDITIONS

- A. The Contractor shall be responsible for removals and cutting and patching, unless specifically noted in the drawings or specifications.
- B. Existing Conditions: Do not disturb existing structures, construction, materials or equipment unless required by the Contract.
 - 1. Do not cut, drill or remove structural members such as joists, beams or columns supporting construction that is to remain unless expressly required by the Contract Documents.

PART- 2 PRODUCTS

2.1 MATERIALS

- A. Match the appearance, performance, and structure of existing corresponding materials as closely as practicable, unless otherwise indicated.

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Prior to cutting, drilling or removal, investigate both sides of the surface involved. Determine the exact location of structural members.
- B. If unforeseen obstructions are encountered, take precautions necessary to prevent damage and obtain instructions from the Owner's Representative before proceeding with the Work.

3.2 PREPARATION

- A. Provide temporary shoring and other supports necessary to prevent settlement or other damage to existing construction that is to remain.
- B. Prepare existing surfaces properly to receive and, where required, bond with the Work.

3.3 REMOVALS, CUTTING, AND ALTERING

- A. In addition to the items that are scheduled for removal on the Drawings, remove existing construction superseded by the Work except items such as pipes, conduits, recessed boxes, and ducts that are built into existing construction that is to remain. Cut off and conceal such items at face of remaining construction. Provide cover plates on recessed boxes.
- B. Remove and alter existing construction as required to install and connect the Work to adjacent construction in an approved manner.
- C. Cut and alter existing materials as required to perform the Work. Limit cutting to the smallest amount necessary. Core drill round holes and saw cut other openings where possible.
- D. Perform cutting, drilling, and removals in a manner that will prevent damage to construction which is to remain.

3.4 PATCHING

- A. Patch existing construction and finishes defaced, damaged, or left incomplete due to alterations and removals. Patching, except as otherwise indicated, shall be limited to the areas which have been cut or altered. Finish patched surfaces to match existing adjacent surfaces as closely as practicable.
- B. Perform patching around items penetrating existing construction in a manner that will maintain the water and fire resistive capability of the existing construction.
- C. Paint patched areas and cover plates to match existing adjacent surfaces as closely as practicable using same type of paint. Painting, except as otherwise indicated, shall be limited to the areas that have been patched.
- D. Where surfaces exposed by removals are to remain as exposed surfaces, paint such areas to match existing adjacent surfaces as closely as practicable using same type of paint.

3.5 REINSTALLATION

- A. Where reinstallation of removed items is indicated, reinstall them to a condition equal to or better than their condition before removal.

END OF SECTION 01 7329

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
- B. Salvaging nonhazardous demolition and construction waste.
- C. Recycling nonhazardous demolition and construction waste.
- D. Disposing of nonhazardous demolition and construction waste
- E. Related Requirements:
- F. Section 01 5000 Temporary Facilities and Controls for environmental protection measures during construction
- G. Section 02 4116 "Structure Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements.
- H. Section 021100 "Site Clearing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.
- I. Section 042000 "Masonry Veneer" for disposal requirements for masonry waste.

1.3 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

- D. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Develop waste management plan that results in end of Project rates for salvage/recycling of 75 percent by weight of total waste generated by the Work.
- B. Each Contract shall prepare and submit a Construction Waste Management Plan (CWM) to the Director's Representative for approval. The CWM Plan shall outline the provisions to be implemented to recycle and salvage demolition and construction waste generated during the project.
- C. Upon approval of the CWM Plan by the Director's Representative, it shall be implemented throughout the duration of the project, and documented in accordance with the SUBMITTALS Article below.
- D. The Construction Waste Management Plan shall include, but not be limited to, the following components:
 - 1. Listing of Targeted Materials: Develop a list of the waste materials from the Project that will be targeted for reuse, salvage, or recycling. The following materials shall be accounted for (materials that will not be recycled shall be indicated as such):
 - a. Cardboard, paper, packaging.
 - b. Acoustical Ceiling Tiles.
 - c. Clean dimensional wood, palette wood.
 - d. Beverage containers.
 - e. Land clearing debris.
 - f. Concrete.
 - g. Stone.
 - h. Concrete Masonry Units (CMU).
 - i. Asphalt.
 - j. Metals from banding, stud trim, ductwork, piping, rebar, roofing, windows, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
 - k. Gypsum board.
 - l. Carpet and pad.
 - m. Paint.
 - n. Asphalt roofing shingles if applicable for any existing building demolition.
 - o. Rigid Foam.
 - p. Glass.
 - q. Plastics.
 - r. Woods.

2. Landfill Information: Provide the name of the landfill(s) where trash will be disposed of and the applicable landfill tipping fee(s).
3. Sorting Method: Provide a description of the proposed means of sorting and transporting the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site for off-site sorting).
4. Packaging Waste: Provide an estimate of packaging materials generated, and note whether suppliers will eliminate or take back packaging.
5. Recycling facilities: Provide the name of the recycling facilities(s) where materials will be sent for recycling, how it will be recycled, and the applicable fee(s).
6. Additional Information: Include any additional information deemed relevant to describe the scope and intent of the CWM Plan to the Director's Representative.
7. Re-Used materials/Equipment: Materials or equipment to be removed from the site or turned over to the State which are classified as recycled materials shall be documented. Documentation shall include the materials turned over, weight or quantity of materials/equipment and a letter on company letterhead indicating the intended use of items.
8. Subcontractor Requirements: Construction Waste Management and recycling requirements shall be incorporated into all Subcontractor's contracts.

1.5 ACTION SUBMITTALS

A. Submittal Requirements:

1. A copy of the Construction Waste Management Plan, as defined in the PERFORMANCE REQUIREMENTS Article above shall be submitted within 30 days of date established from the Notice of Award.
2. In conjunction with payment applications, contractors shall submit a monthly Waste Management submission. This submission shall include waste receipts for the payment period and a completed Waste Management Form for the same payment period.
3. Calculations and supporting documentation to demonstrate end-of-project recycling rates meeting the requirements of the Construction Waste Management Plan. The process for recording and assembling documentation shall be as follows:
 - a. Record and document the total weight (in tons) of all demolition and construction waste materials sent to the landfill. Monthly Waste Management Reporting Forms (sample included at the end of this Section identified as Exhibit "A") shall be used as the basis for determining the total amount of waste landfilled for the project. The monthly reporting forms shall specify:
 - i. The number of dumpsters or other containers sent to the landfill for that month.

- ii. The volume (in cubic yards) of each dumpster or container sent to the landfill for that month.
- iii. The type of waste contained in each dumpster or container.
- iv. The weight of the waste in each dumpster or container. If the weight of the waste is not directly measured for each dumpster or container, the following Solid Waste Conversion Factors shall be used to convert the volume of waste to weight:

Solid Weight Conversion Factors	
Mixed Waste	350 lbs/cubic yard
Wood	300 lbs/cubic yard
Cardboard	100 lbs/cubic yard
Gypsum Board	500 lbs/cubic yard
Rubble	1,400 lbs/cubic yard
Steel	1,000 lbs/cubic yard

- v. Identification of the landfill. In addition, provide the name of the landfill that will be accepting the materials. Receipts or other proof of facility reception of materials is required.
- b. Record and document the total weight (in tons) of all demolition and construction waste materials recycled or salvaged. Monthly Waste Management Reporting Forms shall be used as the basis for determining the total amount of waste recycled or salvaged for the project. The monthly reporting forms shall specify:
- i. The number of dumpsters or other containers of recycled or salvaged materials for that month.
 - ii. The volume (in cubic yards) of each dumpster or container of recycled or salvaged materials for that month.
 - iii. The type of recycled or salvaged material contained in each dumpster or container.
 - iv. The weight of the recycled or salvaged material in each dumpster or container. If the weight of the material is not directly measured for each dumpster or container, the Solid Waste Conversion Factors listed for landfill waste above shall be used, where applicable, to convert the volume of material to weight. For materials not contained in the Solid Waste Conversion Factors above propose a conversion factor for review by the Director's Representative.
 - v. In addition, provide the name of the receiving facilities/companies that will be purchasing or accepting the recycled or salvaged materials. Receipts or other proof of facility reception of materials is required.

- vi. For materials separated for recycling off-site, establish a method for tracking the weight of the recycled material. The method shall be included in the CWM Plan for the Director's Representative review and approval.
- c. Calculate the end-of-project recycling rate percentage by dividing the recycled and salvaged waste (in tons) by the total waste generated (recycled, salvaged, and landfilled waste – also in tons), and multiplying by 100.
- d. For materials turned over to others for reuse, provide documentation on company letterhead indicating the material(s), the quantity (either by weight or units), the date and the intended reuse of the product.

PART- 2 PRODUCTS (NOT USED)

PART- 3 EXECUTION

3.1 PLAN IMPLEMENTATION

- A. The Contractor for Construction Work shall be responsible for the provision of containers and the removal of all waste, non-returned surplus materials, and rubbish from the site in accordance with the Waste Management Plan. The Contractor for Construction Work shall oversee and document the results of the Plan. The Prime Contractors shall be responsible for collecting, sorting, and depositing in designated areas, their waste, non-returned surplus materials, and rubbish, as per the Waste Management Plan.
- B. Instruction. The Contractor for Construction Work shall provide on-site instruction of appropriate separation, handling and recycling, salvage, reuse and return methods to be used by all parties in appropriate stages of the Project.
- C. Separation Facilities: The Contractor for Construction Work shall lay out a specific area(s) to facilitate separation of materials for potential recycling, salvage, reuse and return. Each potential material shall be collected and stored to avoid being mixed with other materials. Recycling and waste bin areas are to be kept neat and clean, and clearly marked.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 - 2. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 MEETINGS

- A. Conduct Construction Waste Management meetings. Meetings shall include Subcontractors affected by the CWM Plan. At a minimum, waste management goals and issues shall be discussed at the following meetings:
 - 1. Pre-construction meeting.
 - 2. Regular job-site meetings.
- B. Any non-compliant practices in the field will be addressed at regular job-site meetings.

3.3 MONTHLY WASTE MANAGEMENT REPORTING FORMS

- A. Monthly Waste Management Reporting Forms, as required in the SUBMITTALS Article above, shall be submitted to the Director's Representative for review throughout the duration of the project.

3.4 SALVAGING DEMOLITION WASTE

- A. Salvaged Items for Reuse in the Work:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until installation.
 - 4. Protect items from damage during transport and storage.
 - 5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- B. Salvaged Items for Sale and Donation: Not permitted on Project site.
- C. Salvaged Items for Owner's Use:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to Owner's storage area on-site designated by Owner.
 - 5. Protect items from damage during transport and storage.

3.5 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

END OF SECTION 01 7419

ALBANY COUNTY SHAKER PLACE REHABILITATION
& NURSING CENTER CAFÉ RENOVATION
ALBANY, NEW YORK

SECTION 01 7419
CONSTRUCTION WASTE
MANAGEMENT AND DISPOSAL

Albany County Shaker Place & DPW New Vehicle Storage Facility (Exhibit "A")
Contractor C&D Waste Management Form
For Waste Generated On-Site

Company: _____

CONTACT: _____

Phone: _____

Material Description (Include packaging waste if applicable)	Total Weight	% Reused on-site	% Recycled off-site	% Sent to landfill	Material Recipient

Recycled Material: Material that would otherwise be destined for landfill but is diverted from the waste stream, reintroduced as material feedstock and reprocessed into new end products.

Reused Material: Materials that can be reused in their original form without any reprocessing.

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 DESCRIPTION

- A. Warranties shall include:
 - 1. One-year warranty as required by General Conditions beginning at Substantial Completion.
 - 2. Extended warranties required by various specification Sections.
- B. Contractor shall review warranties for acceptance prior to final payment.

PART- 2 NOT USED

PART- 3 NOT USED

END OF SECTION 01 7500

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings, and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
- B. Demonstration of operation of systems, subsystems, and equipment.
- C. Training in operation and maintenance of systems, subsystems, and equipment.
- D. Demonstration and training videotapes.
- E. Unit Price for Instruction Time: Length of instruction time will be measured by actual time spent performing demonstration and training in required location. No payment will be made for time spent assembling educational materials, setting up, or cleaning up.

1.3 SUBMITTALS

- A. Instruction Program: Submit two copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
- B. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed project names and addresses, names, and addresses of architects and owners, and other information specified.
- C. Attendance Record: For each training module, submit list of participants and length of instruction time.
- D. Demonstration and Training Videos: Submit one copy at the end of each training module.
- E. Identification: On each copy, provide an applied label with the following information:
- F. Name of Project.
- G. Name and address of photographer.
- H. Name of Contractor.
- I. Name of Contractor.

- J. Date videotape was recorded.

1.4 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 1 Section "Quality Requirements," experienced in operation and maintenance procedures and training.
- C. Photographer Qualifications: A professional photographer who is experienced photographing construction projects.

1.5 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Contractor.

PART- 2 PRODUCTS

2.1 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections, and as follows:
 - 1. Equipment, including food-service equipment.
 - 2. Fire-protection systems, including fire alarm.
 - 3. Intrusion detection systems.
 - 4. Heat generation, including boilers, feed water equipment, and pumps.
 - 5. Refrigeration systems, including chillers, cooling towers, condensers, pumps and distribution piping.
 - 6. HVAC systems, including air-handling equipment, air distribution systems and terminal equipment and devices.
 - 7. HVAC instrumentation and controls.
 - 8. Floor finish maintenance.

9. Electrical service and distribution, including transformers, switchboards, panel boards, uninterruptible power supplies, and motor controls.
 10. Packaged engine generators, including transfer switches.
 11. Lighting equipment and controls.
 12. Communication systems, including intercommunication, surveillance, clocks and programming, and voice and data equipment.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:
1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.
 - g. Limiting conditions.
 - h. Performance curves.
 2. Documentation: Review the following items in detail:
 - a. Operations manuals.
 - b. Maintenance manuals.
 - c. Identification systems.
 - d. Maintenance service agreements and similar continuing commitments.
 3. Emergencies: Include the following, as applicable:
 - a. Instructions on meaning of warnings, trouble indications, and error messages.
 - b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.
 4. Operations: Include the following, as applicable:
 - a. Startup procedures.

- b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.
 - k. Seasonal and weekend operating instructions.
 - l. Required sequences for electric or electronic systems.
 - m. Special operating instructions and procedures.
5. Adjustments: Include the following:
- a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
6. Troubleshooting: Include the following:
- a. Diagnostic instructions.
 - b. Test and inspection procedures.
7. Maintenance: Include the following:
- a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning.
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
8. Repairs: Include the following:
- a. Diagnosis instructions.

- b. Repair instructions.
- c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
- d. Instructions for identifying parts and components.
- e. Review of spare parts needed for operation and maintenance.

PART- 3 EXECUTION

3.1 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Contractor for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 - 1. Schedule training with Contractor with at least seven days' advance notice.
- D. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.3 VIDEOS

- A. Demonstration and Training Videos: Record instruction of Owner's personnel in the operation and maintenance of equipment and systems. Photographer shall select vantage points to best show equipment, systems and procedures demonstrated. Minimum recording time shall be one hour. Video shall be provided to the owner in both digital format and on DVD.

END OF SECTION 01 8200

COUNTY OF ALBANY

REQUEST FOR BIDS SHAKER PLACE NURSING AND REHABILITATION CENTER



RFB #2024-150

SHAKER PLACE CAFÉ PROJECT

VOLUME 2

**ALBANY COUNTY DEPARTMENT OF GENERAL SERVICES
PURCHASING DIVISION
PAMELA O NEILL, PURCHASING AGENT
112 STATE STREET, ROOM 1000
ALBANY, NY 12207**

VOLUME 2

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**ALBANY COUNTY SHAKER PLACE REHABILITATION
& NURSING CENTER CAFÉ RENOVATION
ALBANY, NEW YORK**

October 6, 2023

OWNER

County of Albany
Shaker Place Nursing Home
Albany, New York

ARCHITECT

Angerame Architects, P.C.
30 Essex Street
Albany, New York 12206
(518) 454-9300

STRUCTURAL ENGINEER

MRH Engineering, P.C.
20 Bayberry Drive
Queensbury, New York 12804
(518) 792-4042

**MECHANICAL/PLUMBING/
ELECTRICAL ENGINEER**

Engineered Solutions
646 Plank Road, #104
Clifton Park, New York 12065
(518) 280-2410

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. Fibrous Reinforcement: Section 032101.
- B. Vapor Retarder Under Slabs on Grade: Section 072600.

1.02 REFERENCES

- A. Except as shown or specified otherwise, the Work of this Section shall conform to the requirements of Specifications for Structural Concrete for Buildings ACI 301-16 of the American Concrete Institute.

1.03 DEFINITIONS (Amendments to ACI 301, Section 1.2):

- A. Exposed Construction: Exposed to view.

1.04 SUBMITTALS

- A. Submittals Package: Submit product data for design mix(es) and materials for concrete specified below at the same time as a package.
- B. Shop Drawings: Placing drawings for bar reinforcement.
- C. Product Data:
 - 1. Concrete design mix(es) with name and location of batching plant.
 - 2. Portland Cement: Brand and manufacturer's name.
 - 3. Fly Ash: Name and location of source, and DOT test numbers.
 - 4. Air-entraining Admixture: Brand and manufacturer's name.
 - 5. Water-reducing Admixture: Brand and manufacturer's name.
 - 6. Aggregates: Name and location of source, and DOT test numbers.
 - 7. Lightweight Coarse Aggregate: Brand and manufacturer's name
 - 8. Chemical Hardener (Dustproofing): Brand and manufacturer's name, and application instructions.
 - 9. Chemical Curing and Anti-Spalling Compound: Brand and manufacturer's name, and application instructions.
 - 10. Bonding Agent (Adhesive): Brand and manufacturer's name, and preparation and application instructions.
 - 11. Expansion Joint Filler: Brand and manufacturer's name.
 - 12. Emery Aggregate: Brand and manufacturer's name, and application instructions.

- D. Samples:
 - 1. Fabric Reinforcement: 8 inches square.
 - 2. Bar Supports: Full size.
- E. Quality Control Submittals:
 - 1. Certificates: Affidavit required under Quality Assurance Article.

1.05 QUALITY ASSURANCE

- A. Concrete batching plant shall be currently approved as a concrete supplier by the New York State Department of Transportation.
- B. Fly ash supplier shall be currently approved as a fly ash supplier by the New York State Department of Transportation.
- C. Certifications: Affidavit by the bar reinforcement manufacturer certifying that bar material meets the contract requirements.
 - 1. Submit evidence consisting of certification of source of material, copies of purchase orders and manufacturer's certifications. For stock material, submit copies of latest mill or purchase orders for material replacement.
 - a. Documentation to confirm compliance with General Conditions Article 25.4 Domestic Steel.
 - 2. Fabricator's and Erector's Qualifications Data: Name and experience of fabricator and erector.
- D. The Contractor agrees, that if the value of this contract exceeds \$100,000 all structural steel, reinforcing steel and other major steel items to be incorporated in the Work of this Contract shall be produced and made in whole or substantial part in the United States, its territories or possessions.
- E. Source Quality Control: The Director reserves the right to inspect and approve the following items, at his own discretion, either with his own forces or with a designated inspection agency:
 - 1. Batching and mixing facilities and equipment.
 - 2. Sources of materials.

1.06 STORAGE

- A. Store materials so as to insure the preservation of their quality and fitness for the Work. Materials, even though accepted prior to storage, are subject to inspection and shall meet the requirements of the Contract before their use in the Work.

PART 2 PRODUCTS

2.01 MATERIALS (Amendments to ACI 301, Section 4, for Normal Weight Concrete and Section 7, for Lightweight Concrete):

- A. Water-reducing Admixture: ASTM C 494, Type A, and on the New York State Department of Transportation's current "Approved List".
- B. Fly Ash (Pozzolans): ASTM C 618, including Table 1A (except for footnote A), Class F except that loss on ignition shall not exceed 4.0 percent.
- C. Chemical Curing and Anti-Spalling Compound: ASTM C-309, Type 1D, Class B, with a minimum 18 percent total solids content. No thinning of material allowed.
 - 1. SureCure Emulsion, Kaufman Products, Inc. 3811 Curtis Avenue, Baltimore, MD 21226, (800) 637-6372.
 - 2. Cure & Seal 25 percent (J-22UV) by Dayton Superior Corp., 1125 Byers Rd., Miamisburg, OH 45342, (800) 745-3700.
 - 3. MasterKure CC 200 WB by Master Builders/ BASF Building Systems, 23700 Chagrin Blvd., Cleveland, OH 44122, (800) 628-9990.
- D. Chemical Hardener (Dustproofing): Colorless aqueous solution of magnesium-zinc fluosilicate. Approved products include:
 - 1. MasterKure HD 300WB by Master Builders/ BASF Building Systems, 23700 Chagrin Blvd., Cleveland, OH 44122, (800) 628-9990.
 - 2. Surfhard by The Euclid Chemical Co., 19218 Redwood Rd., Cleveland, OH 44110, (216) 531-9222.
 - 3. Liqui-Hard by W.R. Meadows, Inc., PO Box 543, Elgin, IL 60121, (847) 683-4500.
 - 4. FluoHard by L & M Construction Chemicals, Inc., 14851 Calhoun Rd., Omaha, NE 68152, (402) 453-6600.
 - 5. Armortop by Anti Hydro International, Inc., 265 Badger Ave., Newark, NJ 07108, (800) 777-1773.
 - 6. Diamond by Kaufman Products, Inc., 3811 Curtis Avenue, Baltimore, MD 21226, (800) 637-6372.
 - 7. Basis of Design: "Euco Diamond Hard" by The Euclid Chemical Co
- E. Type 1 Expansion Joint Filler: Preformed, resilient, non-extruding cork units; ASTM D 1752, Type II.
- H. Chamfer Strips: Wood, metal, PVC or rubber; one inch chamfer.
- I. Epoxy Bonding Agent (Adhesive): 100 percent solids epoxy-resin-base bonding compound, complying with ASTM C 881, Types I, II, IV and V, Grade 2 (horizontal areas) or Grade 3 (overhead/vertical areas), and Class B (40-60 degrees Fahrenheit) or Class C (60 degree Fahrenheit and above).
 - 1. SurePoxym Series by Kaufman Products, Inc., 3811 Curtis Avenue, Baltimore, MD 21226, (800) 637-6372.
 - 2. Sikadur Hi-Mod 32 by Sika Corporation, 201 Polito Avenue, Lyndhurst, NJ 07071, (800) 933-7452.
 - 3. MasterEmaco ADH 327 RS by Master Builders/ BASF Building

Systems, 23700 Chagrin Blvd., Cleveland, OH 44122, (800)628-9990.

- J. Emery Aggregate: Natural emery, crushed, polyhedral in shape, with not more than 10 percent flat or elongated pieces, properly screened, graded and packaged in the manufacturer's plant, and delivered to the site in sealed, labeled packages. Approved products include:
1. Emerundum by Anti Hydro International, Inc., 265 Badger Ave., Newark, NJ 07108, (800) 777-1773.
 2. Non-Slip Aggregate by Setcon Industries, Inc., 5 Mathews Ave., Riverdale, NJ 07457-1020, (201) 283-0500.
 3. MasterTop 120SR by Master Builders/ BASF Building Systems, 23700 Chagrin Blvd., Cleveland, OH 44122, (800) 628-9990.

2.02 PROPORTIONING (Amendments to ACI 301, Sections 4 & 7):

- A. Compressive Strength: As required by ACI 318-14 Table 19.3.2.1. "Requirements for concrete by exposure class".
- B. Weight: Normal, except as indicated below:
1. Lightweight Concrete (for floor fills): Air-dry unit weight between 95 and 115 lb/cu ft.
- C. Durability: Concrete shall be air-entrained. Design air content shall be according to ACI 318-14 Table 19.3.2.1 "Requirements for concrete by exposure class", and ACI 318-14 Table 19.3.3.1 "Total air content for concrete exposed to cycles of freezing and thawing", with an allowable tolerance of plus or minus 1.5 percent for total air content. Entrained air shall be provided by use of an approved air-entraining admixture. Air-entrained cement shall not be used.
- D. Slump: Maximum 4 inches; minimum 1 inch before the addition of any water-reducing admixtures or high-range water-reducing admixtures (superplasticizers) at the Site.
- E. Admixtures: Do not use admixtures in concrete unless specified or approved in writing by the Director.
- F. Selection of Proportions: Concrete proportions shall be established on the basis of previous field experience or laboratory trial batches, unless otherwise approved in writing by the Director.
1. Optional Material: Fly ash may be substituted for (Portland) cement in normal weight concrete up to a maximum of 15 percent by weight of the required minimum (Portland) cement. If fly ash is incorporated in a concrete design mix, make necessary adjustments to the design mix to compensate for the use of fly ash as a partial replacement for (Portland) cement.
 - a. Adjustments shall include the required increase in air-entraining admixture to provide the specified air content.

- b. Lower early strength of the concrete shall be considered in deciding when to remove formwork.

2.03 REINFORCEMENT (Amendments to ACI 301, Section 3):

- A. Bar Reinforcement: ASTM A 615, Grade 60, deformed steel bars.
- B. Fabric Reinforcement: ASTM A 185, welded wire fabric, fabricated into flat sheets unless otherwise indicated.
- C. Bar Supports: Galvanized steel or AISI Type 430 stainless steel, and without plastic tips.
- D. Tie Wire: Black annealed wire, 16-1/2 gage or heavier.

2.04 JOINTS AND EMBEDDED ITEMS (Amendments to ACI 301, Section 5.3.2.6):

- A. Obtain bond at construction joints by the use of bonding agent (adhesive) in accordance w/section 5.2.1.7 or the use of cement grout.

2.05 PRODUCTION (Amendments to ACI 301, Section 5):

- A. Provide ready-mixed concrete, either central-mixed or truck-mixed.

PART 3 EXECUTION

3.01 EXAMINATION AND PREPARATION

- A. Do not use items of aluminum for mixing, chuting, conveying, forming or finishing concrete, except magnesium alloy tools may be used for finishing.
- B. Keep excavations free of water. Do not deposit concrete in water.
- C. Hardened concrete, reinforcement, forms, and earth which will be in contact with fresh concrete shall be free from frost at the time of concrete placement.
- D. Prior to placement of concrete, remove all hardened concrete spillage and foreign materials from the space to be occupied by the concrete.

3.02 FORMWORK (Amendments to ACI 301, Section 2):

- A. The formwork shall be designed for loads, lateral pressure, and allowable stresses outlined in Chapter 4 - Design of "Guide to Formwork for Concrete" (ACI347-14).

- B. All formwork shall be removed after the concrete has sufficiently hardened, except in inaccessible spaces where approved.
- C. After the ends or end fasteners of form ties have been removed, the embedded portion of the ties shall terminate not less than 3/4 inch from the formed surfaces of concrete.

3.03 PLACING REINFORCEMENT (Amendments to ACI 301, Section 3):

- A. At the time concrete is placed, reinforcement shall be free of mud, oil, loose rust, loose mill scale, and other materials or coatings that may adversely affect or reduce the bond.

3.04 PLACING CONCRETE (Amendments to ACI 301, Section 5):

- A. Operation of truck mixers and agitators and discharge limitations shall conform to the requirements of ASTM C 94.
- B. Do not allow concrete to free fall more than 4 feet.

3.05 FINISHING FORMED SURFACES (Amendments to ACI 301, Section 5.3.3):

- A. Finish Schedule: Except where indicated otherwise on the Drawings, provide the finishes below:
 - 1. Rough Form Finish for concrete surfaces not exposed to view.
 - 2. Smooth Form Finish for concrete surfaces exposed to view.

3.06 FINISHING SLABS (Amendments to ACI 301, Section 5.3.4):

- A. Slabs On Grade: Provide key type joints unless otherwise shown. Tool exposed joints.
- B. Finish Schedule: Except where indicated otherwise on the Drawings, provide the finishes below:
 - 1. Floated Finish for:
 - a. Treads and platforms of exterior steps and stairs.
 - b. Slabs and fill over which waterproofing, roofing, vapor barrier, insulation, terrazzo, or resin bound flooring is required.
 - 2. Troweled Finish for:
 - a. Interior slabs that are to be exposed to view.
 - b. Slabs and fill over which resilient wood flooring, resilient tile or sheet flooring, carpet, or thin-film coating system is required.
 - c. Slabs and fill over which thin-set ceramic tile is required, except fine-broom finished surface.
 - d. Treads and platforms of interior steps and stairs.
 - 3. Broom or Belt Finish for:

- a. Exterior slabs. Texture, as approved by the Director's Representative.
 - 4. Scratched Finish for:
 - a. Surfaces to be covered with ceramic tile set in a bonded thick mortar bed, except screed to a Class B tolerance.
 - b. Surfaces to be covered with floor topping.
 - 5. Integral Emery Aggregate Surfacing with Floated Finish for:
 - a. Interior pedestrian ramps.
- C. Finishing, General: Provide monolithic finishes on concrete floors and slabs without the addition of mortar or other filler material. Finish surfaces in true planes, true to line, with particular care taken during screeding to maintain an excess of concrete in front of the screed so as to prevent low spots. Screed and darby concrete to true planes while plastic and before free water rises to the surface. Do not perform finishing operations during the time free water (bleeding) is on the surface.
- D. Integral Emery Aggregate Surfacing: Provide a nonslip "dry shake" finish with emery aggregate. Apply emery aggregate in accordance with the manufacturer's printed application instructions for a heavy duty nonslip surface, unless otherwise indicated.

3.07 CURING AND PROTECTION (Amendments to ACI 301, Section 5.3.6):

- A. Maintain concrete surfaces in a moist condition for at least 7 days after placing, except where otherwise indicated. Do not use curing compound.
 - 1. For surfaces of exterior slabs (on grade), apply chemical curing and anti-spalling compound in accordance with the recommendations of the manufacturer.

3.08 CHEMICAL HARDENER (DUSTPROOFING)

- A. Apply chemical hardener to all troweled finished interior floors which are to be left exposed.
- B. Do not apply chemical hardener until concrete has cured the number of days recommended in manufacturer's instructions.
- C. Prepare surfaces and apply chemical hardener in accordance with manufacturer's printed instructions and recommendations.

3.09 FIELD QUALITY CONTROL (Amendments to ACI 301, Section 1):

- A. Make available to the Director's Representatives whatever test samples are required to make tests. Furnish shipping boxes for compression test cylinders.

END OF SECTION 03 3001

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specifications, apply to this Section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section includes an underlayment that consists of a blend of Portland cement and other hydraulic cements that is used to level and smooth interior concrete, terrazzo, ceramic and quarry tile, epoxy coating systems and non-water-soluble adhesive residue on concrete.
- B. ARDEX K 40™ RAPID Rapid, High Flow Self-Leveling Underlayment
- C. Selected ARDEX Primer
- D. ARDEX ARDIFIX™ Low Viscosity Rigid Polyurethane Crack & Joint Repair
- E. ARDEX FEATHER FINISH® Self-Drying Cement Based Finish Underlayment
- F. ARDEX ARDISEAL™ Rapid Plus Semi-Rigid Joint Sealant
- G. Related Sections include the following:
- H. Section 03 30 00, Cast-In-Place Concrete
- I. Division 09 Flooring Sections

1.3 REFERENCES

- A. ASTM C109M, Compressive Strength Air-Cure Only
- B. ASTM E10M, Standard Test Method for Brinell Hardness
- C. ASTM F2170, Relative Humidity in Concrete Floor Slabs Using in situ Probes
- D. ASTM F710, Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used. Include manufacturer's Safety Data Sheets.

- B. Qualification Data: For Installer

1.5 QUALITY ASSURANCE

- A. Installation of the ARDEX product must be completed by a factory-trained applicator, such as an ARDEX LevelMaster® Elite, Choice Contractor or INSTALL Substrate Prep Certified Installer, using mixing equipment and tools approved by the manufacturer. Contact ARDEX Americas (724) 203-5000 for a list of recommended installers.
- B. Product must have hydraulic cement-based inorganic binder content as the primary binder which includes Portland cement per ASTM C150: Standard Specification for Portland cement and other specialty hydraulic cements. Gypsum-based products are not acceptable.
- C. Manufacturer Experience: Provide products of this section by companies which have successfully specialized in production of this type of products for not less than 10 years. Contact Manufacturer Representative prior to installation.

1.6 WARRANTY:

- A. ARDEX K 40™ RAPID installed as part of a floor system, shall be installed in conjunction with the recommended ARDEX Tile & Stone Installation Materials or WW HENRY Flooring Adhesive, as appropriate, to provide the ARDEX SystemOne comprehensive warranty, depending on the system installed.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver products in original packaging, labeled with product identification, manufacturer, batch number and shelf life.
- B. Store products in a dry area with temperature maintained between 50° and 85°F (10° and 29°C) and protect from direct sunlight.
- C. Handle products in accordance with manufacturer's printed recommendations.

1.8 PROJECT CONDITIONS

- A. Do not install material below 50°F (10°C) surface and air temperatures. These temperatures must also be maintained during and for 48 hours after the installation of products included in this section. Install quickly if substrate is warm and follow warm weather instructions available from the ARDEX Technical Service Department.

PART- 2 PRODUCTS

2.1 MATERIALS

- A. Material Name: ARDEX K 40 RAPID
- B. Substitution requests shall be considered in accordance with contract provisions and the performance requirements outlined in this document.

2.2 HYDRAULIC CEMENT UNDERLAYMENT

- A. Hydraulic Cement-based Self-Leveling Underlayment Acceptable Products:
- B. ARDEX K 40™ RAPID; manufactured by ARDEX Americas, USA, (724) 203-5000, www.ardexamericas.com
- C. Selected ARDEX Primer dependent on substrate, and absorbency of substrate and moisture control requirements. See ARDEX K 40 RAPID Technical Data sheet for further information.
- D. Performance and Physical Properties: Meet or exceed the following values for material cured at 73° F +/-3°F (23° C +/-3°C) and 50% +/-5% relative humidity:
- E. Mixing: Barrel Mix or Pump
- F. Flow Time: 10 minutes
- G. Walkable: 60 – 90 minutes
- H. Compressive Strength: 8,000 psi (562 kg/cm²) at 28 days, ASTM C109M
- I. Flexural Strength: 2,000 psi (140.6 kg/cm²) at 28 days, ASTM C348
- J. h. VOC: 0

2.3 CRACK AND JOINT REPAIR

- A. Low Viscosity Rigid Polyurethane Crack and Joint Repair; ARDEX ARDIFIX™; Manufactured by ARDEX Americas; USA; 724-203-5000, www.ardexamericas.com
- B. Semi-Rigid Joint Sealant; ARDEX ARDISEAL™ Rapid Plus Semi-Rigid Joint Sealant; Manufactured by ARDEX Americas; USA; 724-203-5000, www.ardexamericas.com

2.4 PATCH

- A. ARDEX FEATHER FINISH® Self-Drying Cement Based Finished Underlayment

PART- 3 EXECUTION

3.1 PREPARATION

- A. General: Prepare substrate in accordance with manufacturer's instructions.
 - 1. Shot blasting or other mechanical means must be used for Prop Pre. Sanding is not a sufficient means of cleaning or preparing concrete. Do not use acid etching, adhesive removers, solvents or sweeping compounds, as these are bond breakers.
 - 2. Handle and dispose of asbestos and other hazardous materials in accordance with prevailing regulations, which supersede the recommendations in this document.

3. All substrates must be sound, solid and thoroughly clean of all bond-breaking contaminants, including but not limited to overwatered or otherwise loose or weak material, unapproved sealers, unsuitable adhesive residues, and patching and leveling materials.
4. Depending on the selected moisture control system or primer, additional prep may be needed. Please see the technical data sheet.

B. Crack and Joint Preparation:

1. Moving Joints and Moving Cracks – Honor all moving joints and moving cracks up through the underlayment. A flexible sealing compound such as ARDEX ARDISEAL™ Rapid Plus Semi-Rigid Joint Sealant may be installed.
2. Saw Cuts, Dormant Control Joints and Dormant Cracks – Fill all dormant control joints and dormant cracks with ARDEX ARDIFIX™ Low Viscosity Rigid Polyurethane Crack & Joint Repair or ARDEX FEATHER FINISH® Self-Drying, Cement-Based Finish Underlayment as recommended by the manufacturer.
3. If a moisture control system will be installed, the crack and joint preparation recommendations will differ. Please see the technical data sheet.

3.2 APPLICATION

- A. Examine substrates and conditions under which materials will be installed. Do not proceed with installation until unsatisfactory conditions are corrected.
- B. Coordinate installation with adjacent work to ensure proper sequence of construction. Protect adjacent areas from contact due to mixing and handling of materials.
- C. Priming: Comply with manufacturer's printed instructions.
- D. Mixing: Comply with manufacturer's printed instructions. Pumping: Product can be pumped. Please contact the ARDEX Technical Service Department.
- E. Application: Comply with manufacturer's printed instructions.
- F. Curing: The cure time is dependent on the installed thickness and the selected finish flooring. See the Technical Data sheet for further information.

3.3 FIELD QUALITY CONTROL

- A. Where specified, field sampling of the ARDEX underlayment is to be done by taking an entire unopened bag of the product being installed to an independent testing facility to perform compressive strength testing in accordance with ASTM C 109/modified: air-cure only. There are no in situ test procedures for the evaluation of compressive strength.

3.4 PROTECTION

- A. Prior to the installation of the finish flooring, the surface of the underlayment should be protected from abuse by other trades by the use of plywood, Masonite or other suitable protection course.

END OF SECTION 03 5416

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings, and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section includes but is not limited to the following:
 - 1. Structural steel.
 - 2. Field-installed shear connectors.
 - 3. Grout.
- B. Related Requirements:
 - 1. Section 05 5000 "Metal Fabrications" for steel lintels and shelf angles not attached to structural-steel frame miscellaneous steel fabrications and other steel items not defined as structural steel.
 - 2. Section 053100 "Steel Decking" for field installation of shear connectors through deck.
 - 3. Section 09 9100 " Exterior and High Performance Paints and Coatings " and Section 09 9000 "Painting" for surface-preparation and priming requirements.

1.3 DEFINITIONS

- A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

1.4 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

- B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show fabrication of structural-steel components.
 - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 - 2. Include embedment Drawings.
 - 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
 - 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.
- C. Delegated-Design Submittal: For structural-steel connections indicated to comply with design loads, include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- C. Product Test Reports: For the following:
 - 1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
 - 2. Direct-tension indicators.
 - 3. Tension-control, high-strength, bolt-nut-washer assemblies.
 - 4. Shear stud connectors.
 - 5. Shop primers.
 - 6. Nonshrink grout.
- D. Survey of existing conditions, anchor bolt locations and leveling plate elevations..

1.7 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.
- B. Installer Qualifications: A AISC qualified installer having a minimum of 5 years of continuous documented experience with projects of similar scope and complexity..
- C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- D. Comply with applicable provisions of the following specifications and documents:
 - 1. AISC 303.
 - 2. AISC 360.
 - 3. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
 - 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
- B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
 - 1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
 - 2. Clean and relubricate bolts and nuts that become dry or rusty before use.
 - 3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

PART-2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Connections: Provide details of connections required by the Contract Documents to be selected or completed by structural-steel fabricator, including comprehensive engineering analysis by a qualified professional engineer, to withstand loads indicated and comply with other information and restrictions indicated.
 - 1. Select and complete connections using schematic details indicated and AISC 360.

2. Use Allowable Stress Design; data are given at service-load level.

2.2 STRUCTURAL-STEEL MATERIALS

- A. W-Shapes: ASTM A 992/A 992M.
- B. Channels, Angless: ASTM A 36/A 36M.
- C. Plate and Bar: ASTM A 36/A 36M.
- D. Cold-Formed Hollow Structural Sections: ASTM A 500/A 500M, Grade B, structural tubing.
- E. Steel Pipe: ASTM A 53/A 53M, Type E or Type S, Grade B.
 1. Weight Class: Standard weight unless noted otherwise.
 2. Finish: Black except where indicated to be galvanized.
- F. Welding Electrodes: Comply with AWS requirements.

2.3 BOLTS, CONNECTORS, AND ANCHORS

- A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers; all with plain finish.
 1. Direct-Tension Indicators: ASTM F 959, Type 325, compressible-washer type with plain finish.
- B. Zinc-Coated High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade DH heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers.
 1. Finish: Hot-dip zinc coating.
 2. Direct-Tension Indicators: ASTM F 959, Type 325, compressible-washer type with mechanically deposited zinc coating finish.
- C. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, heavy-hex or round head assemblies consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers.
 1. Finish: Plain .
- D. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.
- E. Headed Anchor Rods: ASTM F 1554, Grade 36, straight.
 1. Nuts: ASTM A 563 heavy-hex carbon steel.

2. Plate Washers: ASTM A 36/A 36M carbon steel.
 3. Washers: ASTM F 436, Type 1, hardened carbon steel.
 4. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.
- F. Threaded Rods: ASTM A 36/A 36M.
1. Nuts: ASTM A 563 heavy-hex carbon steel.
 2. Washers: ASTM A 36/A 36M carbon steel.
 3. Finish: Plain unless noted otherwise.
- G. Eye Bolts and Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1030.
- H. Sleeve Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1018.

2.4 REPAIR PAINT

- A. Galvanizing Repair Paint: MPI#18, MPI#19, or SSPC-Paint 20.

2.5 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.6 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," and to AISC 360.
1. Camber structural-steel members where indicated.
 2. Fabricate beams with rolling camber up.
 3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.
 4. Mark and match-mark materials for field assembly.
 5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.

- C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 3, "Power Tool Cleaning."
- F. Steel Wall-Opening Framing: Select true and straight members for fabricating steel wall-opening framing to be attached to structural-steel frame. Straighten as required to provide uniform, square, and true members in completed wall framing. Build up welded framing, weld exposed joints continuously, and grind smooth.
- G. Welded Door Frames: Build up welded door frames attached to structural-steel frame. Weld exposed joints continuously and grind smooth. Plug-weld fixed steel bar stops to frames. Secure removable stops to frames with countersunk machine screws, uniformly spaced not more than 10 inches o.c. unless otherwise indicated.
- H. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.
 - 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 - 2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
 - 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.7 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened unless noted otherwise. Slip critical at braced frames and members with reversed loading unless noted otherwise.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - 1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

2.8 SHOP PRIMING

- A. Shop prime the following steel surfaces:
 - 1. Exterior surfaces including steel associated with canopies and steel roof top dunnage.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

1. SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
 2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

2.9 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.
 1. Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.
 2. Galvanize lintels shelf angles and welded door frames attached to structural-steel frame and located in exterior walls.

2.10 SOURCE QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform shop tests and inspections.
 1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
- B. Bolted Connections: Inspect shop-bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- C. Welded Connections: Visually inspect shop-welded connections according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
 1. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
 2. Ultrasonic Inspection: ASTM E 164.
- D. In addition to visual inspection, test and inspect shop-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
 1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
 2. Conduct tests according to requirements in AWS D1.1/D1.1M on additional shear connectors if weld fracture occurs on shear connectors already tested.

- E. Prepare test and inspection reports.

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
 - 1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- B. Proceed with fabrication and erection only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.
 - 1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
- B. Baseplates, Bearing Plates, and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 - 1. Set plates for structural members on setting nuts as detailed.
 - 2. Weld plate washers to top of baseplate.
 - 3. Snug-tighten anchor rods after supported members have been positioned and plumbed.
 - 4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- C. Maintain erection tolerances of structural steel within AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

- D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of structure.
 - 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- E. Splice members only where indicated.
- F. Do not use thermal cutting during erection.
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.
- H. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened unless noted otherwise. Slip critical at braced frames and members with reversed loading unless noted otherwise.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - 1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
 - 2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
 - 3. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," for mill material.

3.5 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
 - 1. Verify structural-steel materials and inspect steel frame joint details.
 - 2. Verify weld materials and inspect welds.

3. Verify connection materials and inspect high-strength bolted connections.
- B. Bolted Connections: Inspect and test bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- C. Welded Connections: Visually inspect field welds according to AWS D1.1/D1.1M.
 1. In addition to visual inspection, test and inspect field welds according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
 - a. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
 - b. Ultrasonic Inspection: ASTM E 164.

3.6 REPAIRS AND PROTECTION

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780/A 780M.
- B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
- C. Touchup Painting: Cleaning and touchup painting are specified in Section 09 9100 "Exterior and High Performance Paints and Coatings" and Section 09 9000 "Painting."

END OF SECTION 05 1200

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specifications, apply to this Section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. Section Includes:
- B. Roof deck.
- C. Related Requirements:
- D. Section 03 3000 "Cast-in-Place Concrete" for normal-weight and lightweight structural concrete fill over steel deck.
- E. Section 05 1200 "Structural Steel Framing" for shop- and field-welded shear connectors.
- F. Section 05 5000 "Metal Fabrications" for framing deck openings with miscellaneous steel shapes.

1.3 SUBMITTALS

- A. Product Data: For each type of deck, accessory, and product indicated.
- B. Shop Drawings:
- C. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.
- D. Welding certificates.
- E. Product Certificates: For each type of steel deck.
- F. Product Test Reports: For tests performed by a qualified testing agency, indicating that each of the following complies with requirements:
- G. Power-actuated mechanical fasteners.
- H. Acoustical roof deck.
- I. Field quality-control reports.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
- B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."
- C. FM Global Listing: Provide steel roof deck evaluated by FM Global and listed in its "Approval Guide, Building Materials" for Class 1 fire rating and Class 1-90 windstorm ratings.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.
- C. Protect and ventilate acoustical cellular roof deck with factory-installed insulation to maintain insulation free of moisture.

PART- 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."
- B. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 ROOF DECK

- A. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:
 - B. Galvanized-Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33 G60 zinc coating.
 - C. Deck Profile: As indicated.
- A. Profile Depth: As indicated
- B. Design Uncoated-Steel Thickness: As indicated
- C. Span Condition: Double span.
- D. Side Laps: Overlapped

2.3 ACCESSORIES

- A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- A. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- B. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.
- C. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.
- D. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- E. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi, of same material and finish as deck, and of thickness and profile recommended by SDI Publication No. 31 for overhang and slab depth.
- F. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck unless otherwise indicated.
- G. Piercing Hanger Tabs: Piercing steel sheet hanger attachment devices for use with floor deck.
- H. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, 0.0598 inch thick, with factory- punched hole of 3/8-inch minimum diameter.
- I. Flat Sump Plates: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck. For drains, cut holes in the field.
- J. Galvanizing Repair Paint: ASTM A 780/A 780M
- K. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- A. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.

- A. Install temporary shoring before placing deck panels if required to meet deflection limitations.
- B. Locate deck bundles to prevent overloading of supporting members.
- C. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
- D. Align cellular deck panels over full length of cell runs and align cells at ends of abutting panels.
- E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
- H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
- I. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

3.3 ROOF-DECK INSTALLATION

- A. Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches long, and as follows:
 - 1. Weld Diameter: 5/8 inch, nominal.
 - 2. Weld Spacing: Weld edge and interior ribs of deck units with a minimum of two welds per deck unit at each support. Space welds 12 inches apart in the field of roof and 6 inches apart in roof corners and perimeter.
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of one-half of the span or 18 inches, and as follows:
 - 1. Mechanically fasten with self-drilling, No. 10 diameter or larger, carbon-steel screws.
 - 2. Mechanically clinch or button punch.
 - 3. Fasten with a minimum of 1-1/2-inch-long welds.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:
 - 1. End Joints: Lapped 2 inches minimum.
- D. Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and weld or [mechanically fasten flanges to top of deck. Space attachment not more than 12 inches apart with at least one attachment at each corner.

1. Install reinforcing channels or zees in ribs to span between supports and weld or mechanically fasten.
- E. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld or mechanically fasten to substrate to provide a complete deck installation.
1. Weld cover plates at changes in direction of roof-deck panels unless otherwise indicated.
- F. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive according to manufacturer's written instructions to ensure complete closure.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Field welds will be subject to inspection.
- C. Prepare test and inspection reports.

3.5 PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780/A 780M and manufacturer's written instructions.

END OF SECTION 05 3100

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings, and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section includes but is not limited to the following:
 - 1. Loose bearing and leveling plates.
 - 2. Loose steel lintels and angles.
 - 3. Miscellaneous accessories as shown on architectural drawings.

1.3 DEFINITIONS

- A. Definitions in ASTM E 985 for railing-related terms apply to this section.

1.4 SUBMITTALS

- A. General: Submit the following in accordance with Condition of Contract and Division-1 Specification Sections.
- B. Product data for products used in miscellaneous metal fabrications.
- C. Shop drawings detailing fabrication and erection of each metal fabrication indicated.

1.5 QUALITY ASSURANCE

- A. Codes and Standards: Comply with the provisions of the following codes, standards and specifications, except as otherwise shown and specified:
 - 1. AISC "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings", including "Commentary of the AISC Specifications".
 - 2. AISC "Specifications for the Design of Cold-Formed Steel Structured Members."
 - 3. AWS "Structural Welding Code".

- B. Qualifications for Welding Work: Qualify welding processes and welding operators in accordance with AWS "Standard Qualifications Procedures".

1.6 PROJECT CONDITIONS

- A. Field Measurements: Check actual locations of walls and other construction to which metal fabrications must fit, by accurate field measurements before fabrication; show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of Work.

PART- 2 PRODUCTS

2.1 FERROUS METALS

- A. Metal Surfaces, General: For metal fabrications exposed to view upon completion of the Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, rolled trade names, roughness, and, for steel sheet, variation in flatness exceeding those permitted by reference standards for stretcher-level sheet.
- B. Steel Plates, Shapes and Bars: ASTM A 36.
- C. Steel Pipe: ASTM A 53; finish type, and weight class as follows:
 - 1. Galvanized finish to receive paint for exterior installation and high moisture areas.
 - 2. Type S, Grade B, standard weight (schedule 40), unless otherwise indicated.
- D. Malleable Iron Castings: ASTM A 47, Grade 32510.
- E. Fasteners: Use fasteners of same basic metal. Do not use metals that are corrosive or incompatible with metals joined.
- F. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as support rails, unless otherwise indicated.
- G. Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for the metal alloy to be welded.

2.2 GROUT AND ANCHORING CEMENT

- A. Non-shrink Nonmetallic Grout: Premixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with CE CRDC 621. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.
- B. Non-shrink Non-metallic Grout:
 - 1. "Kemset"; Chem-Masters Corp.
 - 2. "Cyrstex"; L&M Construction Chemicals, Inc.

3. "Five Star Grout"; United States Grout.
4. "Masterflow 713"; Master Builders, Inc.
5. "SonogROUT"; Sonneborn Building Product Div., Rexnord Chemical Products, Inc.

2.3 FASTENERS

- A. General: Provide zinc-coated fasteners for exterior use or when built into exterior walls. Select fasteners for the type, grade and class required.
- B. Bolts and Nuts: Regular hexagon head type, ASTM A 307, Grade A.
- C. Lag Bolts: Square head type, FS FF-B-561.
- D. Machine Screws: Cadmium plated steel, FS FF-S-92.
- E. Wood Screws: Flat head carbon steel, FS FF-S-111.
- F. Plain Washers: Round, carbon steel, FS FF-W-92.
- G. Drilled-In Expansion Anchors: Expansion anchors complying with FS FF-S-325, Group VIII (anchors, expansion, [non-drilling], Type I (internally threaded tubular expansion anchor); and machine bolts complying with FS FF-B-575, Grade 5.
- H. Toggle Bolts: Tumble-wing type, FS FF-B-588, type, calls and style as required.
- I. Lock Washers: Helical spring type carbon steel, FS FF-W-84,

2.4 PAINT

- A. Shop Primer for Ferrous Metal: Manufacturer's or Fabricator's standard, fast-curing, lead-free universal modified alkyd primer selected for good resistance to normal atmospheric corrosion, for compatibility with finish paint systems indicated, and for capability to provide a sound foundation for field-applied topcoats despite prolonged exposure; complying with performance requirements of FS TT-P-645.
- B. Galvanizing: ASTM A 123 for fabricated and unfabricated steel products made of uncoated rolled, pressed and forged steel shapes, plates and bars.
- C. Galvanizing Repair Paint: High zinc dust content paint for re-galvanizing welds in galvanized steel, with dry film containing not less than 94% zinc dust by weight, and complying with DOD-P-21935 or SSPC-Paint-20.
- D. Miscellaneous Framing and Supports: Provide miscellaneous steel framing and support which are not a part of the structural steel framework, shown or specified in Section 051200 and/or 051213, and are required to complete the work.
- E. Fabricate miscellaneous units to sizes, shapes and profiles shown or, if not shown, of the required dimensions to receive adjacent grating, plates, doors, or other work to be retained by the framing. Except as otherwise shown, fabricate from structural steel shapes and plates and steel bars of all welded construction using mitered corners, welded brackets and splice plates and a minimum number of joints for field connection. Cut, drill and tap units to receive hardware and similar items to be anchored to the work.

2.5 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required.

2.6 MISCELLANEOUS FRAMING AND SUPPORT

- A. General: Provide steel framing and supports for applications indicated or which are not a part of structural steel framework, as required to complete work.
- B. Fabricate units to sizes, shapes and profiles indicated and required to receive adjacent other construction retained by framing and supports. Fabricate from structural steel shapes, plates and steel bars of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware, hangers, and similar items.

2.7 FINISHES, GENERAL

- A. Comply with NAAMM "Metal Finishes Manual" for recommendations relative to application and designation of finishes.
- B. Finish metal fabrications after assembly.

2.8 STEEL AND IRON FINISHES

- A. Exterior Galvanizing: For those items indicated for galvanizing, apply zinc coating by the hot-dip process compliance with the following requirements.
 - 1. ASTM A 153, for galvanizing iron and steel hardware.
 - 2. ASTM A 123, for galvanizing both fabricated and unfabricated iron and steel products made of uncoated rolled, pressed, and forged shapes, plates, bars, and strip 0.0299" thick and heavier.
 - 3. Interiors (Primer Zone 1A): SSPC-SP3 "Power Tool Cleaning."
- B. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finish or to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with requirements of SSPC-PA1 "Paint Application Specification No. 1" for shop painting.

PART- 3 EXECUTION

3.1 PREPARATION

- A. Coordinate and furnish anchorage's setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, including concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.
- B. Center nosing's or tread widths with noses flush with riser faces and tread surfaces.

- C. Set sleeves in concrete with tops flush with finish surface elevations; protect sleeves from water and concrete entry.

3.2 FABRICATION, GENERAL

- A. Fabricator shall design connections to properly transmit total reactions, moments, and axial forces either indicated on Drawings or reasonably inferred from information provided.
- B. Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication.
- C. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
- D. Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints, and overstressing of welds and fasteners. Base design calculations on actual surface temperatures of metals due to both solar heat gain and nighttime sky heat loss.
- E. Shear and punch metals clearly and accurately. Remove bars.
- F. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- G. Remove sharp or rough areas on exposed traffic surface.
- H. Weld corners and seams continuously, to comply with AWS recommendations and the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.
- I. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersink) screws or bolts. Locate joints where least conspicuous.
- J. Provide for anchorage of type indicated or required, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.
- K. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- L. Cut, reinforce, drill and up miscellaneous metal work as indicated to receive finish hardware screws, and similar items. Countersink all fasteners.

- M. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

3.3 INSTALLATION, GENERAL

- A. Comply with requirements of manufacturer.
- B. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.
- C. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true and free of rack; and measured from established lines and level.
- D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.
- E. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.
- F. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work, and the following:
- G. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
- H. Obtain fusion without undercut or overlap.
- I. Remove welding flux immediately.
- J. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.
- K. Manufacturer Items: Install units as recommended by manufacturer with all required accessories.

3.4 ADJUSTING AND CLEANING

- A. Touch-up Painting: Cleaning and touch-up painting of field welds, bolted connections and abraded areas of the shop paint on miscellaneous metal is specified in Division 9 Section "Painting" of these specifications.
- B. For galvanized surfaces, clean welds, bolted connections, and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

END OF SECTION 05 5000

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings, and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. Section Includes: Framing with dimension lumber.
 - 1. Installation of all doors and frames.
 - 2. Installation of finish hardware.
 - 3. Installation of specialty items.
 - 4. Temporary work.
- B. Related Requirements:
 - 1. Section 061600 "Sheathing."

1.3 DEFINITIONS

- A. Exposed Framing: Framing not concealed by other construction.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
- B. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.

- C. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
- D. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
- E. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
- F. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.5 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.
- B. Evaluation Reports: For the following, from ICC-ES:
 - 1. Wood-preservative-treated wood.
 - 2. Fire-retardant-treated wood.
 - 3. Power-driven fasteners.
 - 4. Powder-actuated fasteners.
 - 5. Expansion anchors.
 - 6. Metal framing anchors.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

PART- 2 PRODUCTS: NOT USED

PART- 3 EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set rough carpentry to required levels and lines, with member's plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- B. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view.
- D. Metal Framing Anchors: Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- E. Do not splice structural members between supports unless otherwise indicated.
- F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
- G. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.
- H. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:
 - 1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
 - 2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal-thickness.
 - 3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq.ft. and to solidly fill space below partitions.
 - 4. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet o.c.

- I. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- J. Comply with AWPAM4 for applying field treatment to cut surfaces of preservative-treated lumber.
- K. Use inorganic boron for items that are continuously protected from liquid water. Use copper naphthenate for items not continuously protected from liquid water.
- L. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. NESNER-272 for power-driven fasteners. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
- M. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 TEMPORARY WORK

- A. Provide temporary ladders for access to all floors and provide rubbish chutes in locations as required.
- B. Provide tread protection at all concrete steps, stairs and platforms; install temporary handrails as required to make stairs safe and at all openings to vertical shafts exterior or penetrations through floor slabs.
- C. Provide door jamb protection at all exterior door frames used for material ingress or egress; provide temporary batten doors as required to make building secure and weathertight.
- D. Provide temporary closures at windows, exterior scaffolding, etc., as required to make building weather-tight and capable of maintaining required minimum working temperatures during cold weather construction.
- E. All items of temporary construction to be of sound material and erected in such a manner as to prevent damage to underlying or adjacent surfaces, and to adequately protect personnel and property.
- F. Provide all necessary barricades and safeguards required to protect or separate construction areas from public areas.
- G. Upon completion of the project, remove all temporary work and repair any damages to permanent installation.

3.3 DOORS AND FRAMES

- A. Receive, handle, store, erect, and brace metal door frames scheduled for installation in walls and partitions, interior and exterior. All frames to be erected plumb and square, set at a proper height above rough or finish floor. Secure to concrete openings with expansion bolts or power actuated fasteners. Install spreaders at midpoint of frame to prevent bow of jambs.
- B. Receive, handle, store, and erect all hollow metal doors throughout the building. Hang doors in accordance with approved door and finish hardware schedules.

3.4 FINISH HARDWARE

- A. Receive, handle, store and apply all items of finish hardware, including thresholds, and weather-stripping throughout the building. All items of finish hardware will arrive on the job properly marked and packaged to minimize the on-the-job sorting and distribution. Store in one designated room, use items in proper locations as there will be no "swapping" of hardware items.
- B. Install all items plumb and true to insure smooth and proper operations of doors. Maintain precautions to prevent marring of adjacent surfaces or finish of hardware both during application and in subsequent operations.
- C. Check all pressed steel frames and metal doors for reinforcing at surface applied hardware specified in Section 087000. DO NOT INSTALL DOORS IF SPECIFIED REINFORCING IS MISSING.
- D. Arrange with painter to seal all door bottoms before hanging doors, if not completed at factory.
- E. All other items of this section are to be installed in accordance with accepted practices of the industry, details on drawings or manufacturer's recommendations.
- F. All other items not specified in other section of work:
 - 1. Installation shall be completed in a neat, secure manner using attachments supplied with accessories and in strict accordance with manufacturer's instructions. Coordinate installation of required blocking.
- G. Construct corners and intersections with not less than 3 studs. Install miscellaneous blocking and framing as shown and as required for support of facing materials, fixtures, specialty items, and trim.
 - 1. Install continuous horizontal blocking row at mid-height of single-story partitions over 8' high and at midpoint of multi-story partitions, using 2" thick members of width as wall or partitions.
- H. Frame openings with multiple studs and headers. Install nailed header members of thickness equal to width of studs. Set headers on edge and support on jamb studs.

3.5 INSTALLATION OF CONSTRUCTION PANELS

- A. General: Comply with applicable recommendations contained in From NO. E30, "APA Design/Construction Guide - Residential and Commercial," for type of construction panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
 - 1. Plywood Backing Panels: Screw to supports 12" o.c., or ramset to concrete wall. Install panels in all telephone closet/rooms - on all walls over 18" wide

3.6 PROTECTION

- A. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06 1000

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. Section Includes:
- B. Wood, nails, bolts, screws, framing anchors and other rough hardware, and other items needed, and perform rough carpentry for the construction shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- C. Furnish and install wood furring.
- D. Furnish and install blocking for:
- E. Wood blocking for installation of custom or manufactured casework.
- F. Toilet accessories furnished and/or installed by other Sections.
- G. Wood blocking in conjunction with drywall partitions wall mounted items and equipment.
- H. Wood blocking for grab bars, handrails and related wall mounted items.
- I. Other locations where wood blocking is indicated on the Drawings.
- J. Furnish and install all wood nailers in connection with roofing work including rooftop equipment bases and support curbs.
- K. Furnish and install plywood backing panels at electrical and telecommunications closets.
- L. Furnish and install wood blocking and plywood for TV wall brackets.
- M. Concealed steel bracket supports.
- N. Related Requirements:
- O. Division 08 Section "Hollow Metal Frames"

1.3 REFERENCES

- A. Dimension Lumber: Lumber of 2 inches' nominal or greater but less than 5 inches' nominal in least dimension.
- B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
- C. NeLMA: Northeastern Lumber Manufacturers' Association.
- D. NHLA: National Hardwood Lumber Association.
- E. NLGA: National Lumber Grades Authority.
- F. SPIB: The Southern Pine Inspection Bureau.
- G. WCLIB: West Coast Lumber Inspection Bureau.
- H. WWPA: Western Wood Products Association.
- I. FM Global:
- J. FM Global Property Loss Prevention Data Sheets 1-49 (FM Global 1-49), Perimeter Flashing, September 2000 revision.

1.4 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
- B. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
- C. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
- D. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
- E. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
- F. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.5 QUALITY ASSURANCE

- A. Single-Source Responsibility for Fire-Retardant-Treated Wood: Obtain each type of fire-retardant treated wood product from one source and by a single producer.
- B. Single-Source Responsibility for Preservative-Treated Wood: Obtain each type of preservative-treated wood product from one source and by a single producer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.
- B. Load and unload material in a manner that prevents damage or breakage.
- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect, at no change in Contract Sum.

PART- 2 PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Certified Wood: Lumber and plywood shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
- B. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
- C. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
- D. Provide dressed lumber, S4S, unless otherwise indicated.
- E. General: Provide miscellaneous lumber and panels indicated for support or attachment of other construction, as follows:
- F. Grades of Lumber and Species:
- G. Wood Bucks, Blocking: Eastern Spruce No. 2 common; Southern Pine No. 2 common; Douglas Fir No. 2 common.
- H. Plywood subtools: APA Rated underlayment; Group 1, Exposure (Fire retardant treated).1, ¾" thickness, unless otherwise noted.

- I. Plywood panels for electrical, security and telecommunications panels: APA graded BD INT, (touch sanded), $\frac{3}{4}$ inch thick (Fire retardant treated).
- J. Plywood for TV wall bracket: APA Rated B-D, Group 2, Exposure 1, $\frac{3}{4}$ inch thick unless noted otherwise. (Fire retardant treated).
- K. Plywood for parapets: APA Rated Sheathing, Exposure 1, $\frac{3}{4}$ inch thickness, unless noted otherwise.
- L. Blockings concealed within walls: As indicated on drawings or as required for secure installation. (Fire retardant treated)
- M. For blocking and nailers used for attachment of other items, select and cut lumber to eliminate knots or other defects.
- N. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWP A U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.
- B. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- D. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- E. Application: Treat items indicated on Drawings, and the following:
- F. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
- G. Wood sills, sleepers, blocking, and similar concealed members in contact with masonry or concrete.
- H. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
- C. Use treatment that does not promote corrosion of metal fasteners.
- D. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
- E. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
- F. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
- G. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.

2.4 WOOD BACKING SYSTEM

- A. Provide backing system: Clark Dietrich, Danback Flexible wood back system or equal.
- B. Material: $\frac{3}{4}$ " CDX Doug Fir Dricon fire-retardant treated wood.
- C. Dimensions: 5-1/8" x 48" (130mm x 1219mm)

2.5 CONSTRUCTION PANELS FOR BACKING

- A. Plywood Backing Panels: For mounting electrical or telephone equipment, provide fire-retardant treated plywood panels with grade designation, APA C-D PLUGGED EXPOSURE 1, in thickness indicated, or if not otherwise indicated, not less than $\frac{3}{4}$ inch.

2.6 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
 - 2. Where carpentry is pressure-preservative treated, provide fasteners of Type 304 stainless steel.
- B. Rough Hardware: Furnish and install all rough hardware
 - 1. Steel Items: Comply with ASTM A7 or ASTM A36.
 - 2. Nails, Brads, and Staples: ASTM F 1667.

3. Power-Driven Fasteners: NES NER-272.
4. Wood Screws: ASME B18.6.1.
5. Screws for Fastening to Metal Framing: ASTM C 954, length as recommended by screw manufacturer for material being fastened.
6. Lag Bolts: ASME B18.2.1.
7. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.
8. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

2.7 CONCEALED STEEL BRACKET SUPPORTS

- A. Manufactured by A+M Hardware Inc, model EC-24' and C-24" or equal

PART- 3 EXECUTION

3.1 INSTALLATION, GENERAL

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.
- B. Selection of lumber pieces
 1. Carefully select the members.
 2. Select individual pieces so that knots and obvious defects will not interfere with placing bolts or proper nailing and will allow making of proper connections.
 3. Cut out and discard defects which render a piece unable to serve its intended function.
 4. Lumber may be rejected by the Architect, whether or not it has been installed, for excessive warp, twist, bow, crook, mildew, fungus, or mold; as well as for improper cutting and fitting
- C. Stockpile materials sufficiently in advance of need to assure their availability in a timely manner for this Work.
- D. Do not permit materials not complying with the provisions of this Section to be brought onto or stored at the job site.

- E. Promptly remove non-complying materials from the job site and replace with materials meeting the requirements of this Section.
- F. Comply with preservative treated material manufacturer's product data, including product technical bulletins, product catalog installation instruction and product carton instructions for installation.
 - 1. ACQ treated wood scraps and cut-offs should be disposed of in a non-hazardous material lined landfill in accordance with local, state and federal regulations.
- G. Set carpentry to required levels and lines, with member's plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit.
- H. Prevent direct contact between ACQ preservative treated material and aluminum. Maintain minimum of 1/4-inch space between treated wood and aluminum building components using polyethylene or nylon spacers, or maintain separation using minimum 10-mil. thick polyethylene film.
- I. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view.
- J. Metal Framing Anchors: Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- K. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- L. Comply with AWWA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
 - 1. Use inorganic boron for items that are continuously protected from liquid water.
 - 2. Use copper naphthenate for items not continuously protected from liquid water.

3.2 PLYWOOD SUBSTOOLS FOR EXTERIOR

- A. Install plywood substools required for the installation of laminated plastic window stools. Install substools to framing, using countersunk flathead screws for metal framing and common nails for wood framing. Shim as required to assure a leveled top surface.

3.3 INSTALLATION OF WOOD SPREADERS AT DOORS FRAMES

- A. During the installation of pressed metal door frames, after the steel spreader bar has been removed, install 2 x 4 wood spreaders at door opening, carefully dimensioned to permit square, true installation of door frames and doors.
- B. Spreaders shall remain in place until doors are installed.

3.4 ALIGNMENT

- A. On framing members to receive a finished surface, align the finish subsurface to vary not more than 1/8" from the plane of surfaces of adjacent furring and framing members.

3.5 INSTALLATION – ROOF NAILERS AND BLOCKING

- A. Provide anchorage for nailers as required for roof and edging in accordance with the requirements of Factory Mutual Loss Prevention Data Bulletin # 1-49 and as indicated on Contract Drawings.
- B. Secure roof nailers and blocking as indicated on the Drawings.
- C. Ensure finished height of nailers is same as top surface of roof insulation within 1/4-inch.

3.6 CONCEALED STEEL BRACKETS

- A. Install as recommended by manufacturer

3.7 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06 1053

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. The extent of Architectural Woodwork is shown on the drawings and specified herein including, but not limited to, the following:
- B. Fabrication and delivery to the site of all casework.
- C. Plastic laminate Counters, and casework.
- D. Interior wood casework to receive painted finish.
- E. Casework hardware.
- F. Interior Trim Work.
- G. Interior wood columns.
- H. Wood Cabinets and casework.

1.3 SUBMITTALS

- A. Shop Drawings: Submit shop drawings on all items of architectural woodwork as called for in the Supplementary Conditions. Details shall be drawn in related or dimensional position with sections shown at full or quarter size.
- B. Brochures: Submit manufacturer's descriptive literature of specialty items not manufactured by the architectural woodworker but included as part of his work.
- C. Samples: Submit three samples of each species, cut and finish for woodwork which is to receive a transparent finish. Submit 18" long samples full member width and thickness (6" wide if plywood) finished - as specified on one face, on edge and one end. Submit three 12" square samples of each type and surface finish of plastic laminate. Samples will be reviewed by the Architect for appearance

only. Compliance with other requirements is the exclusive responsibility of the Contractor. Cabinet hardware; one unit of each type.

- D. Submit two copies of certificates signed by the mill or woodwork shop, certifying that the architectural woodwork complies with the Quality Standard and Grade and other requirements as specified.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of woodwork.
- B. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards."
- C. Solid Polymer Allowable Tolerances:
- D. Variation in sheet dimension. 2%.
- E. Variation in sheet thickness, 10%.
- F. Location of openings, 1/8"
- G. Variation in overall component size, 1/8".

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. LEED Submittals:
- C. Product Data for Credit EQ 4.4:
- D. For each composite-wood product used, documentation indicating that the bonding agent contains no urea formaldehyde.
- E. For each adhesive used, documentation indicating that the adhesive contains no urea formaldehyde.
- F. Certificates for Credit MR 7: Chain-of-custody certificates certifying that products specified to be made from certified wood comply with forest certification requirements. Include evidence that mill is certified for chain of custody by an FSC-accredited certification body.
- G. Include statement indicating costs for each certified wood product.
- H. Woodwork Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.6 SUBMITTALS

- A. Product data for each type of product and process specified in this section and incorporated into items of architectural woodwork during fabrication, finishing and installation, including cabinet hardware.
- B. Shop drawings showing location of each item, dimensioned plans and elevations, large-scale details, attachment devices and other components.
- C. Samples for initial selection purposes of the following in form of manufacturer's color charts consisting of actual units or sections of units showing full range colors, textures and patterns available for each type of material indicated.
- D. Plastic laminate.
- E. Factory-applied finishes.
- F. Solid Surface materials.

1.7 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Protect woodwork during transit, delivery, storage and handling to prevent damage, soiling and deterioration.
- B. Do not deliver woodwork, until painting, wet work, grinding and similar operations which could damage, soil, or deteriorate woodwork have been completed in installation areas. If, due to unforeseen circumstances, woodwork must be stored in other than installation areas, store only in areas which meet the requirements specified for installation areas.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install work until building is enclosed, wet-work is completed and nominally dry, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Do not deliver millwork materials until relative humidity in the building can be maintained between 30 percent and 50 percent maximum.
- C. The Installer must examine the substrate and the conditions under which the work under this section is to be performed, and notify the Contractor in writing of any unsatisfactory conditions. Do not proceed with work under this section until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
- D. Do not install trim or casework that has not been back primed as specified.
- E. Do not install composite interior molding until interior temperature conditions can be maintained at 60 deg F minimum and 80 deg F maximum.

- F. Field Measurements: Where woodwork is indicated to be fitted to other construction, check actual dimensions of other construction by accurate field measurements before manufacturing woodwork; show recorded measurements on final shop drawings. Coordinate manufacturing schedule with construction progress to avoid delay of work, where field measurements cannot be made without delaying of work, guarantee dimensions, and proceed with manufacture of woodwork without field measurements. Coordinate other construction to ensure that actual dimensions correspond to guaranteed dimensions.

PART- 2 PRODUCTS

2.1 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural plastic-laminate cabinets indicated for construction, finishes, installation, and other requirements.
- B. Provide certificates from AWI certification program indicating that woodwork, including installation, complies with requirements of grades specified.
- C. Grade: Custom.
- D. Type of Construction: Frameless.
- E. Cabinet, Door, and Draw Front Interface Style: Flush overlay.
- F. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by woodworking quality standard.
- G. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- H. Lab Designs.
 - I. Formica Corporation – "Premium FX".
 - J. Wilsonart Americas – "Commercial Collection".
- K. Laminate Cladding for Exposed Surfaces:
 - L. Horizontal Surfaces: Grade HGL.
 - M. Post-Formed Surfaces: Grade HGP.
 - N. Vertical Surfaces: Grade VGS.
- O. Door and Drawer Edge Banding: Color matched PVC.
- P. Pattern Direction: As indicated.

- Q. Pattern and Color: To be determined at later date.
- R. Materials for Semi-Exposed Surfaces:
- S. Surfaces Other Than Drawer Bodies: Thermoset decorative panels.
- T. Draw Sides and Backs: Thermoset decorative panels with PVC or polyester edge banding.
- U. Draw Bottoms: Thermoset decorative panels.
- V. Dust Panels: 1/4-inch plywood or tempered hardboard above compartments and draws unless located directly under tops.
- W. Solid-Surfacing Material Countertops: Homogeneous solid sheets of filled plastic resin comply with ISSFA-2.
- X. Manufacturers:
- Y. Avonite Surfaces – Acrylic Solid Surface.
- Z. Dupont Corian.
- AA. Formica Solid Surface.
- BB. Wilsonart Americas.
- CC. Edge Treatments: Double Eased Edges.
- DD. Backsplashes: Height as indicated; Coved Backsplash (1/2")
- EE. Pattern and Color: To be determined at a later date.
- FF. Solid-Surfacing-Material integral sinks:
- GG. Mounting: Seamed undermount.
- HH. Color: As selected from manufacturers full range. Provide samples for selection.
- II. Model Number: (Basis-of-Design Product model number by Dupont Polymers; Corian, unless otherwise noted):
- JJ. Sink: Model 810, 16 1/2" X 13 1/8" X 5 3/8" (accessible).

2.2 FIRE-RETARDANT-TREATED MATERIALS

- A. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Comply with performance requirements of AWPA C20 (lumber) and AWPA C27 (plywood). Use Exterior Type or Interior Type A. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Kiln-dry material after treatment.

- B. Fire-Retardant Particleboard: Panels made from softwood particles and fire-retardant chemicals mixed together at time of panel manufacture with flame-spread index of 25 or less and smoke-developed index of 25 or less per ASTM E 84.
- C. Fire-Retardant Fiberboard: ANSI A208.2 medium-density fiberboard panels made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at time of panel manufacture with flame spread index of 25 or less and smoke-developed index of 200 or less per ASTM E 84.

2.3 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural woodwork, except for items specified in Division 08 Section "Door Hardware (Scheduled by Describing Products)."
- B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, self-closing.
- C. Bar Pulls: Liberty 4", Stainless Steel bar pull, # P13456L-SS-U1
- D. Door Pulls: Richelieu, Aluminum, #31007596, 4 - 1/8" long.
- E. Catches: Push-in magnetic catches, BHMA A156.9, B03131
- F. Drawer Slides: BHMA A156.9, B05091.
- G. Heavy Duty (Grade 1HD-100 and Grade 1HD-200): Side mounted; full extension type; zinc-plated steel ball-bearing slides.
- H. Box Drawer Slides: Grade 1; for drawers, not more than 6 inches high and 24 inches wide.
- I. File Drawer Slides: Grade 1HD-200; for drawers, more than 6 inches high or 24 inches wide.
- J. Pencil Drawer Slides: Grade 1; for drawers, not more than 3 inches high and 24 inches wide.
- K. Door Locks: BHMA A156.11, E07121.
- L. Provide "Cam" style lock at each cabinet box
- M. Manufacturer: National Cabinet Lock (or approved equal).
- N. Model #: NL-C8000 series.
- O. Drawer Locks: BHMA A156.11, E07041.
- P. Provide "Cam" style lock at each cabinet box
- Q. Manufacturer: National Cabinet Lock or approved equal
- R. Model #: NL-C8000 series
- S. Push Fit Fastener

- T. Provide Push Fit fasteners as required
- U. Manufacturer: Hafele
- V. Model # Hespa frame component AS.
- W. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
- X. Satin Stainless Steel: BHMA 630.
- Y. Grommets for Cable Passage through Countertops: 2 ½" (verify with owner) molded plastic grommets and matching plastic caps with slot for wire passage.

2.4 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.

2.5 FABRICATION

- A. GENERAL: Complete fabrication to maximum extent possible before shipment to Project site. Where necessary for fitting at site, provide allowance for scribing, trimming, and fitting.
- B. Interior Woodwork Grade: Premium.
- C. Shop cut openings to maximum extent possible. Sand edges of cutouts to remove splinters and burrs. Seal edges of openings in countertops with a coat of varnish.
- D. Interior Standing and Running Trim:
- E. For transparent-finished trim items wider than available lumber, use veneered construction. Do not glue for width.
- F. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.
- G. Assemble casings in plant except where limitations of access to place of installation require field assembly.
- H. Plastic-Laminate-Faced Architectural Cabinets:
- I. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural plastic-laminate cabinets indicated for construction, finishes, installations, and other requirements.
 - a. Provide certificates from AWI certification program indicating that woodwork, including installation, complies with requirements of grades specified.

- J. Grade: Custom
- K. Type of Construction: Frameless
- L. Cabinet, Door, and Drawer Front Interface Style: Flush overlay.
- M. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicates as required by woodwork quality standard.
 - a. Manufacturers: subject to compliance with requirements, provide products by one of the following:
 - i. Formica Corporation.
 - ii. Panolam Industries; Nevamar
 - iii. Panolam Industries; Pionite.
 - iv. Wilsonart International Holdings, Inc.
- N. Laminate Cladding for Exposed Surfaces:
 - a. Horizontal Surfaces: Grade HGL.
 - b. Post formed Surfaces: Grade HGP.
 - c. Vertical Surfaces: Grade VGS.
 - d. Door and Drawer Edge Banding: Color Matches PVC.
 - e. Pattern Direction: As indicated.
 - f. Pattern and Color: As shows in Drawings.
- O. Materials for Semi-Exposed Surfaces: (Kitchens).
 - a. Surfaces Other Than Drawer Bodies: Thermoset decorative panels.
 - b. Drawer Sides and Backs: Thermoset decorative panels with PVC or polyester edge banding.
 - c. Drawer Bottoms: Thermoset decorative panels.
- P. PVC Edge Banding: Polyvinyl chloride edge banding made from thermoplastic resin. Color as chosen from manufacturer's full range of color samples.
- Q. Dust Panels: 1/4 -inch plywood or tempered hardboard above compartments and drawers unless located directly under tops.

- R. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of expose laminate surfaces complying with the following requirements.
 - a. As Indicated by laminate manufacturer's designations.
- S. Plastic-Laminate Countertops/Shelves:
- T. High-Pressure Decorative Laminate Grade: HGS.
- U. Colors, Patterns, and Finishes: Refer to Finish Matrix.
- V. Edge Treatment: Vinyl edge banding to match adjacent laminate.
- W. Solid-Surfacing-Material Countertops:
- X. Solid-Surfacing-Material Thickness: 1/2 inch.
- Y. Colors, Patterns, and Finishes: As indicated on Finish Matrix or as selected by Architect from manufacturer's full range.
- Z. Fabricate tops in one piece with shop-applied backsplashes. Comply with solid surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.
- AA. Solid-Surfacing-Material Sinks:
- BB. Solid-Surfacing-Material Thickness: As indicated by manufacturer's designations.
- CC. Colors, Patterns, and Finishes: As indicated on Finish Matrix or as selected by Architect from manufacturer's full range.
- DD. Install integral sink bowls in countertops in shop.
- EE. Mounting: Seamed undermount.
- FF. Tackboard:
- GG. All-Natural Tacking surface by Claridge or equal.
- HH. Color by Architect from full color range.

2.6 SHOP FINISHING

- A. Finish architectural woodwork at fabrication shop. Defer only final touchup, cleaning, and polishing until after installation.
- B. Back priming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to back of paneling.
- C. Transparent Finish:

- D. Grade: Premium.
- E. AWI Finish System: Catalyzed vinyl.
- F. Staining: Match approved sample for color.
- G. Wash Coat for Stained Finish: Apply a wash-coat sealer to woodwork made from closed-grain wood before staining and finishing.
- H. Open-Grain Woods: After staining (if any), apply paste wood filler to open-grain woods and wipe off excess. Tint filler to match stained wood.
- I. Sheen: Semi-gloss, 46-60 gloss units measured on 60-degree gloss meter per ASTM D 523.

PART- 3 EXECUTION

3.1 GENERAL

- A. Only experience and capable foremen and an adequate crew of skilled mechanics experienced in erecting finish carpentry and millwork shall be employed.
- B. To permit fabricator of millwork to utilize his manufacturing process to best advantage, exact details of millwork construction are not always shown on drawings, but it is the intent of these specifications to secure a first-class finished product in all respects.
- C. Fabricate millwork completely at shop as far as possible, and deliver ready to set in largest units consistent with convenient erection.
- D. Work material in best manner, thoroughly blocked, mortised, tenoned, doweled and glued to require minimum use of nails or screws. All fastenings to be concealed.
- E. Provide all millwork with fine sandpaper finish ready for painting and finishing. No sanding across grain permitted.
- F. Round all exposed edges or corners of millwork on 1/16" radius unless otherwise shown on drawings.
- G. Seal all edges of MDF.

3.2 INSTALLATION

- A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas. Examine shop-fabricated work for completion and complete work as required, including removal of packing and back priming.
- B. Grade: Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.

- C. Install woodwork level, plumb, true, and straight to a tolerance of 1/8 in. Shim as required with concealed shims.
- D. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.
- F. Standing and Running Trim: Install with minimum number of joints possible, using full length pieces (from maximum length of lumber available) to greatest extent possible. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base if finished.
- G. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation.
- H. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c. with No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish. Provide decorative washers at cabinet interiors.
- I. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop. Calk space between backsplash and wall with sealant specified in Division 07 Section "Joint Sealants."

3.3 FINISHING

- A. For finishes of other millwork see Division 099000.

3.4 PROTECTION

- A. Cover casework with 4-mil polyethylene film, for protection against soiling and deterioration during remainder of construction period.

END OF SECTION 06 4000

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SECTION INCLUDES

- A. Provide solid surfacing fabrications including but not limited to following:
 - 1. Lavatory or laboratory tops with seamed bowls.
 - 2. Lavatory or laboratory tops with undermount bowls.
 - 3. Lavatory or laboratory tops with integral bowls.
 - 4. Vanity tops.
 - 5. Millwork counter tops with sinks and cove backsplashes.

1.3 RELATED SECTIONS:

- A. Following description of work is included for reference only and shall not be presumed complete:
 - 1. Waste management and disposal requirements: Section 01 7419, Waste Management and Disposal.
 - 2. Provision of finish carpentry and architectural woodwork: Section 06 4000, Architectural Woodwork.
 - 3. Provision of elastomeric joint sealants: Section 07 9200, Joint Sealants.
 - 4. Provision of tile work: Section 09 3000, Tiling.
 - 5. Provision of plumbing and plumbing fixtures: Division 22, Plumbing.

1.4 REFERENCES

- A. Abbreviations and Acronyms:

1. LEED®: Leadership in Energy and Environmental Design; www.cagbc.org.
2. MDF: Medium Density Fiberboard.
3. SCAQMD: South Coast Air Quality Management District; www.aqmd.gov.
4. VOC: Volatile Organic Compound.

B. Definitions:

1. Solid Surface: Non-porous, homogeneous material maintaining the same composition throughout the part with a composition of acrylic polymer, aluminum trihydrate filler and pigment.

1.5 REFERENCE STANDARDS:

- | | | |
|----|----------------------------------|--|
| A. | ANSI/NPA A208.2-09 | - Medium Density Fiberboard (MDF) For Interior Applications |
| B. | ASTM C920-14a | - Standard Specification for Elastomeric Joint Sealants |
| C. | ASTM D638-10 | - Standard Test Method for Tensile Properties of Plastics |
| D. | ASTM D785-08 | - Standard Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials |
| E. | ASTM D790-10 | - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials |
| F. | ASTM D5420-10 | - Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight (Gardner Impact) |
| G. | ASTM E84-14 | - Standard Test Method for Surface Burning Characteristics of Building Materials |
| H. | ASTM E228-11 | - Standard Test Method for Linear Thermal Expansion of Solid Materials with a Push-Rod Dilatometer |
| I. | ASTM G21-13 | - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi |
| J. | ASTM G22-76(96) | - Standard Practice for Determining Resistance of Plastics to Bacteria |
| K. | ASTM G155-13 | - Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials |
| L. | CSA B45.5-11/
IAPMO Z124-2011 | - Plastic Plumbing Fixtures |

- | | | |
|----|--|--|
| M. | NFPA 255-06 | - Standard Method of Test of Surface Burning Characteristics of Building Materials |
| N. | NSF/ANSI 51-07 | - Food Equipment Materials |
| O. | SCAQMD Rule 1168 | - Adhesive and Sealant Applications (amended January 2005) |
| P. | UL 723 | - Standard for Test for Surface Burning Characteristics of Building Materials |
| Q. | UL Environment/
GREENGUARD
UL 2818 | - Standard for Chemical Emissions for Building Materials,
- Finishes and Furnishings, Section 7.1 |
| R. | UL Environment/
GREENGUARD
UL 2818 | - Gold Standard for Chemical Emissions for Building Materials,
- Finishes and Furnishings, Section 7.1 and 7.2 |
| S. | UL 2824 | - GREENGUARD Certification Program, Method for Measuring Microbial Resistance from Various Sources Using Static Environmental Chambers |

1.6 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meetings: Arrange preinstallation meeting 1 week prior to commencing work with all parties associated with trade as designated in Contract Documents or as requested by Architect. Presided over by Contractor, include Architect who may attend, Subcontractor performing work of this trade, Owner's representative, testing company's representative and consultants of applicable discipline. Review Contract Documents for work included under this trade and determine complete understanding of requirements and responsibilities relative to work included, storage and handling of materials, materials to be used, installation of materials, sequence and quality control, Project staffing, restrictions on areas of work and other matters affecting construction, to permit compliance with intent of work of this Section.

1.7 SUBMITTALS

- A. Product Data: Indicate Product description including solid surface sheets, sinks, bowls and illustrating full range of standard colors, fabrication information and compliance with specified performance requirements. Submit Product data with resistance to list of chemicals.
- B. Shop Drawings: Submit Shop Drawings for work of this Section in accordance with Section 01 3000. Indicate plans, sections, dimensions, component sizes, edge details, thermosetting requirements, fabrication details, attachment provisions, sizes of furring, blocking, including concealed blocking and coordination requirements with adjacent work. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, waste receptacles and other items installed in solid surface.

- C. Coordination Drawings: Submit coordination drawings indicating plumbing and miscellaneous steel work indicating locations of wall rated or non-rated, blocking requirements, locations and recessed wall items and similar items.
- D. Samples: Submit samples in accordance with Section 01 3000. Submit minimum 6" x 6" samples. Cut sample and seam together for representation of inconspicuous seam. Indicate full range of color and pattern variation. Approved samples will be retained as standards for work.
- E. Test and Evaluation Reports: Submit flammability test reports.

1.8 CLOSEOUT SUBMITTALS

- A. Operational and Maintenance Data:
 - 1. Submit manufacturer's care and maintenance data, including repair and cleaning instructions. Include in Project closeout documents.
 - 2. Provide a commercial care and maintenance kit and video. Review maintenance procedures and warranty details with Owner upon completion.

1.9 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Installers: Provide work of this Section executed by competent installers with minimum 5 years experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.
- B. Mock-Ups:
 - 1. Prior to final approval of Shop Drawings, erect 1 full size mock-up of each component at Project site demonstrating quality of materials and execution for Architect review.
 - 2. Should mock-up not be approved, rework or remake until approval is secured. Remove rejected units from Project site.
 - 3. Approved mock-up will be used as standard for acceptance of subsequent work.
 - 4. Approved mock-ups may remain as part of finished work.

1.10 DELIVERY, STORAGE AND HANDLING

- A. Delivery and Acceptance Requirements: Deliver no components to Project site until areas are ready for installation.
- B. Storage and Handling Requirements:

1. Store components indoors prior to installation.
2. Handle materials to prevent damage to finished surfaces.

1.11 WARRANTY

- A. Manufacturer Warranty: Provide manufacturer's standard warranty for material only for period of 10 years against defects and/or deficiencies in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Architect and at no expense to Owner.

PART- 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer List: Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:
 1. Corian® by DuPont; www.corian.com
 2. Trinseo Aristech Surfaces, LLC., Avonite
 3. Wilsonart Contract; www.wilsonartcontract.com
- B. Substitution Limitations: This Specification is based on Avonite Products. Comparable Products from manufacturers listed herein will be accepted provided they meet requirements of this Specification.

2.2 MATERIALS

- A. Avonite
 1. Color: New Concrete, #7842.
- B. Performance/Design Criteria:

Property	Requirement (min or max)	Test Procedure
1. Solid Surface Based Products:		
a. Tensile Strength	6000 psi min	ASTM D638

b. Tensile Modulus	1.5 x 10 ⁶ psi min	ASTM D638
c. Tensile Elongation	0.4% min.	ASTM D638
d. Flexural Strength	10000 psi min	ASTM D790
e. Flexural Modulus	1.2 x 10 ⁶ psi min	ASTM D790
f. Hardness	>85-Rockwell "M" scale min.	ASTM D785
g. Thermal Expansion	2.2 x 10 ⁻⁵ in./in./°F	ASTM E228
h. Fungi and Bacteria	Does not support microbial growth	ASTM G21 & G22
i. Microbial Resistance	Highly resistant to mold growth	UL 2824
j. Ball Impact	No fracture - 1/2 lb. Ball: 6 mm slab - 36" drop 12 mm slab - 144" drop	NEMA LD 3, Method 3.8
k. Weatherability	ΔE*94<5 in 1,000 hrs	ASTM G155
l. Flammability		ASTM E84, NFPA 255 & UL 723

All Colors

	6 mm	12 mm	
m. Flame Spread	<25	<25	
n. Smoke Developed	<25	<25	
o. Class	A	A	NFPA 101®, Life Safety Code

C. Solid Surface Material:

1. Non-porous, homogeneous material maintaining the same composition throughout the part with a composition of acrylic polymer, aluminum trihydrate filler and pigment; not coated, laminated or of composite construction; meeting following criteria:
2. Flammability: Class 1 and A when tested to UL 723.
3. Food Equipment Material Compliance: Food Zone to NSF/ANSI 51.
 - a. Ensure material has minimum physical and performance properties specified under "Performance/Design Criteria".
 - b. Ensure superficial damage to a depth of 0.010" is repairable by sanding and polishing.

- D. Adhesive for Bonding to Other Products: One component silicone to ASTM C920.
- E. Sealant: A standard mildew-resistant, FDA/UL® [and NSF/ANSI 51 compliant in Food Zone area,] recognized silicone color matched sealant or clear silicone sealants.
- F. Sink/Bowl Mounting Hardware: Manufacturer's approved bowl clips, brass inserts and fasteners for attachment of undermount sinks/bowls.
- G. Heat Reflecting Tape: Manufacturer's standard aluminum foil tape, with required thickness, for use with cutouts near heat sources.
- H. Insulating Nomex® Fabric: Manufacturer's standard for use with conductive tape in insulating solid surface material from adjacent heat source.

2.3 COMPONENTS

- A. Window Sills: 1/2" thick solid surfacing material, adhesively joined with inconspicuous seams, edge details as indicated on Drawings. Color selected later by Architect from manufacturer's full color range.
- B. Counter Perimeter Frame: Ensure 1/2" [3/4"] thick, moisture resistant [cores for counter tops in wet areas having sinks or lavatories are 3/4" thick exterior grade plywood with waterproof adhesive, Fir or Poplar plywood, veneer core only.] [MDF core conforming to ANSI/NPA A208.2 balanced design, manufactured from recycled materials, meeting ANSI Standards for emissions, of minimum density of 48 lb/cu ft and surface character to match sample approved by Architect. Ensure fire retardant Product contains fire-retardant chemicals injected with raw materials during manufacturing and achieves a maximum flame-spread rating of 25 with a maximum smoke development of 200 when tested to ASTM E84.]
- C. Lavatory Tops with Seamed Bowls: 1/2" [3/4"] thick countertop of [solid polymer] [100% acrylic] [polyester-acrylic blend] solid surfacing material, cast to desired profiles and sizes having edge details as indicated on Drawings conforming to CSA B45.5/IAPMO Z124, complete with [seamed "S" undermount] bowl. Provide countertops complete with backsplashes of size shown on Drawings. Ensure countertop and backsplash is [] color; [single color] [maximum 2, 3 or 4 colors] [non-coved] [coved] as selected by Architect. Ensure [5] bowls are [] model.
- D. Lavatory Tops with Undermount Bowls: 1/2" [3/4"] thick countertop of [solid polymer] [100% acrylic] [polyester-acrylic blend] solid surfacing material, cast to desired profiles and sizes having edge details as indicated on Drawings conforming to CSA B45.5/IAPMO Z124, complete with [1] undermount bowl. Provide countertops complete with backsplashes of size shown on Drawings. Use undermount hardware according to manufacturer's instructions. Ensure vanity top and backsplash is [] color; [single color] [maximum 2, 3 or 4 colors] [non-coved] [coved] as selected by Architect. Ensure bowl[s] is/are [] model and [] color.
- E. Lavatory Tops with Integral Bowls: Molded countertop of solid polymer material [19-1/2"] [22"], complete with integrally molded bowl[s] of solid polymer material; edge details as indicated on Drawings. Provide with [non-coved] [coved] backsplash [and endsplashes] as shown on Drawings. Provide [] model and [] color.
- F. Fabrication:

1. Fabricate components in shop to greatest extent practical to sizes and shapes indicated, in accordance with approved Shop Drawings and solid polymer manufacturer requirements. Form joints between components using manufacturer's standard joint adhesive without conspicuous joints. Provide factory cutouts for plumbing fittings and bath accessories as indicated on Drawings.
2. Where indicated, thermoform corners and edges or other objects to shapes and sizes indicated on Drawings, prior to seaming and joining. Cut components larger than finished dimensions and sand edges to remove nicks and scratches. Heat entire component uniformly prior to forming.
3. Ensure no blistering, whitening and cracking of components during forming.
4. Fabricate backsplashes from solid surfacing material with optional radius cove where counter and backsplashes meet as indicated on Drawings. Backsplashes for most colors may be fabricated by traditional means discussed in K-25294 *Backsplashes*. Colors with metallic/mica particle or veined colors creating directional aesthetics (K-26833 *Directional Aesthetics*) may require the techniques in Technical Bulletin K-28235 *Thermoformed Backsplash*.
5. Fabricate joints between components using manufacturer's standard joint adhesive. Ensure joints are inconspicuous in appearance and without voids. Attach 50 mm (2") wide reinforcing strip of solid polymer material under each joint. Reinforcing strip of solid polymer material is not required when using DuPont™ Joint Adhesive 2.0.
6. Provide holes and cutouts for plumbing and bath accessories as indicated on Drawings.
7. Rout and finish component edges to a smooth, uniform finish. Rout cutouts, then sand edges smooth. Repair or reject defective or inaccurate work.
8. Finish: Ensure surfaces have uniform finish:
 - a. Matte, with a 60° gloss rating of 5 - 20.
9. Fabrication Tolerances:
 - a. Variation in Component Size: +/-1/8".
 - b. Location of Openings: +/-1/8" from indicated location.

PART- 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

1. Examine substrates and conditions, with fabricator present for compliance with requirements for installation tolerances and other conditions affecting performance of work. Proceed with installation only after unsatisfactory conditions have been corrected.

2. Verify actual site dimensions and location of adjacent materials prior to commencing work.
 3. Examine cabinets upon which counter tops are to be installed. Verify cabinets are level to within 1/8" in 10' - 0".
 4. Notify Architect in writing of any conditions which would be detrimental to installation.
- B. Evaluation and Assessment: Commencement of work implies acceptance of previously completed work.

3.2 INSTALLATION

- A. Install components plumb, level, rigid, scribed to adjacent finishes in accordance with reviewed Shop Drawings and Product installation details.
- B. Fabricate field joints using manufacturer's recommended adhesive, with joints being inconspicuous in finished work. Exposed joints/seams are not permitted. Keep components and hands clean when making joints. Reinforce field joints as specified herein. Cut and finish component edges with clean, sharp returns.
- C. Route radii and contours to template. Anchor securely to base component or other supports. Align adjacent components and form seams to comply with manufacturer's written recommendations using adhesive in color to match work. Carefully dress joints smooth, remove surface scratches and clean entire surface.
- D. Install countertops with no more than 1/8" sag, bow or other variation from a straight line.
- E. Adhere undermount/submount/bevel mount sinks/bowls to countertops using manufacturer's recommended adhesive and mounting hardware.
- F. Adhere topmount sinks/bowls to countertops using manufacturer recommended adhesives and color-coordinated silicone sealant. [Secure seam mount bowls and sinks to counter tops using color matched joint adhesive.]
- G. Seal between wall and components with joint sealant as specified herein and in Section 07 92 00, as applicable.
- H. Provide backsplashes and endsplashes as indicated on Drawings. Adhere to countertops using a standard color-coordinated silicone sealant. Adhere applied sidesplashes to countertops using a standard color-matched silicone sealant. Provide coved backsplashes and sidesplashes at walls and adjacent millwork. Fabricate radius cove at intersection of counters with backsplashes to dimensions shown on reviewed Shop Drawings. Adhere to countertops using manufacturer's standard color-coordinated joint adhesive.
- I. Keep components and hands clean during installation. Remove adhesives, sealants and other stains. Ensure components are clean on date of Substantial Completion of the Work.
- J. Coordinate connections of plumbing fixtures with Plumbing and Mechanical. Make plumbing connections to sinks in accordance with Plumbing and Mechanical.

3.3 REPAIR

- A. Repair minor imperfections and cracked seams and replace areas of severely damaged surfaces in accordance with manufacturer's "Technical Bulletins".

3.4 SITE QUALITY CONTROL

- A. Non-Conforming Work: Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Architect at no cost to Owner.

3.5 CLEANING

- A. Remove excess adhesive and sealant from visible surfaces.
- B. Clean surfaces in accordance with manufacturer's "Care and Maintenance Instructions".

3.6 PROTECTION

- A. Provide protective coverings to prevent physical damage or staining following installation for duration of Project.
- B. Protect surfaces from damage until date of Substantial Completion of the Work.

END OF SECTION 06 6116

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specifications, apply to this Section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section includes but is not limited to the following:
 - 1. Fireproofing for all beams and columns exposed and not enclosed in rated gypsum board walls or masonry.
 - a. Type 1 - Light Density Gypsum based cementitious fireproofing for concealed interior beams and columns.
 - b. Type 2 - Medium density Portland cement fireproofing for perimeter steel beams and columns.

1.3 SUBMITTALS

- A. Product data for each sprayed-on fireproofing product indicated.
- B. Certification by manufacturers that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).
- C. Thickness Schedule Indicating Building Elements to be protected with spray-applied fireproofing; extent of sprayed-on-fireproofing for each different construction and fire-resistance rating including the following:
 - 1. Applicable fire-resistive design designations of inspecting or testing agency acceptable to authorities having jurisdiction.
 - 2. Minimum thickness needed to achieve required fire-resistance ratings of structural components and assemblies.
 - 3. Test reports for sprayed-on-fireproofing from a qualified independent testing agency employed and paid by Contractor or manufacturer.

4. Provide reports indicating that physical Product certificates from fireproofing manufacturers that each sprayed-on fireproofing product indicated for Project complies with specified requirements including those for fire- test-response characteristics and compatibility with adhesives, primers, and other surface coatings on substrates indicated to receive fireproofing.

1.4 QUALITY ASSURANCE

- A. Single Source Responsibility: Obtain sprayed-on fireproofing materials from a single manufacturer for each different product required.
- B. Fire Performance Characteristics: Provide materials and construction which are identical to those tested for the following fire performance characteristics, per test method indicated, by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. See Drawings for UL System.
- C. Contractor shall have successfully completed three (3) projects with specified material.
- D. Installer Qualifications: Engage an experienced installer certified, licensed, or otherwise qualified by the sprayed-on fireproofing manufacturer as having the necessary experience, staff, and training to install manufacturer's sprayed-on fireproofing products. Contractor shall have successfully completed (3) projects with the specified materials.
- E. Provide fireproofing products containing no detectable asbestos as determined according to the method specified in 40 CFR Part 763, Subpart F, Appendix A, Section 1, Polarized Light Microscopy.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to project site in original, unopened packages with manufacturers' labels identifying products legible and intact. Include on labels name of products and manufacturers, date of manufacture and shelf life, where applicable. Also include UL labels for fire-resistance ratings applicable to project.
- B. Use materials with limited shelf life within period indicated. Remove from project site and discard any materials whose shelf life has expired.
- C. Store materials inside, under cover, above ground and in a manner to keep them dry until ready to use. Remove from project site and discard any materials that have been exposed to moisture or have otherwise deteriorated.

1.6 PROJECT CONDITIONS

- A. Environmental Conditions: Do not install sprayed-on fireproofing when ambient or substrate temperatures are 40 deg F (4.4 deg C) and falling, unless temporary protection and heat can be provided to maintain temperatures of both at or above this temperature level for 24 hours before, during and for 24 hours after application of sprayed fireproofing.

- B. Ventilation: Ventilate spray fireproofing by means of natural or, when this is inadequate, of forced air circulation during and after application until it dries thoroughly. Maintain minimum of four (4) air exchanges per hour.

1.7 SEQUENCING

- A. Sequence and coordinate application of sprayed-on fireproofing with other, related work specified in other sections to comply with the following requirements.
 - 1. Provide temporary enclosures to prevent deterioration of sprayed-on fireproofing for interior applications due to exposure to unfavorable environmental conditions.
 - 2. Avoid unnecessary exposure of sprayed-on fireproofing to abrasion and other damage likely to occur during construction operations subsequent to its application.
 - 3. Whenever possible, do not begin applying fireproofing until clips, hangers, supports, sleeves, and other items penetrating fireproofing are in place. When clips and hangers are installed after the application of the fireproofing material, patch the surrounding exposed steel and totally encapsulate the clip or hanger at a thickness equal to that being applied to the structural member.
 - 4. Defer installing ducts, piping, and other items that would interfere with applying fireproofing until fireproofing is installed.
 - 5. Do not install enclosing or concealing construction until after fireproofing has been applied, inspected, tested, and corrections have been made to any defective fireproofing.
 - 6. Protect permanently exposed walls or floors, or special surfaces.

1.8 WARRANTY

- A. General: The warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.
- B. Warranty: Submit a written warranty, executed by Contractor, and cosigned by installer, agreeing to repair or replace sprayed-on fireproofing that has failed within the specified warranty period. Failures include but are not limited to the following:
 - 1. Cracking, flaking, eroding in excess of specified requirements, peeling, and delaminating of sprayed-on fireproofing from substrates due to defective materials and workmanship within the specified warranty period.
 - 2. Not covered under the warranty are failures attributable to damage by occupants and Owner's maintenance personnel, exposure to environmental conditions other than those investigated and approved during fire-response testing, and to other causes not reasonably foreseeable under conditions of normal use.

3. Warranty Period: 2 years from date of Substantial Completion.

PART- 2 PRODUCTS

2.1 TYPE 1 CONCEALED SPRAYED-ON FIREPROOFING MATERIALS

- A. General: For concealed applications of sprayed-on fireproofing provide manufacturer's standard products complying with requirements indicated in this article or material composition and physical properties representative of installed products.
- B. Cementitious fireproofing consisting of factory-mixed, dry formulation of gypsum or Portland cement binders and lightweight mineral or synthetic aggregates mixed with water at Project site to form a slurry or mortar for conveyance and application.
- C. Provide Thickness based on Unrestrained Assemblies and designs.
- D. Products containing mineral wool fibers will not be considered for use on this project.
- E. Physical Properties: Minimum values, unless otherwise indicated or higher values required to attain designated fire-resistance ratings, measured per standard test methods referenced with each property listed below:
 1. Bond Strength: 2001bs. per sq. ft. average 150 lbs. per sq. ft. individual bond strength as determined per ASTM E 736 under the following conditions:
 2. Compressive Strength: 1440 psf as determined in the laboratory per ASTM E 761. Minimum sprayed-on fireproofing thickness tested shall be 0.75 inch and the minimum dry density shall be as specified, but not less than 15 pcf.
 3. Corrosion Resistance: No evidence of corrosion as determined per ASTM E 937.
 4. Deflection: No cracking, spalling, delamination or the like as determined per ASTM E 759.
 5. Effect of Impact on Bonding: No cracking, spalling, delamination or the like as determined per ASTM E 760.
 6. Air Erosion: Maximum weight loss of 0.005 grams per sq. ft. in 24 hours as determined per ASTM E 859. For laboratory tests, the minimum sprayed-on fireproofing thickness is 0.75 inch, the maximum dry density is 15 pcf, test specimens are not pre-purged by mechanically induced air velocities, and tests are terminated after 24 hours.
 7. Dry Density: 15 pcf for average and individual densities regardless of density indicated in referenced fire-resistive design, or greater if required to attain fire resistance ratings indicated, as determined per ASTM E 605 or Appendix A.

8. Thickness: Provide minimum average thickness required for fire-resistive design indicated, but not less than 1/2" for beams and columns, regardless of the thickness required by the given UL design assembly.
 9. Surface Burning Characteristics: Material shall exhibit the following surface burning characteristics when tested in accordance with ASTM E84: Flame Spread 0 Smoke Development 0.
 10. Resistance to Mold: The fireproofing material shall be formulated at the time of manufacturing with a mold inhibitor. Fireproofing shall be tested per ASTM G21 and shall show resistance to mold growth for a period of 21 days.
- F. Products: Subject to compliance with requirements, provide one of the following products only:
- G. Monokote Type MK-6, Construction Products Div., W.R. Grace & Co.-Conn. Or similar products meeting the performance requirements of this specification by the Pyrock Company, or Southwest Vermiculite.

2.2 AUXILIARY FIREPROOFING MATERIALS

- A. General: Provide auxiliary fireproofing materials that are compatible with sprayed-on fireproofing products and substrates, are approved for use indicated by manufacturer or sprayed-on fireproofing, and are approved by UL or other testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance rated designs indicated.
- B. Provide accessories to comply with manufacturer's recommendations and to meet fire resistance design and code requirements. Such accessories include, but are not limited to, any required or optional items such as Spatterkote SK-3; bonding agents, mechanical attachments; application aids such as metal lath, scrim, or netting; and Monokote Accelerator.

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, to determine if they are in satisfactory condition to receive sprayed-on fireproofing.
- B. Do not proceed with installation of fireproofing until satisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of substances which could impair bond of fireproofing, including oil, grease, rolling compounds, incompatible primers, and loose mill scale.

- B. Cover other work which might be damaged by fall-out or over spray of fireproofing materials during application. Provide temporary enclosure as required to confine spraying operations, protect the environment, and to ensure adequate ambient conditions for temperature and ventilation.
- C. Prior to application of fireproofing, a bonding agent, approved by fireproofing manufacturer, shall be applied to all concrete substrates to receive MK – 6.

3.3 INSTALLATION, GENERAL

- A. General: The application of spray fireproofing shall not commence until the roofing is completely installed and tight, and after roof traffic has ceased.
- B. Comply with fireproofing manufacturer's instructions for mixing materials, for application procedures and for types of equipment used to convey and spray-on fireproofing materials, as applicable to the particular conditions of installation and as required to achieve fire-resistance ratings indicated.
- C. Coat substrates with adhesive prior to application of fireproofing where required to achieve fire resistance ratings designated for each condition, unless greater thickness and densities are indicated.
- D. Spray textured finish with no further treatment.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: A qualified independent testing agency employed and paid by the Owner will perform field quality-control testing.
- B. Extent and Testing Methodology: Owner will provide qualified independent testing facility to test for:
 - 1. Bond Strength: ASTM E 736.
 - 2. Density: ASTM E 605.
 - 3. Thickness: ASTM E 605.
- C. Remove and replace fireproofing where test results indicate that it does not comply with specified requirements for cohesion and adhesion or for density or both.
- D. Apply additional fireproofing per manufacturer's directions where test results indicate that the thickness does not comply with specified requirements.

3.5 CLEANING, REPAIR, AND PROTECTION

- A. Cleaning: Immediately upon completion of spraying operations in each containable area of project, remove over-spray and fall-out of materials from surfaces of other work and clean exposed surfaces to remove evidence of soiling.

- B. Cure exposed cementitious fireproofing materials in compliance with fireproofing manufacturer's recommendations to prevent premature drying.
- C. Protect fireproofing according to the advice of fireproofing manufacturer and Installer from damage resulting from construction operations or other causes so that fireproofing will be without damage or deterioration at time of substantial completion.
- D. Coordinate installation of fireproofing with other work in order to minimize the need for other trades to cut or remove fireproofing. As other trades, successively complete installation of their work, maintain protection of structure afforded by fireproofing by patching any areas which have been removed or damaged prior to concealment of fireproofing by other work.
- E. Repair or replace work which has not been successfully protected.
- F. Floors shall be left in broom clean finish.

END OF SECTION 07 2500

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to this section.
- B. Refer to other sections of the specification, drawings, and details to determine type and extent of work there is affecting the work of this section, whether or not such work specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. Section Includes:
- B. Fully adhered thermoplastic polyolefin (TPO) sheet roofing system, including roofing insulation and protection board, where indicated on the Drawings, as specified herein, and as needed for a complete and proper installation.
- C. Removal of existing roof system in areas indicated to receive new roofing system and in other areas as required to complete the work.
- D. Vapor retarder
- E. Wood nailers for roofing attachment
- F. Roof insulation
- G. Flashings
- H. Manufacturer's pre-construction and final inspection as specified herein. These inspections are to be included; additional inspections, or work incurred as a result of the final inspection shall be without additional cost to the Owner.
- I. Related Requirements:
- J. Division 06 Section "Miscellaneous Rough Carpentry": Furnishing and installing wood blocking.
- K. Division 23 Mechanical Specifications.
- L. Disposal of demolition debris and construction waste is the responsibility of Contractor. Perform disposal in manner complying with all applicable federal, state, and local regulations.
- M. Comply with the published recommendations and instructions of the roofing membrane Manufacturer.

- N. Commencement of work by the Contractor shall constitute acknowledgement by the Contractor that this specification can be satisfactorily executed, under the project conditions and with all necessary prerequisites for warranty acceptance by roofing membrane Manufacturer.

1.3 DEFINITIONS

- A. Roofing Terminology: Definitions in the current editions of ASTM D1079 and NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to work of this Section.

1.4 QUALITY ASSURANCE

- A. The manufacturer's authorized technical representative shall provide a final inspection at the completion of the project to insure, that the project has been completed in accordance with the manufacturer's requirements. Upon approval and acceptance of the project, furnish to Owner, implemented manufacturer's warranty certification.
- B. Submit Manufacturer's field quality control reports of field inspections, including, revised "as-built" shop drawings and manufacturer's final punch list.
- C. All roofing shall be as described in this Section and shall be provided and approved by the roof system manufacturer. Any materials not manufactured or provided by manufacturer shall have written approval from the manufacturer stating the materials are acceptable and are compatible with the other materials and systems required.
- D. UL Listing: Provide labeled materials which have been tested and listed by UL in "Building Materials Directory" for application indicated, with "Class A" rated materials/system for roof slopes shown.
- E. Fire Performance Characteristics: Provide insulation materials which are identical to those whose fire performance characteristics, as listed for each material or assembly of which insulation is a part, have been determined by testing, per methods indicated below, by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.
- F. The roof system manufacturer's Technical Specifications shall be considered a part of this specification and should be used as a reference for specific application procedures and recommendations. Where a conflict does exist between the manufacturer's written specifications and those procedures specified in this Section, the more stringent requirements meeting the Manufacturer's minimum requirements for the provided warranty shall apply.

1.5 SUBMITTALS

- A. Product Data
- B. Provide membrane Manufacturer's printed data sufficient to show that all components of roofing system, including insulation and fasteners, comply with the specified requirements and with the membrane Manufacturer's requirements and recommendations for the system type specified; include data for each product used in conjunction with roofing membrane.

- C. Where UL or FM requirements are specified, provide documentation that shows that the roofing system to be installed is UL-Classified or FM-approved, as applicable. Include data itemizing the components of the classified or approved system.
- D. Installation Instructions
- E. Provide Manufacturer's instructions to Installer, marked up to show exactly how all components will be installed.
- F. Where instructions allow installation options, clearly indicate which option will be used.
- G. Shop Drawings
- H. Provide roof plan indicating orientation of steel deck (if applicable), and fastener and/or adhesive layouts.
- I. Provide the roof membrane Manufacturer's standard details customized for this project for all relevant conditions, including flashings, base tie-ins, roof edges, terminations, expansion joints, penetrations, and drains.
- J. Provide copy of Pre-Installation Notice to show that Manufacturer's required Pre-Installation Notice (PIN) has been accepted and approved by the Manufacturer.
- K. Submit samples of each product to be used. (optional)
- L. Specimen Warranty
- M. Closeout Submittals
- N. Executed Warranty
- O. Maintenance data

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products in Manufacturer's original containers, dry and undamaged, with seals and labels intact and legible. Label with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Discard and legally dispose of material that cannot be applied within its stated shelf life.
- C. Store materials clear of ground and moisture with weather protective covering.
- D. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
- E. Keep combustible materials away from ignition sources.

- F. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck and/or structural overloading.
- G. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

1.7 FIELD CONDITIONS

- A. Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed in accordance with Manufacturer's written instructions and warranty requirements.

1.8 WARRANTY

- A. Provide Elevate 20-year Red Shield™ Roofing System Limited Warranty covering membrane, roof insulation, and system accessories. Comply with all warranty procedures required by Manufacturer, including notifications, scheduling, and inspections.
- B. Limit of Liability: No dollar limitation (NDL).
- C. Scope of Coverage: Repair leaks in the roofing system caused by
 - D. Ordinary wear and tear
 - E. Normal exposure to the elements
 - F. Manufacturing defect in Elevate materials
 - G. Defective workmanship used to install these materials
 - H. Damage due to winds up to 80mph
 - I. Not Covered:
 - J. Damage due to winds in excess of 80mph
 - K. Damage due to hurricanes or tornadoes
 - L. Hail
 - M. Intentional damage
 - N. Unintentional damage due to normal rooftop inspections, maintenance, or service

PART- 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Firestone Building Products; ULTRAPLY TPO XR Adhered Membrane or a comparable product by one of the following:
- B. Firestone Building products.
- C. Carlisle SynTec Incorporated.
- D. Versico Inc.
- E. Source Limitations: Obtain components including roof insulation fasteners and accessories for roofing system from same manufacturer as membrane roofing manufacturer approved by membrane roofing manufacturer.
- F. Substitution requests shall be considered in accordance with contract provisions and the performance requirements outlined in this document.

2.2 ROOFING SYSTEM DESCRIPTION

- A. Roofing System
- B. Membrane: Thermoplastic polyolefin (TPO)
- C. Thickness: As specified elsewhere
- D. Membrane Attachment: Adhered
- E. Slope: ¼:12 (2%) by means of tapered insulation or along with structural slope if present.
- F. Comply with applicable local building code requirements.
- G. Provide assembly having Underwriters Laboratories, Inc. (UL) Class A Fire Hazard Classification
- H. Provide assembly complying with Factory Mutual Corporation (FM) Roof Assembly Classification, FM Data Sheets 1-28 and 1-29, and meeting minimum requirements of FM 1-90 wind uplift rating.
- I. Vapor Barrier over deck/deck cover:
- J. Membrane: High density polyethylene sheet with SBS modified bitumen adhesive
- K. Attachment: Self-adhering
- L. Insulation (composite):
- M. Total System R-Value: 48 or greater

- N. Maximum Board Thickness: 4"
- O. Use as many layers as necessary to achieve required R-value
- P. Stagger joints in adjacent layers
- Q. Base Layer: Polyisocyanurate foam board, non-composite
- R. Attachment: Low-rise polyurethane adhesive
- S. Top Layer: Polyisocyanurate foam board, composite
- T. Attachment: Low-rise polyurethane adhesive
- U. TPO Membrane Materials
- V. Roofing and Flashing Membrane: Flexible, heat weldable sheet composed of thermoplastic polyolefin polymer and ethylene propylene rubber; complying with ASTM D 6878, with polyester weft inserted reinforcement and the following additional characteristics:
- W. Thickness: 0.080" (match existing)
- X. Color: White (match existing)
- Y. Reinforcement: Polyester, weft-inserted scrim
- Z. Sheet Width: Use widest sheet practical for jobsite conditions to minimize field seams
- AA. Acceptable Product: UltraPly™ TPO Membrane by Elevate
- BB. Membrane Fasteners: Type and size as required by roof membrane Manufacturer for roofing system and warranty to be provided; use only fasteners furnished by roof membrane Manufacturer.
- CC. Curb and Parapet Flashing: Same material as membrane, with encapsulated edge which eliminates need for seam sealing the flashing-to-roof splice; precut to 18" (457 mm) wide; UltraPly™ TPO 18" Curb Flashing.
- DD. Formable Flashing: Non-reinforced, flexible, heat weldable sheet, composed of thermoplastic polyolefin polymer and ethylene propylene rubber, color to match roof membrane; UltraPly™ TPO Unsupported Flashing by Elevate.
- EE. Factory-formed Weldable Flashing Accessories: UltraPly™ TPO Flashing (various) by Elevate.
- FF. Self-Adhering Flashing Membrane: Unsupported (non-reinforced) TPO membrane factory laminated to white seam tape; UltraPly™ TPO QuickSeam™ Flashing by Elevate.
- GG. Factory-formed Self-Adhering Flashing Accessories: UltraPly™ TPO QuickSeam™ Flashing (various) by Elevate.

- HH. Bonding Adhesive: Formulated for compatibility with TPO membrane and wide variety of substrate materials; UltraPly™ Bonding Adhesive by Elevate.
- II. Seam Edge Treatment: Clear polymer-based sealant, formulated for sealing exposed edges of membrane; UltraPly™ TPO Cut Edge Sealant by Elevate.
- JJ. Pourable Sealer: One part polyurethane; White One-Part Pourable Sealer by Elevate.
- KK. Water Block Seal: Butyl rubber sealant for use between two surfaces, not exposed; Water Block Seal S-20 by Elevate
- LL. Metal Plates and Strips used for Fastening Membrane and Insulation: Steel with Galvalume coating; corrosion-resistance meeting FM 4470 criteria
- MM. Coated Metal Plates for Induction Welding (if applicable): UltraPly™ TPO InvisiWeld™ Plate by Elevate.
- NN. Termination Bars: Aluminum bars with integral caulk ledge; 1.3" (33 mm) wide by 0.10" (2.5 mm) thick; Termination Bar by Elevate
- OO. Roof Walkway Pads: TPO pad designed to provide protection from essential rooftop services and traffic and maintain the integrity of the existing roof surface; UltraPly™ TPO Walkway Pad by Elevate.
- PP. Yellow Safety Strip: A 5.5" (140 mm) by 100' long (30 m) strip and nominal 30 mil (0.76 mm) thick yellow TPO membrane laminated to a white, cured, seam tape, compatible with TPO and EPDM; QuickSeam™ Yellow Safety Strip by Elevate.
- QQ. Roof Insulation and Cover Boards
- RR. Polyisocyanurate Board Insulation: Closed cell polyisocyanurate foam with glass reinforced mat laminated to facers, complying with ASTM C 1289 Type II Class 1, with the following additional characteristics:
 - SS. Thickness: As indicated elsewhere
 - TT. Size: 48" by 48" nominal
 - UU. R-Value (LTTR) per inch (25 mm): min. 6.2R at 40 °F (4.4 °C) and min. 5.7R at 75 °F (23.9 °C)
 - VV. Compressive Strength: 20 psi (138 kPa)
 - WW. Ozone Depletion Potential: Zero; made without CFC or HCFC blowing agents
 - XX. Acceptable Product: ISOGARD GL polyiso board insulation by Elevate.
 - YY. Composite Insulation: closed cell polyiso foam core laminated to ½" (13 mm) high density ISOGARD HD board:
 - ZZ. Thickness: As indicated elsewhere
 - AAA. Size: 48" by 48" nominal

- BBB. Compressive Strength: 20 psi (138 kPa) core with 80 psi (552 kPa) board
- CCC. Ozone Depletion Potential: Zero; made without CFC or HCFC blowing agents
- DDD. Acceptable Product: ISOGARD™ HD Composite by Elevate
- EEE. Insulation Fasteners: Type and size as required by roof membrane Manufacturer for roofing system and warranty to be provided; use only fasteners furnished by roof membrane Manufacturer.
- FFF. Low Rise Foam Adhesive: Two-component, low-rise polyurethane adhesive designed to attach polyisocyanurate insulation to a variety of acceptable substrates; Twin Jet or I.S.O.Stick™ or I.S.O. Twin Pack™ or I.S.O.Spray™ R by Elevate
- GGG. Vapor Barrier
- HHH. Vapor Barrier Membrane: Comprised of SBS modified bitumen adhesive, factory-laminated to a tri-laminate woven, high-density polyethylene top surface. Release liner protecting adhesive. May be used as a temporary roof membrane for up to ninety (90) days.
 - III. Thickness: 0.0325" (0.826 mm) minimum, when tested in accordance with ASTM D 5147
- JJJ. Max Load at Break at 73 °F (23 °C): 64 lbf/in, MD (11 kN/m) 88 lbf/in, XMD (15 kN/m) when tested in accordance with ASTM D 5147
- KKK. Low Temperature Flexibility: -30 °F (-34 °C) when tested in accordance with ASTM D 5147
- LLL. Moisture Vapor Permeance, 0.02 Perms (0.92 Ng/Pa•s•m²) maximum, when tested in accordance with ASTM E 96
- MMM. Air Permeability: 0.00114 ft³/min•ft² (0.007 L/sec•m²) maximum, when tested in accordance with ASTM E 2178
- NNN. Acceptable Product: V-Force Vapor Barrier Membrane by Elevate.
- OOO. Metal Accessories
- PPP. Metal Roof Edging and Fascia: Continuous metal edge member serving as termination of roof membrane and retainer for metal fascia; watertight with no exposed fasteners; mounted to roof edge nailer
- QQQ. Wind Performance:
- RRR. Membrane Pull-Off Resistance: 100 lbs./ft (1460 N/m), minimum, when tested in accordance with ANSI/SPRI ES-1 Test Method RE-1, current edition
- SSS. Fascia Pull-Off Resistance: At least the minimum required when tested in accordance with ANSI/SPRI ES-1 Test Method RE-2, current edition
- TTT. Provide product listed in current Factory Mutual Research Corporation Approval Guide with at least FM 1-270 rating

- UUU. Description: Two-piece, 45° sloped galvanized steel sheet edge member securing top and bottom edges of formed metal fascia
- VVV. Fascia Face Height: 5" (127 mm)
- WWW. Edge Member Height Above Nailer: 1 ¼" (31 mm)
- XXX. Fascia Material and Finish: 24-gage, 0.024" (0.06 mm) galvanized steel with Kynar 500 finish in Manufacturer's standard color; matching concealed joint splice plates; factory-installed protective plastic film
- YYY. Length: minimum of 120" (3.048 m)
- ZZZ. Functional Characteristics: Fascia retainer supports while allowing for free thermal cycling of fascia
- AAAA. Acceptable Product: Appropriate Elevate pre-manufactured fascia system
- BBBB. Weldable Metal: Flexible non-reinforced thermoplastic polyolefin membrane factory laminated to hot-dipped galvanized steel, color to match roof membrane; UltraPly™ TPO Coated Metal
- CCCC. Aluminum Bar: Continuous 6063-T6 alloy aluminum extrusion with pre-punched slotted holes; miters welded; injection molded EPDM splices to allow thermal expansion
- DDDD. Anchor Bar Cleat: 20-gage, 0.036" (0.9 mm) G90 coated commercial type galvanized steel with pre-punched holes
- EEEE. Curved Applications: Factory modified
- FFFF. Fasteners: Factory-provided corrosion resistant fasteners, with drivers; no exposed fasteners permitted
- GGGG. Special Shaped Components: Provide factory-fabricated pieces necessary for complete installation, including miters, scuppers, and end caps; minimum 14" (355 mm) long legs on corner pieces
- HHHH. Scuppers: Welded watertight
 - IIII. Accessories: Provide matching brick wall cap, downspout, extenders, and other special fabrications as shown on the drawings
 - JJJJ. Parapet Copings: Formed metal coping with galvanized steel anchor/support cleats for capping any parapet wall; watertight, maintenance free, without exposed fasteners; butt type joints with concealed splice plates; mechanically fastened as indicated
- KKKK. Wind Performance:
 - LLLL. At least the minimum required when tested in accordance with ANSI/SPRI ES-1 Test Method RE-3, current edition.
- MMMM. Provide product listed in current Factory Mutual Research Corporation Approval Guide with at least FM 1-90 rating.

- NNNN. Description: Coping sections allowed to expand and contract freely while locked in place on anchor cleats by mechanical pressure from hardened stainless steel springs factory attached to anchor cleats; 8" (200 mm) wide splice plates with factory applied dual non-Curing sealant strips capable of providing watertight seal.
- OOOO. Material and Finish: 24-gage, 0.024" (0.06 mm) thick galvanized steel with Kynar 500 finish in Manufacturer's standard color; matching concealed joint splice plates; factory-installed protective plastic film.
- PPPP. Dimensions:
- QQQQ. Wall Width: As indicated on the drawings.
- RRRR. Piece Length: Minimum 144" (3.65 m).
- SSSS. Curved Application: Factory fabricated in true radius.
- TTTT. Anchor/Support Cleats: 20-gage, 0.036" (0.9 mm) thick pre-punched galvanized cleat with 12" (305 mm) wide stainless-steel spring mechanically locked to cleat at 72" (1.82 m) on center.
- UUUU. Special Shaped Components: Provide factory-fabricated pieces necessary for complete installation, including miters, corners, intersections, curves, pier caps, and end caps; minimum 14" (355 mm) long legs on corner, intersection, and end pieces.
- VVVV. Fasteners: Factory-furnished; electrolytically compatible; minimum pull out resistance of 240 lbs. (109 kg) for actual substrate used; no exposed fasteners.
- WWWW. Acceptable Product: Appropriate Elevate pre-manufactured coping system
- XXXX. Accessory Materials
- YYYY. Wood Nailers: PS 20-dimension lumber, Structural Grade No. 2 or better Southern Pine, Douglas Fir; or PS 1, APA Exterior Grade plywood; pressure preservative treated.
- ZZZZ. Width: as noted on drawings, nominal minimum, or as wide as the nailing flange of the roof accessory to be attached to it
- AAAAA. Thickness: Same as thickness of roof insulation

PART- 3 EXECUTION

3.1 GENERAL

- A. Install roofing, insulation, flashings, and accessories in accordance with roofing Manufacturer's published instructions and recommendations for the specified roofing system. Where Manufacturer provides no instructions or recommendations, follow good roofing practices and industry standards. Comply with federal, state, and local regulations.
- B. Obtain all relevant instructions and maintain copies at project site for duration of installation period.

- C. Do not start work until Pre-Installation Notice has been approved by Manufacturer as confirmation that this project qualifies for a Manufacturer's warranty.
- D. Perform work using competent and properly equipped personnel.
- E. Temporary closures, which ensure that moisture does not damage any completed section of the new roofing system, are the responsibility of the Applicator. Completion of flashings, terminations, and temporary closures shall be completed as required to provide a watertight condition.
- F. Install roofing membrane only when surfaces are clean, dry, smooth, and free of snow or ice; do not apply roofing membrane during inclement weather or when ambient conditions will not allow proper application; consult Manufacturer for recommended procedures during cold weather. Do not work with sealants and adhesives when material temperature is outside the range of 60 to 80 °F (15 to 25 °C).
- G. Protect adjacent construction, property, vehicles, and persons from damage related to roofing work; repair or restore damage caused by roofing work.
- H. Protect from spills and overspray from bitumen, adhesives, sealants, and coatings.
- I. Particularly protect metal, glass, plastic, and painted surfaces from bitumen, adhesives, and sealants within the range of wind-borne overspray.
- J. Protect finished areas of the roofing system from roofing related work traffic and traffic by other trades.
- K. Until ready for use, keep materials in their original containers as labeled by the Manufacturer.
- L. Consult membrane Manufacturer's instructions, container labels, and Safety Data Sheets (SDS) for specific safety instructions. Keep all adhesives, sealants, primers, and cleaning materials away from all sources of ignition.

3.2 EXAMINATION

- A. Examine roof deck to determine that it is sufficiently rigid to support installers and their mechanical equipment, and that deflection will not strain or rupture roof components or deform deck.
- B. Verify that surfaces and site conditions are ready to receive work. Correct defects in the substrate before commencing with roofing work. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
- C. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
- D. Examine roof substrate to verify that it is properly sloped to drains.
- E. Verify that the specifications and drawing details are workable and not in conflict with the roofing Manufacturer's recommendations and instructions; start of work constitutes acceptance of project conditions and requirements

3.3 PREPARATION

- A. Prior to proceeding, prepare roof surface so that it is clean, dry, and smooth, and free of sharp edges, fins, roughened surfaces, loose or foreign materials, oil, grease, and other materials that may damage the membrane.
- B. Fill all surface voids in the immediate substrate that are greater than 1/4" (6 mm) wide with fill material acceptable to membrane Manufacturer.
- C. Seal, grout, or tape deck joints, where needed, to prevent seepage into building.

3.4 VAPOR BARRIER INSTALLATION

- A. All substrates (except metal decks) must be primed prior to application. Use only primer supplied by membrane Manufacturer.
- B. Expanded Polystyrene, Extruded Polystyrene, Common Polyisocyanurate, Fiberglass, Wood Fiber, Perlite, and existing single-ply roofs are not acceptable substrates for SBS bitumen adhesive.
- C. Application can be made at ambient temperatures as low as 25 °F (-4 °C) as long as membrane has been stored in a heated area so that it will be between 50 °F (10 °C) and 100 °F (38 °C) at the time of application.
- D. Install with minimum 3" (76.2 mm) side laps and 6" (152.4 mm) end laps.
- E. Roll in with a 75 lb. (34 kg) roller to fully mate each roll to substrate, including all lap areas

3.5 INSULATION AND COVER BOARD INSTALLATION

- A. Install insulation in configuration and with attachment method(s) specified in PART 2, under Insulation.
- B. Install only as much insulation as can be covered with the completed roofing system before the end of the day's work or before the onset of inclement weather.
- C. Lay roof insulation in courses parallel to roof edges.
- D. Neatly and tightly fit insulation to all penetrations, projections, and nailers, with gaps not greater than 1/4" (6 mm). Fill gaps greater than 1/4" (6 mm) with acceptable insulation. Do not leave the roofing membrane unsupported over a space greater than 1/4" (6 mm).
- E. Mechanical Fastening: Using specified fasteners and insulation plates engage fasteners through insulation into deck to depth and in pattern required by Factory Mutual for specified FM Class and membrane Manufacturer, whichever is more stringent.
- F. Adhesive Attachment: Apply in accordance with membrane Manufacturer's instructions and recommendations; "walk-in" individual roof insulation boards to obtain maximum adhesive contact.

3.6 SINGLE-PLY MEMBRANE INSTALLATION

- A. Beginning at low point of roof, place membrane without stretching over substrate and allow to relax at least 30 minutes before attachment or splicing; in colder weather allow for longer relax time.
- B. Lay out the membrane pieces so that field and flashing splices are installed to shed water.
- C. Install membrane without wrinkles and without gaps or fishmouths in seams, and bond and test seams and laps in accordance with membrane Manufacturer's instructions and details.
- D. Adhered Membrane: Bond membrane sheet to substrate using membrane Manufacturer's recommended bonding material, application rate, and procedures.
- E. Edge Securement: Secure membrane at all locations where membrane terminates or goes through an angle change greater than 1:12 inches (8.3%) using mechanically fastened reinforced perimeter fastening strips, plates, or metal edging as indicated or as recommended by roofing Manufacturer. Exceptions: Round pipe penetrations less than 18" (460 mm) in diameter and square penetrations less than 4" (200 mm) square.
 - 1. Metal edging is not merely decorative; ensure anchorage of membrane as intended by roofing Manufacturer and compliant with IBC.

3.7 FLASHING AND ACCESSORIES INSTALLATION

- A. Install flashings, including laps, splices, joints, bonding, adhesion, and attachment, as required by membrane Manufacturer's recommendations and details.
- B. Metal Accessories: Install metal edgings, gravel stops, and copings in locations indicated on the drawings, with horizontal leg of edge member over membrane and flashing over metal onto membrane.
 - 1. Follow roofing Manufacturer's instructions.
 - 2. Use weldable TPO-coated metal where membrane-to-metal connections occur.
 - 3. Remove protective plastic surface film immediately before installation.
 - 4. Install water block sealant under the membrane anchorage leg.
 - 5. Flash with Manufacturer's recommended flashing sheet unless otherwise indicated.
 - 6. Where single application of flashing will not completely cover the metal flange, install additional piece of flashing to cover the metal edge.
 - 7. If the roof edge includes a gravel stop and sealant is not applied between the laps in the metal edging, install an additional piece of self-adhesive flashing membrane over the metal lap to the top of the gravel stop; apply seam edge treatment at the intersections of the two flashing sections.
 - 8. When the roof slope is greater than 1:12 (8.3%), apply seam edge treatment along the back edge of the flashing.

- C. Scuppers: Set TPO-coated metal scuppers in sealant and weld to membrane as recommended by Manufacturer.
- D. Roofing Expansion Joints: Install as shown on drawings and as recommended by roofing Manufacturer.
- E. Flashing at Walls, Curbs, and Other Vertical and Sloped Surfaces:
 - 1. Install weathertight flashing at all walls, curbs, parapets, skylights, and other vertical and sloped surfaces that the roofing membrane abuts to; extend flashing at least 8" (200 mm) above membrane surface.
 - 2. Use the longest practical flashing pieces.
 - 3. Evaluate the substrate and overlay and adjust installation procedure in accordance with membrane Manufacturer's recommendations.
 - 4. Complete the splice between flashing and the main roof sheet with specified splice adhesive before adhering flashing to the vertical surface.
 - 5. Provide termination directly to the vertical substrate as shown on roof drawings.
- F. Roof Drains:
 - 1. Taper insulation around drain to provide smooth transition from roof surface to drain. Use specified pre-manufactured tapered insulation with facer or suitable bonding surface to achieve slope; slope not to exceed Manufacturer's recommendations.
 - 2. Position membrane, then cut a hole for roof drain to allow ½" to ¾" (12 to 19 mm) of membrane to extend inside clamping ring past drain bolts.
 - 3. Make round holes in membrane to align with clamping bolts; do not cut membrane back to bolt holes.
 - 4. Apply sealant on top of drain bowl where clamping ring seats below the membrane
 - 5. Install roof drain clamping ring and clamping bolts; tighten clamping bolts to achieve constant compression.
- G. Flashing at Penetrations: Flash all penetrations passing through the membrane; make flashing seals directly to the penetration.
- H. Pipes, Round Supports, and Similar Items: Flash with specified pre-molded pipe flashings wherever practical; otherwise use specified self-curing elastomeric flashing.
- I. Pipe Clusters and Unusual Shaped Penetrations: Provide penetration pocket at least 2" (50 mm) deep, with at least 1" (25 mm) clearance from penetration, sloped to shed water.
- J. Structural Steel Tubing: If corner radii are greater than ¼" (6 mm) and longest side of tube does not exceed 12" (305 mm), flash as for pipes; otherwise, provide a standard curb with flashing.

- K. Flexible and Moving Penetrations: Provide weathertight gooseneck set in sealant and secured to deck, flashed as recommended by Manufacturer.

3.8 WALKWAY INSTALLATION

- A. Install walkways at access points to the roof, around rooftop equipment that may require maintenance, and where indicated on the drawings.
 - 1. Use specified walkway pads unless otherwise indicated.
 - 2. Walkway Pads: Adhere to the roofing membrane, spacing each pad at minimum of 1" (25 mm) and maximum of 3" (75 mm) from each other to allow for drainage.
 - 3. If installation of walkway pads over field fabricated splices or within 6" (150 mm) of a splice edge cannot be avoided, adhere another layer of flashing over the splice and extending beyond the walkway pad a minimum of 6" (150 mm) on either side.
 - 4. Prime the membrane, remove the release paper on the pad, press in place, and walk on pad to ensure proper adhesion.

3.9 FIELD QUALITY CONTROL

- A. Inspection by Manufacturer: Provide final inspection of the roofing system by a Technical Representative employed by roofing system Manufacturer specifically to inspect installation for warranty purposes (e.g., not a sales representative).
- B. Perform all corrections necessary for issuance of warranty.

3.10 CLEANING

- A. Clean all contaminants generated by roofing work from building and surrounding areas, including bitumen, adhesives, sealants, and coatings.
- B. Repair or replace building components and finished surfaces damaged or defaced due to the work of this section; comply with recommendations of Manufacturers of components and surfaces.
- C. Remove leftover materials, trash, debris, equipment from project site and surrounding areas.

3.11 PROTECTION

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Where construction traffic must continue over finished roof membrane, provide durable protection, and replace or repair damaged roofing to original condition.

- C. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- D. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07 5423

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Section, apply to work specified in this section.
- B. Refer to other sections of the specification, drawings, and detail to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 DEFINITIONS

- A. Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in fire rated wall and floor assemblies.

1.3 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

- A. Only tested firestop systems shall be used in specific locations as follows:
 - 1. Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.
 - 2. Blank openings through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.
 - 3. Openings and penetrations in fire-rated partitions or walls containing fire doors.
 - 4. Openings around structural members which penetrate floors or walls.

1.4 RELATED WORK OF OTHER SECTIONS

- A. Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - 1. Section 03 3000 - Cast-In-Place Concrete
 - 2. Section 07 8443 - Joint Firestopping
 - 3. Section 07 9000 - Sealants
 - 4. Section 09 2500 - Gypsum Drywall

5. Section 21 0000 - Fire Suppression
6. Section 22 0000 - Plumbing
7. Section 23 0000 - Heating, Ventilating, and Air Conditioning
8. Section 26 0000 - Electrical
9. Section 27 0000 - Communications

1.5 REFERENCES

- A. Test Requirements: ASTM E 814, "Standard Method of Fire Tests of Through Penetration Fire Stops"
- B. Test Requirements: UL 1479, "Fire Tests of Through-Penetration Firestops"
- C. Underwriters Laboratories (UL) of Northbrook, IL publishes tested systems in their "FIRE RESISTANCE DIRECTORY" that is updated annually.
 1. UL Fire Resistance Directory:
 - a. Firestop Devices (XHJI)
 - b. Fire Resistance Ratings (BXRH)
 - c. Through-Penetration Firestop Systems (XHEZ)
 - d. Fill, Voids, or Cavity Material (XHHW)
 - e. Forming Materials (XHKU)
- D. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments
- E. ASTM E 84, Standard Test Method for Surface Burning Characteristics of Building Materials.
- F. Inspection Requirements: ASTM E 2174, "Standard Practice for On-site Inspection of Installed Fire Stops."
- G. All major building codes: ICBO, SBCCI, BOCA, IBC
- H. NFPA 101 - Life Safety Code
- I. NFPA 70 - National Electric Code

1.6 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Provide through-penetration fire stop systems that comply with specified requirements of tested systems.

- B. Firestop System installation must meet requirements of ASTM E 814, UL 1479 or UL 2079 tested assemblies that provide a fire rating equal to that of construction being penetrated.
- C. Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.
- D. Firestop Systems do not reestablish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.
- E. For those firestop applications that exist for which no qualified tested system is available through a manufacturer, an engineering judgment derived from similar qualified tested system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineering judgment documents must follow requirements set forth by the International Firestop Council.

1.7 SUBMITTALS

- A. Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of qualified firestop systems to be used and manufacturer's installation instructions to comply with Section 01 6000 Submittals.
- B. Manufacturer's engineering judgment identification number and drawing details when no qualified tested system is available for an application. Engineering judgment must include both project name and contractor's name who will install firestop system as described in document.
- C. Submit safety data sheets provided with product delivered to job-site.

1.8 INSTALLER QUALIFICATIONS

- A. Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements. A supplier's willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.
- B. The work is to be installed by a contractor with at least one of the following qualifications:
 - 1. FM 4991 Approved Contractor
 - 2. UL Approved Contractor
 - 3. Hilti Accredited Fire Stop Specialty Contractor
- C. Firm with not less than 3 years experience with fire stop installation.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type and UL label where applicable.
- B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.
- C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.
- D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.
- E. Do not use damaged or expired materials.

1.10 PROJECT CONDITIONS

- A. Do not use materials that contain flammable solvents.
- B. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.
- C. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.
- D. Weather conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.
- E. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

PART- 2 PRODUCTS

2.1 FIRESTOPPING - GENERAL

- A. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.
- B. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.
- C. Penetrations in Fire Resistance Rated Walls: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.
 - 1. F-Rating: Not less than the fire-resistance rating of the wall construction being penetrated.

- D. Penetrations in Horizontal Assemblies: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.
 - 1. F-Rating: Minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.
 - 2. T-Rating: when penetrant is located outside of a wall cavity, minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.
 - 3. W-Rating: Class 1 rating in accordance with water leakage test per UL 1479.
- E. Penetrations in Smoke Barriers: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.
 - 1. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at both ambient and elevated temperatures.
- F. Mold Resistance: Provide penetration firestopping with mold and mildew resistance rating of zero (0) as determined by ASTM G21.
- G. Firestopping Materials are either “cast-in-place” (integral with concrete placement) or “post installed.” Provide cast-in-place firestop devices prior to concrete placement.

2.2 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with through penetration firestop systems (XHEZ) listed in Volume II of the UL Fire Resistance Directory, provide products of the following manufacturer as identified below:
 - 1. Basis of Design:
 - a. Hilti, Inc., Plano, Texas
800-879-8000
www.us.hilti.com
 - 2. Substitution requests shall be considered in accordance with contract provisions and the performance requirements outlined in this document.

2.3 MATERIALS

- A. Use only firestop products that have been UL 1479, ASTM E 814 or UL 2079 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.
- B. Pre-formed firestop devices for use with noncombustible and combustible pipes (closed and open systems), conduit, and/or cable bundles penetrating concrete floors the following products are acceptable:

1. Hilti Cast-In Place Firestop Device (CP 680-P)
 - a. Add Aerator Adaptor when used in conjunction with aerator system.
2. Hilti Cast-In Place Firestop Device (CP 680-M) for use with noncombustible penetrants.
3. Hilti Cast-in Place Firestop System for Metal Decks (CFS CID MD P) including all components as described by manufacturer for proper installation.
4. Hilti Cast-in Place Firestop System for Metal Decks (CFS CID MD M) including all components as described by manufacturer for proper installation, for use with noncombustible penetrants.
5. Hilti Tub Box Kit (CP 681) for use with tub installations.
6. Hilti Firestop Speed Sleeve (CP 653) for use with cable penetrations.
7. Hilti Firestop Drop-In Device (CFS-DID) for use with noncombustible and combustible penetrants.
8. Hilti Firestop Block (CFS-BL)
9. Hilti Closet Stub (CFS-CID CS)
- C. Sealants, caulking materials, or foams for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT), the following products are acceptable:
 1. Hilti Intumescent Firestop Sealant (FS-ONE MAX)
 2. Hilti Fire Foam (CP 620)
 3. Hilti Flexible Firestop Sealant (CP 606)
 4. Hilti Firestop Silicone Sealant Gun Grade (CFS-S SIL GG)
 5. Hilti Firestop Silicone Sealant Self Leveling (CFS-S SIL SL)
- D. Sealants or caulking materials for use with sheet metal ducts, the following products are acceptable:
 1. Hilti Silicone Sealant Gun Grade (CFS-S SIL GG)
 2. Hilti Firestop Silicone Sealant Self Leveling (CFS-S SIL SL)
 3. Hilti Flexible Firestop Sealant (CP 606)
 4. Hilti Intumescent Firestop Sealant (FS-ONE MAX)

- E. Intumescent sealants, caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe, the following products are acceptable:
 - 1. Hilti Intumescent Firestop Sealant (FS-ONE MAX)
- F. Foams, intumescent sealants, or caulking materials for use with flexible cable or cable bundles, the following products are acceptable:
 - 1. Hilti Intumescent Firestop Sealant (FS-ONE MAX)
 - 2. Hilti Fire Foam (CP 620)
 - 3. Hilti Flexible Firestop Sealant (CP 606)
 - 4. Hilti Firestop Silicone Sealant Gun Grade (CFS-S SIL GG)
 - 5. Hilti Firestop Silicone Sealant Self Leveling (CFS-S SIL SL)
- G. Non-curing, re-penetrable intumescent putty or foam materials for use with flexible cable or cable bundles, the following products are acceptable:
 - 1. Hilti Firestop Putty Stick (CP 618)
 - 2. Hilti Firestop Plug (CFS-PL)
- H. Wall opening protective materials for use with U.L. listed metallic and specified nonmetallic outlet boxes, the following products are acceptable:
 - 1. Hilti Firestop Putty Pad (CFS-P PA)
 - 2. Hilti Firestop Putty Pad (CP 617)
 - 3. Hilti Firestop Box Insert
- I. Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems), the following products are acceptable:
 - 1. Hilti Firestop Collar (CP 643N)
 - 2. Hilti Firestop Collar (CP 644)
 - 3. Hilti Wrap Strips (CP 648-E/648-S)
- J. Materials used for large openings and complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:
 - 1. Hilti Firestop Block (CFS-BL)

2. Hilti Composite Sheet (CFS-COS)
 3. Hilti Firestop Mortar (CP 637)
 4. Hilti Fire Foam (CP 620)
 5. Hilti Firestop Board (CP 675T)
- K. Non curing, re-penetrable materials used for large size/complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:
1. Hilti Firestop Block (CFS-BL)
 2. Hilti Firestop Board (CP 675T)
- L. Re-penetrable, round cable management devices for use with new or existing cable bundles penetrating gypsum or masonry walls, the following products are acceptable:
1. Hilti Firestop Speed Sleeve (CP 653) with integrated smoke seal fabric membrane.
 2. Hilti Firestop Cable Collar (CFS-CC)
 3. Hilti Firestop Sleeve (CFS-SL SK)
 4. Hilti Retrofit Sleeve (CFS-SL RK) for use with existing cable bundles.
 5. Hilti Gangplate (CFS-SL GP) for use with multiple cable management devices.
 6. Hilti Gangplate Cap (CFS-SL GP CAP) for use at blank openings in gangplate for future penetrations.
- M. For blank openings made in fire-rated wall or floor assemblies, where future penetration of pipes, conduits or cables is expected, the following products are acceptable:
1. 1. Hilti Firestop Block (CFS-BL)
 2. 2. Hilti Firestop Plug (CFS-PL)
- N. For single or cable bundles up to one inch diameter penetrating gypsum, masonry, concrete walls or wood floor assemblies the following product is acceptable:
1. Hilti Firestop Cable Disc (CFS-D)

PART- 3 EXECUTION

3.1 PREPARATION

- A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
 - 1. Verify penetrations are properly sized and in suitable condition for application of materials.
 - 2. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
 - 3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
 - 4. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
 - 5. Do not proceed until unsatisfactory conditions have been corrected.

3.2 COORDINATION

- A. Coordinate construction of openings, penetrations and construction joints to ensure that the fire stop systems are installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration fire stop systems. Coordinate construction and sizing of joints to ensure that fire-resistive joint systems are installed according to specified requirements.
- C. Coordinate fire stopping with other trades so that obstructions are not placed in the way prior to the installation of the fire stop systems.
- D. Do not cover up through-penetration fire stop and joint system installations that will become concealed behind other construction until each installation has been examined by the building inspector, per requirements of Section 109, International Building Code 2000, ed.

3.3 INSTALLATION

- A. Regulatory Requirements: Install firestop materials in accordance with UL Fire Resistance Directory.
- B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration materials.
 - 1. Seal all holes or voids made by penetrations to ensure an air and water-resistant seal.

2. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of UL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
3. Protect materials from damage on surfaces subjected to traffic.

3.4 FIELD QUALITY CONTROL

- A. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.
- B. Keep areas of work accessible until inspection by applicable code authorities.
- C. Inspection of through-penetration firestopping shall be performed in accordance with ASTM E 2174, "Standard Practice for On-Site Inspection of Installed Fire Stops" or other recognized standard.
- D. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.
- E. Manufacturer's Field Services: Contractor to ensure a manufacturer's direct representative is on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. Training will be done per manufacturer's written recommendations published in their literature and drawing details. During installation, contractor shall have manufacturer's representative provide periodic visual observations and written documentation of the results. Contact Hilti for support at 800.879.8000.

3.5 IDENTIFICATION & DOCUMENTATION

- A. The firestop contractor is to supply documentation for each single application addressed. This documentation is to identify each penetration and joint location on the entire project.
 1. The Documentation Form for through penetrations is to include:
 - a. A Sequential Location Number
 - b. The Project Name
 - c. Date of Installation
 - d. Detailed Description of the Penetration's Location
 - e. Tested System or Engineered Judgment Number
 - f. Type of Assembly Penetrated
 - g. A Detailed Description of the Size and Type of Penetrating Item
 - h. Size of Opening
 - i. Number of Sides of Assemblies Addressed

- j. Hourly Rating to be achieved.
 - k. Installer's Name
- B. Copies of these documents are to be provided to the general contractor at the completion of the project.
- C. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
 - 1. The words: "Warning: Through Penetration Firestop System – Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address and phone number.
 - 3. Through-penetration firestop system designation of applicable testing and inspecting agency.
 - 4. Date of installation.
 - 5. Through-penetration firestop system manufacturer's name.
 - 6. Installer's name.
- D. A firestop documentation manager software shall be used to document, track, and maintain the passive firestop systems throughout the construction and maintenance phase of the facility. The software solution shall be used to track and document every firestop system installed on the project and each subsequent addition, change, or removal of the firestop system. The firestop documentation shall be managed with a cloud-based software which allows the installer to use a standard smartphone or tablet device (either iOS, Android or Windows capable) to capture the relevant information for the installation. The following data shall be tracked for each penetration within the facility: product installed, system installed, date of installation, location of the penetration including a notation on the 2D plan image, F-rating, name of installer, photo (pre-installation and post-installation), and inspection status. The Owner and/ or Construction Manager may designate additional items to be tracked. The firestop documentation manager software must perform the following basic functions:
 - 1. Create multiple projects/ facilities, add/create/ remove users for each project, upload documents including UL systems, 2D floor plans, product data, engineering judgments, etc.
 - 2. Define data to track using pre-defined input fields or creating custom input fields as desired.
 - 3. Capture multiple photos for each penetration, including a pre-installation and post-installation photo.
 - 4. Scan QR Code on Hilti identification label to link the program data to a specific penetration location.
 - 5. Annotate (mark) location of penetration on 2D floor plan.
 - 6. Create reports by filtering data and utilizing report templates.

7. Online/ offline (for use in areas where data service is unavailable) synchronization of data between mobile device, online application and cloud-based system.
 8. Ability to transfer ownership of projects from one customer to another from construction phase to facility maintenance.
- E. Permanently attach Hilti identification labels to surfaces adjacent to and within 6 inches (150 mm) of firestopping edge so labels will be visible to anyone seeking to remove or change penetrating items or firestopping. Labels shall have a unique QR code for each penetration which can be scanned by the firestop documentation software to quickly identify the penetration attributes.
- F. Acceptable Software: Hilti CFS-DM, from Hilti Inc., Tulsa, OK. Tel (800) 879-8000 or Hilti (Canada) Corporation, Mississauga, Ontario (800) 363-4458 website: www.us.hilti.com or www.hilti.ca.com
1. Single Source: Obtain firestop documentation manager software and firestop systems for each type of penetration and construction condition indicated only from a single manufacturer.

3.6 ADJUSTING AND CLEANING

- A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.
- B. Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.

3.7 LABOR USE TO INSTALL FIRESTOP SYSTEMS

- A. To ensure complete harmony on the project site, the installation of each scope of work is to be performed jurisdictionally correct per existing trade agreements.

3.8 SCHEDULE OF THROUGH PENETRATION FIRESTOP SYSTEMS

CONCRETE FLOORS			CONCRETE OR BLOCK WALLS		
TYPE OF PENETRANT	F-RATING (HR)	BASIS OF DESIGN UL SYSTEM	TYPE OF PENETRANT	F-RATING (HR)	BASIS OF DESIGN UL SYSTEM
CIRCULAR BLANK OPENINGS	1	F-A-0006, C-AJ-0055, C-AJ-0090	CIRCULAR BLANK OPENINGS	1	C-AJ-0055, C-AJ-0090
	2	F-A-0006, C-AJ-0055, C-AJ-0090		2	C-AJ-0055, C-AJ-0090
	3	F-A-0006, C-AJ-0055, C-AJ-0086,		3	C-AJ-0055, C-AJ-0086
SINGLE METAL PIPES OR CONDUIT	1	C-AJ-1226, F-A-1028, F-A-1017	SINGLE METAL PIPES OR CONDUIT	1	C-AJ-1226, W-J-1067, W-J-1020
	2	C-AJ-1226, F-A-1028, F-A-1017		2	C-AJ-1226, W-J-1067, W-J-1020, W-J-1248
	3	C-AJ-1226, F-A-1017		3	C-AJ-1226, W-J-1041, W-J-1068
	4	C-BJ -1037, C-BJ-1034		4	C-BJ-1034, C-BJ-1037, W-J-1041, W-J-1042, W-J-1068
SINGLE NON-METALLIC PIPE OR CONDUIT (I.E. PVC, CPVC, ABS, FRP, ENT)	1	F-A-2053, F-A-2025, C-AJ-2109, C-AJ-2098, C-AJ-2271, C-AJ-2167,	SINGLE NON-METALLIC PIPE OR CONDUIT (I.E. PVC, CPVC, ABS, FRP, ENT)	1	C-AJ-2109, C-AJ-2098, C-AJ-2167, C-AJ-2371, C-AJ-2342
	2	C-AJ-2098, C-AJ-2271, C-AJ-2167, C-BJ-2021, C-AJ-2371, C-AJ-2342		2	C-AJ-2109, C-AJ-2098, C-AJ-2167, C-AJ-2371, C-AJ-2342
	3	F-A-2054, C-AJ-2109, C-AJ-2098, C-AJ-2371, C-AJ-2342		3	C-AJ-2109, C-AJ-2098, C-AJ-2371, C-AJ-2342
	4	C-BJ 2016, C-AJ-2017		4	W-J-2057, W-J-2091
SINGLE/CABLE BUNDLES	1	F-A-3007,C-AJ-3095,C-AJ-3180, C-AJ-3283	SINGLE/CABLE BUNDLES	1	W-J-3036, C-AJ-3095, C-AJ-3180, W-J-3060, W-J-3167
	2	F-A-3007,C-AJ-3095,C-AJ-3334, F-A-3060		2	W-J-3036, C-AJ-3095, C-AJ-3180, W-J-3060, W-J-3167, W-J-3189
	3	F-A-3007, C-AJ 3095, C-AJ-3285		3	C-AJ-3095, C-AJ-3180, W-J-3167
				4	W-J-3050
CABLE TRAY	1	C-AJ-4034, C-AJ-4035	CABLE TRAY	1	W-J-4027, C-AJ-4034, C-AJ-4035
	2	C-AJ-4034, C-AJ-4035		2	W-J-4027, C-AJ-4034, C-AJ-4035
	3	C-AJ-4034, C-AJ-4035		3	C-AJ-4034, C-AJ-4035
				4	W-J-8007
SINGLE INSULATED PIPES	1	F-A 5015, F-A 5017, C-AJ-5090, C-AJ-5091, C-AJ-5090, C-AJ-5048	SINGLE INSULATED PIPES	1	C-AJ-5090, C-AJ-5091, C-AJ 5061, W-J-5042
	2	F-A 5015, F-A 5017, C-AJ-5090, C-AJ-5091, C-AJ-5090		2	C-AJ-5090, C-AJ-5091, C-AJ-5061, W-J-5042

	3	F-A 5016, C-AJ-5090, F-A-5018		3	C-AJ-5090, C-AJ-5061
	4	C-BJ-5006		4	C-BJ-5006, W-J-5028
ELECTRICAL BUSWAY	1	C-AJ-6006, C-AJ-6017, F-A-6002, C-AJ-6036	ELECTRICAL BUSWAY	1	C-AJ-6006, C-AJ-6017, C-AJ-6036
	2	C-AJ-6006, C-AJ-6017, F-A 6042, C-AJ-6036		2	C-AJ-6006, C-AJ-6017, C-AJ-6036
	3	C-AJ-6006, C-AJ-6017		3	C-AJ-6006, C-AJ-6017
MECHANICAL DUCTWORK WITHOUT DAMPERS NON-INSULATED	1	C-AJ-7046, C-AJ-7051, C-AJ-7084	MECHANICAL DUCTWORK WITHOUT DAMPERS NON-INSULATED	1	C-AJ-7046, C-AJ-7051, W-J-7021, W-J-7022
	2	C-AJ-7046, C-AJ-7051, C-AJ-7085		2	C-AJ-7046, C-AJ-7051, W-J-7021, W-J-7022
	3	C-AJ-7046, C-AJ-7051		3	C-AJ-7046, C-AJ-7051
MECHANICAL DUCTWORK WITHOUT DAMPERS INSULATED	N/A**	N/A**	MECHANICAL DUCTWORK WITHOUT DAMPERS INSULATED	1	W-J-7029, W-J-7124
				2	W-J-7091, W-J-7112, W-J-7124
MIXED PENETRANTS	1	C-AJ 8099, C-AJ-8056, C-AJ-8143	MIXED PENETRANTS	1	C-AJ 8099, C-AJ 8056, W-J 8007, C-AJ 8143
	2	C-AJ-8099, C-AJ-8056, C-AJ-8143		2	C-AJ 8099, C-AJ 8056, W-J 8007, C-AJ 8143
	3	C-AJ-8099, C-AJ-8056		3	C-AJ 8041, C-AJ 8056, W-J 8007, C-AJ 8099
	4	C-AJ-8095		4	C-AJ 8095, W-J 8007
WOOD FLOORS			GYPSUM WALLS		
TYPE OF PENETRANT	F-RATING (HR)	BASIS OF DESIGN UL SYSTEM	TYPE OF PENETRANT	F-RATING (HR)	BASIS OF DESIGN UL SYSTEM
METAL PIPES OR CONDUIT	1	F-C-1009, F-C-1059, F-C-1168	METAL PIPES OR CONDUIT	1	W-L-1054, W-L-1058, W-L-1164, W-L-1506
	2	F-C-1009, F-C-1059, F-C-1168		2	W-L-1054, W-L-1058, W-L-1164, W-L-1506
				4	W-L-1110, W-L-1111, W-L-1165
NON-METALLIC PIPE OR CONDUIT	1	F-C-2232, F-C-2030, F-C-2160, F-C-2389	NON-METALLIC PIPE OR CONDUIT	1	W-L-2078, W-L-2075, W-L-2128
	2	F-C-2029, F-C-2030, F-C-2128, F-C-2160		2	W-L-2078, W-L-2075, W-L-2128
				4	W-L-2184, W-L-2245
SINGLE OR BUNDLED CABLES	1	F-C-3012, F-C-3110, F-C-3044	SINGLE OR BUNDLED CABLES	1	W-L-3065, W-L-3111, W-L-3112, W-L-3334, W-L-3414, W-L-3396
	2	F-C-3012, F-C-3110		2	W-L-3065, W-L-3111, W-L-3112, W-L-3334, W-L-3414, W-L-3396
				3	W-L-3385, W-L-3277
				4	W-L-3139, W-L-3334

INSULATED PIPES	1	F-C-5004, F-C-5037, F-C-5036	CABLE TRAY	1	W-L-4011, W-L-4019, W-L-4081
				2	W-L-4011, W-L-4019, W-L-4081
				4	W-L 8014
	2	F-C-5004, F-C-5037	INSULATED PIPES	1	W-L-5028, W-L-5029, W-L-5047
				2	W-L-5028, W-L-5029, W-L-5047
				4	W-L-5073
NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	F-C-7013	NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	W-L 7017, W-L-7040, W-L-7042, W-L-7155
				2	W-L-7040, W-L-7042, W-L-7155
INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	N/A**	INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	W-L-7059, W-L-7153, W-L-7156, W-L-7151
	2	N/A**		2	W-L-7059, W-L-7153, W-L-7156, W-L-7151
MIXED PENETRANTS	1	F-C-8009, F-C-8014, F-C-8026	MIXED PENETRANTS	1	W-L-1095, W-L-8013
				2	W-L-1095, W-L-8013
				4	W-L-8014

COMPOSITE METALDECK FLOORS

TYPE OF PENETRANT	FLOOR COVERAGE	F-RATING (HR)	BASIS OF DESIGN UL SYSTEM
CIRCULAR BLANK OPENINGS	2-1/2"	2	F-A-0040
	4-1/2"	2	F-A-0040, F-A-0041
SINGLE METALLIC PIPE OR CONDUIT (STEEL, IRON, COPPER)	2-1/2"	2	F-A-1192, F-A-1193
	4-1/2"	3	F-A-1192, F-A-1193
	4-1/2"	2	F-A-1194
SINGLE NON-METALLIC PIPE OR CONDUIT (I.E. PVC, CPVC, ABS, FRP, ENT)	2-1/2"	2	F-A-2310, FA-2311
	4-1/2"	2	F-A-2313, F-A-2314, F-A-2315, F-A-2316
	4-1/2"	3	F-A-2310, FA-2311, F-A-2312
SINGLE/CABLE BUNDLES	2-1/2"	3	F-A-3071, F-A-3072
SINGLE INSULATED PIPES	2-1/2"	2	F-A-5069, F-A-5070, F-A-5071
	4-1/2"	3	F-A-5069, F-A-5070, F-A-5071
MIXED PENETRANTS	4-1/2"	3	F-A-8055

END OF SECTION 07 8413

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Section, apply to work specified in this section.
- B. Refer to other sections of the specification, drawings, and detail to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 DEFINITIONS

- A. Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in fire rated wall and floor assemblies.

1.3 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

- A. Only tested and listed firestop systems shall be used in specific locations as follows:
 - 1. Safing slot gaps between edge of floor slabs and perimeter curtain walls.
 - 2. Openings between structurally separate sections of wall or floors.
 - 3. Gaps between the top of walls and ceilings or roof assemblies.
 - 4. Expansion joints in walls and floors.

1.4 RELATED WORK OF OTHER SECTIONS

- A. Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - 1. Section 03 3000 - Cast-In-Place Concrete
 - 2. Section 07 8413 - Penetration Firestopping
 - 3. Section 07 9000 – Sealants
 - 4. Section 09 2500 - Gypsum Drywall

1.5 REFERENCES

- A. Underwriters Laboratories, Inc. (UL) Fire Resistance Directory, Volume II, updated annually:
 - 1. Joint Systems (XHBN)
 - 2. Perimeter Fire Containment Systems (XHDG)
 - 3. Fire Resistance Ratings (BXRH)
 - 4. Fill, Voids, or Cavity Material (XHHW)
 - 5. Forming Materials (XHKU)
- B. Omega Point Laboratories, Inc. (OPL) Listed Products Directory, Volume II, updated annually:
 - 1. Fire Resistant Joint Systems
- C. ASTM E 1966, "Standard Test Method for Fire-Resistive Joint Systems"
- D. ASTM E 1399, "Test Method for Cyclic Movement and Measuring the Minimum and Maximum Joint Width of Architectural Joint Systems"
- E. ASTM E 84, "Standard Test Method for Surface Burning Characteristics of Building Materials"
- F. ASTM E 2174, "Standard Practice for On-Site Inspection of Installed Fire Stops"
- G. ASTM E 2307, "Standard Test Method for Determining the Fire Endurance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus."
- H. ANSI/UL 2079, "Tests for Fire Resistance of Building Joint Systems"
- I. ASTM D6904, "Standard Practice for Resistance to Wind-Driven Rain"
- J. International Firestop Council Recommended (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments
- K. International Building Code (IBC 2009)
- L. NFPA 101 - Life Safety Code
- M. ASTM C679, "Standard Test Method for Tack-Free Time of Elastomeric Sealants"

1.6 QUALITY ASSURANCE

- A. A manufacturer's direct representative (not distributor or agent) to be on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. This will be done per manufacturer's written recommendations published in their literature and drawing details.

- B. Firestop System installation shall meet requirements of ASTM E 1966 and/or ANSI/UL 2079 tested and listed assemblies that provide fire-resistance ratings not less than that of the construction in which the joint occurs.
- C. Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.
- D. Firestop Systems do not reestablish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.
- E. For those firestop applications that exist for which no tested and listed system is available through a manufacturer, an engineering judgment derived from similar tested system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineering judgment documents shall follow requirements set forth by the International Firestop Council.

1.7 SUBMITTALS

- A. Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of tested firestop systems to be used and manufacturer's installation instructions to comply with Section 01 3000.
- B. Manufacturer's engineering judgment identification number and details when no tested and listed system is available for an application. Engineering judgment shall include both project name and contractor's name who will install firestop system as described in document.
- C. Submit safety data sheets provided with product delivered to job-site.

1.8 INSTALLER QUALIFICATIONS

- A. Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements. A manufacturer's willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.
- B. The work is to be installed by a contractor with at least one of the following qualifications:
 - 1. FM 4991 Approved Contractor
 - 2. UL Approved Contractor
 - 3. Hilti Accredited Fire Stop Specialty Contractor
- C. Installer shall have not less than 3 years' experience with fire stop installation.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL or OPL label, where applicable.
- B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.
- C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.
- D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.
- E. Do not use damaged or expired materials.

1.10 PROJECT CONDITIONS

- A. Do not use materials that contain flammable solvents.
- B. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.
- C. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.
- D. Weather conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.
- E. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.
- F. Comply with ASTM D 6905 (modified) for resistance to wind driven rain and water.

PART- 2 PRODUCTS

2.1 JOINT FIRESTOPPING - GENERAL

- A. Provide firestopping composed of components that are compatible with each other and substrates forming joints under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.
- B. Provide components for each fire-resistive joint system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.
- C. Joints in or between Fire Rated Construction: Provide joint firestopping systems with ratings determined per UL 2079 or ASTM E 1966:

1. F-Rating: not less than the fire resistance rating of the construction they will join.
 2. Firestop Top Track Seal: For metal stud partitions installed on flat concrete slab use one-piece, pre-formed, polyurethane foam based, firestop seal for use with standard head-joint top tracks, and slip-type head joints in fire-rated construction at top of partition to maintain continuity of the fire-resistance-rated assembly indicated. Provide in width and configuration required to accommodate depth and installation of studs and designed to saddle-over the top track.
 3. Firestop Top Track Seal for metal deck: For metal stud partitions installed to underside of metal deck, use one-piece, pre-formed, polyurethane foam based, firestop seal for use with standard head-joint top tracks and slip-type head joints in fire-rated construction at top of partition to maintain continuity of the fire-resistance-rated assembly indicated. Provide in width and configuration required to accommodate depth and installation of studs and designed to saddle-over the top track. Refer to manufacturers installation instructions for plug and cover usage to completely seal off void's formed by metal deck flutes.
- D. Joints at Exterior Curtain Wall / Floor Intersections: Provide joint firestopping systems with ratings determined per ASTM E 2307:
1. F-Rating: not less than the fire resistance rating of the construction they will join.
 2. For the edge of slab conditions use pre-formed polyurethane foam based material for use as part of a perimeter fire barrier between fire resistance rated floors and exterior wall assemblies. Use tested systems HI/BPF 120-18, HI/BPF 120-19 issued by Intertek Laboratories.
 3. For edge of slab conditions with a full height vision glass, or for conditions which do not contain an insulated spandrel at the floor line, only tested system HI/BPF 120-10 issued by Intertek Laboratories shall be used. If the tested system does not meet the project conditions, an engineering judgment derived from HI/BPF 120-10 shall be submitted to local authorities having jurisdiction for their review and approval prior to installation.
 4. Basis of design: Preformed material for use as part of a perimeter fire barrier system between fire resistance rated floors and exterior wall assemblies,
- E. Joints in Smoke Barriers: Provide joint firestopping systems with ratings determined per UL 2079:
1. L-Rating: Not exceeding 5.0 cfm/ft. of joint at both ambient and elevated temperatures.
- F. Joints at Intersection between Rated Wall Assemblies and Nonrated Horizontal Assemblies: Provide joint firestopping systems with ratings determined by ASTM E 2837.
- G. Mold Resistance: Provide joint firestopping system sealant with mold and mildew resistance rating of one (1) or less as determined by ASTM G21.
- H. Rain and water resistance: provide perimeter joint sealant tested in accordance with ASTM D 6904 with less than 1 hour tack free time as tested in accordance with ASTM C 679.

2.2 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with joint systems (XHBN) listed in Volume II of the UL Fire Resistance Directory or OPL Listed Products Directory; provide products of the following manufacturer as identified below:

1. Basis of Design:

- a. Hilti, Inc., Plano, Texas
- b. Substitution requests shall be considered in accordance with contract provisions.

2.3 MATERIALS

- A. Use only firestop products that have been tested in accordance with ASTM E 1966 and/or ANSI/UL 2079 for specific rated construction conditions conforming to construction assembly type, movement capability, spacing requirements, and fire-resistance-rating involved for each separate instance.

- B. Sealants, sprays, or pre-formed materials for use with fire-rated construction joints and other gaps, the following products are acceptable:

- 1. Hilti Firestop Top Track Seal (CFS-TTS)
- 2. Hilti Firestop Top Track Seal for Metal deck (CFS-TTS MD)
- 3. Hilti Firestop Joint Spray (CFS-SP WB)
- 4. Hilti Firestop Silicone Joint Spray (CFS-SP SIL)
- 5. Hilti Flexible Firestop Sealant (CP 606)
- 6. Hilti Firestop Silicone Sealant Gun Grade (CFS-S SIL GG)
- 7. Hilti Firestop Silicone Sealant Self Leveling (CFS-S SIL SL)
- 8. Hilti bottom of wall sealant CP 605

- C. Pre-formed materials or sealants for use as part of a Perimeter Fire Barrier System between fire-resistance-rated floors and exterior wall assemblies, the following products are acceptable:

- 1. Hilti Preformed Firestop System (CFS-EOS QuickSeal)
- 2. Hilti Firestop Joint Spray (CFS-SP WB)
- 3. Hilti Firestop Silicone Joint Spray (CFS-SP SIL)
- 4. Hilti Firestop Silicone Sealant Gun Grade (CFS-S SIL GG)
- 5. Hilti Firestop Silicone Sealant Self Leveling (CFS-S SIL SL)

- D. Pre-formed mineral wool designed to fit flutes of metal profile deck and gap between top of wall and metal deck profile; use as a backer for spray material.
 - 1. Hilti Speed Plugs (CP 777)
 - 2. Hilti Speed Strips (CP 767)
- E. Pre-formed mineral wool designed to fit flutes of metal profile deck and gap between top of wall and metal deck profile;
 - 1. Hilti 1.5" Plug (CFS-TTS MD P1.5 - Plug)
 - 2. Hilti 2" Plug (CFS-TTS MD P1.5 - Plug)
 - 3. Hilti 3" Plug (CFS-TTS MD P1.5 - Plug)
 - 4. Hilti 1.5" Cover (CFS-TTS MD C1.5 - Cover)
 - 5. Hilti 2" Cover (CFS-TTS MD C2 - Cover)
 - 6. Hilti 3" Cover (CFS-TTS MD C3 - Cover)
- F. Provide a firestop system with an Assembly Rating as determined by ASTM E 1966 and/or ANSI/UL 2079 which is equal to the fire-resistance ratings of the construction in which the joint occurs.

PART- 3 EXECUTION

3.1 PREPARATION

- A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
 - 1. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
 - 2. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
 - 3. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
 - 4. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Regulatory Requirements: Install firestop materials in accordance with UL Fire Resistance Directory or Omega Point Laboratories Listed Products Directory.

- B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of construction joint materials.

- 1. Protect materials from damage on surfaces subjected to traffic.

3.3 FIELD QUALITY CONTROL

- A. Examine sealed joints to ensure proper installation before concealing or enclosing areas.
- B. Keep areas of work accessible until inspection by applicable code authorities and/or independent inspection agency.
- C. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.
- D. Manufacturer's Field Services: Contractor to ensure a manufacturer's direct representative is on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. Training will be done per manufacturer's written recommendations published in their literature and drawing details. During installation, contractor shall have manufacturer's representative provide periodic visual observations and written documentation of the results. Contact Hilti for support at 800.879.8000.

3.4 IDENTIFICATION & DOCUMENTATION

- A. The firestop contractor is to supply documentation for each single application addressed. This documentation is to identify each penetration and joint location on the entire project.
- B. The Documentation Form for Construction Joints is to include:
 - 1. A Sequential Location Number
 - 2. The Project Name
 - 3. Date of Installation
 - 4. Detailed description of the Construction Joints location
 - 5. Tested System or Engineered Judgment Number
 - 6. Type of Construction Joint
 - 7. The Width of the Joint
 - 8. The Lineal Footage of the Joint
 - 9. Number of sides addressed
 - 10. Hourly rating to be achieved

11. Installers Name

- C. Copies of these documents are to be provided to the general contractor at the completion of the project.
- D. A firestop documentation manager software shall be used to document, track, and maintain the passive firestop systems throughout the construction and maintenance phase of the facility. The software solution shall be used to track and document every firestop system installed on the project and each subsequent addition, change, or removal of the firestop system. The firestop documentation shall be managed with a cloud-based software which allows the installer to use a standard smartphone or tablet device (either iOS, Android or Windows capable) to capture the relevant information for the installation. The following data shall be tracked for each penetration within the facility: product installed, system installed, date of installation, location of the penetration including a notation on the 2D plan image, F-rating, name of installer, photo (pre-installation and post-installation), and inspection status. The Owner and/ or Construction Manager may designate additional items to be tracked. The firestop documentation manager software must perform the following basic functions:
 - 1. Create multiple projects/ facilities, add/create/ remove users for each project, upload documents including UL systems, 2D floor plans, product data, engineering judgments, etc.
 - 2. Define data to track using pre-defined input fields or creating custom input fields as desired.
 - 3. Capture multiple photos for each penetration, including a pre-installation and post-installation photo.
 - 4. Scan QR Code on Hilti identification label to link the program data to a specific penetration location.
 - 5. Annotate (mark) location of penetration on 2D floor plan.
 - 6. Create reports by filtering data and utilizing report templates.
 - 7. Online/ offline (for use in areas where data service is unavailable) synchronization of data between mobile device, online application and cloud-based system.
 - 8. Ability to transfer ownership of projects from one customer to another from construction phase to facility maintenance.
- E. Permanently attach Hilti identification labels to surfaces adjacent to and within 6 inches (150 mm) of firestopping edge so labels will be visible to anyone seeking to remove or change penetrating items or firestopping. Labels shall have a unique QR code for each penetration which can be scanned by the firestop documentation software to quickly identify the penetration attributes. Acceptable Software: Hilti CFS-DM, from Hilti Inc., Plano, TX. Tel (800) 879-8000 or Hilti (Canada) Corporation, Mississauga, Ontario (800) 363-4458 website: www.us.hilti.com or www.hilti.ca.com.
 - 1. Substitutions: Not permitted.
 - 2. Single Source: Obtain firestop documentation manager software and firestop systems for each type of penetration and construction condition indicated only from a single manufacturer.

3.5 ADJUSTING AND CLEANING

- A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.
- B. Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.

3.6 LABOR USE TO INSTALL FIRESTOP SYSTEMS

- A. To ensure complete harmony on the project site, the installation of each scope of work is to be performed jurisdictionally correct per existing trade agreements.

3.7 SCHEDULE OF MOST COMMON JOINT FIRESTOP SYSTEM

- A. Schedule of joint firestop systems. Basis of design: Hilti, Inc.

Joint Type	F-Rating (Hr)	Hilti Basis of Design UL System	
		Joint Width Less than 2"	Joint Width Greater than 2" Less than or Equal to 6" ⁴
Concrete (Floor to Floor)	1	FF-D-1012, FF-D-1013 ¹	FF-D-1012, FF-D-1013
	2	FF-D-1012, FF-D-1013 ¹	FF-D-1012, FF-D-1013
	3	FF-D-1011, FF-D-1026 ¹	FF-D-1011, FF-D-1026
	4	FF-D-1047	FF-D-1125
Concrete (Edge of Floor Slab to Wall)	1	FW-D-1011, FW-D-1012, FW-D-1013	FW-D-1011, FW-D-1012, FW-D-1013, FW-D-1021
	2	FW-D-1011, FW-D-1012, FW-D-1013	FW-D-1011, FW-D-1012, FW-D-1013, FW-D-1021, HI-BPF 120-18, HI-BPF 120-19
	3	FW-D-1011	FW-D-1011, FW-D-1021
	4	FW-D-1047	FW-D-1092
Concrete (Edge of Floor Slab to Curtain wall)	2	HI-BPF 120-18, HI-BPF 120-19	HI-BPF 120-18, HI-BPF 120-19
Concrete or Block Wall to Flat Concrete Floor (Top-of-Wall)	1	N/A**	N/A**
	2	HW-D-0097 ¹	HW-D-1009

	3	HW-D-1008 ¹ , HW-D 0268	HW-D-1008
	4	HW-D-1042	HW-D-1103
Concrete or Block Wall to Concrete Over Fluted Metal Deck (Top-of-Wall)	1	HW-D-0098	N/A**
	2	HW-D-0080, HW-D-0081, HW-D-0098	HW-D-1037
	3	N/A**	N/A**
	4	HW-D-0294	N/A**
Gypsum Wall to Flat Concrete Floor (Top-of-Wall)	1	HW-D-0757, HW-D-0082, HW-D-0083, HW-D-0106, HW-D-0119	HW-D-1011, HW-D-1012, HW-1020
	2	HW-D-0757, HW-D-0082, HW-D-0083, HW-D-0106, HW-D-0119	HW-D-1011, HW-D-1012, HW-1020
	3	HW-D-0119	HW-D-1011, HW-D-1012, HW-1020
Gypsum Shaft Wall to (Top-of-Wall)	2	HW-D-0342 (FLAT CONCRETE) HW-D-0541, HW-D-0542 (CONCRETE OVER METAL DECK)	N/A**
Gypsum Shaft Wall to Concrete Floor (Bottom-of-Wall)	1	BW-S-0023	N/A**
	2	BW-S-0023	N/A**
Gypsum Wall to Concrete Floor (Bottom-of-Wall)	1	BW-S-0001, BW-S-0002, BW-S-0039	N/A**
	2	BW-S-0001, BW-S-0002, BW-S-0039	N/A**
Gypsum Wall to Concrete Over Fluted Metal Deck (Top-of-Wall)	1	HW-D-0042*, HW-D-0049*, HW-D-0087*, HW-D-0089*, HW-D-0045, HW-D-0046*, HW-D-0076*, HW-D-0077*, HW-D-0154, HW-D-0184*, HW-D-0292, HW-D-0295, HW-D-0538*, HW-D-0871, HW-D-0872, HW-D-0873, HW-D-0875, HW-D-0884, HW-D-0876, HW-S-0134, HW-D-0881, HW-D-0881, HW-D-0882, HW-D-0883	HWD-1011, HWD-1012, HW-1020
	2	HW-D-0042*, HW-D-0049*, HW-D-0087*, HW-D-0089*, HW-D-0045, HW-D-0046*, HW-D-0076*, HW-D-0077*, HW-D-0154, HW-D-0184*, HW-D-292, HW-D-0295, HW-D-0538*, HW-D-0871, HW-D-0872, HW-D-0873, HW-D-0874, HW-D-0875, HW-D-0884, HW-D-0876, HW-S-0134, HW-D-0881, HW-D-0881, HW-D-0882, HW-D-0883	HW-D-1011, HW-D-1012, HW-D-1020
	3	HW-D-0292, HW-D-0295	HWD-1011, HWD-1012, HW-1020
	4	HW-D-0292, HW-D-0295	N/A**

Concrete (Wall to Wall)	2	WW-D-0017, WW-D-0082	WW-D-1080, WW-D-1084
	3	WW-D-1011', WW-D-0032	WW-D-1011
	4	WW-D-1047	WW-D-1128
Gypsum to Concrete (Wall to Wall)	1	WW-D-0040	N/A**
	2	WW-D-0040	N/A**

* SEE NOTE 3 ** CONTACT HILTI FOR CURRENT UL-CLASSIFIED SYSTEM OR ENGINEER JUDGMENT
DRAWING: 800-879-8000

NOTES:

1. CLASSIFIED SYSTEMS FOR 2" - 6" WIDE JOINTS MAY BE USED FOR JOINTS 2" WIDE AND LESS.
2. CONFIRM THAT MOVEMENT CAPABILITIES OF THE SELECTED UL SYSTEM MEETS OR EXCEEDS THE SPECIFIED MOVEMENT RANGE OF THE PARTICULAR JOINT.
3. SYSTEMS MARKED WITH ASTERIK (*) ARE SUITABLE FOR TOP-OF-WALL JOINTS WHERE THE FLUTED METAL DECK HAS SPRAY-ON MONOKOTE MK-6/HY FIREPROOFING.
4. VERIFY ALLOWABLE JOINT WIDTH ON SPECIFIC UL SYSTEM DRAWING.

END OF SECTION 07 8443

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specifications, apply to this Section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 DESCRIPTION OF WORK

- A. The required application of sealants include, but are not limited to the following general locations:
 - 1. Expansion joints in exterior and interior concrete slabs and walks.
 - 2. Intersections of concrete walks and slabs with vertical surfaces.
 - 3. Exterior wall joints, and dissimilar materials.
 - 4. Vertical joints on siding material.
 - 5. Metal doorframes, window frames and storefront framing.
 - 6. Joints between items of equipment and other construction.
 - 7. Control joints in interior walls.
 - 8. Joints between dissimilar materials.
 - 9. Locations indicated on drawings.

1.3 QUALITY ASSURANCE

- A. Installer:
 - 1. A firm with a minimum of 5 years' successful experience in the application of the types of materials required, and who agrees to employ only skilled tradesmen for the work.

1.4 SUBMITTALS

- A. Samples:

1. Submit samples of each color required for each type of sealant exposed to view. It shall be the Contractor's responsibility to match color to adjacent wall system or material.
2. Install sample between 2 strips of material similar to or representative of typical surfaces where sealant or compound will be used, held apart to represent typical joint widths. Architect will review samples.
3. Compliance with all other requirements is the exclusive responsibility of the Contractor.

B. Guarantee:

1. Submit written guarantee agreeing to repair or replace sealants which fail to perform as air-tight and water-tight joints; or fail in joint adhesion, cohesion, abrasion resistance, weather resistance, extrusion resistance, migration resistance, stain resistance, or general durability; or appear to deteriorate in any other manner not clearly specified by submitted manufacturer's data, as an inherent quality of the material for the exposure indicated. Provide guarantee signed by the Installer and Contractor.
2. Guarantee period is two (2) years.

1.5 JOB CONDITIONS

A. Condition of Other Work:

1. Examine the joint surfaces, backing, and anchorage of units forming sealant rabbet, and the conditions under which the sealant work is to be performed. Do not proceed with the sealant work until unsatisfactory conditions have been corrected.

B. Weather Conditions:

1. Do not proceed with installation of sealants under adverse weather conditions, or when temperatures are below 40 deg F or above manufacturer's recommended limitations for installation. Proceed with the work only when forecasted weather conditions are favorable for proper cure and variations, install elastomeric sealants only when temperatures are in the lower third of the manufacturer's recommended installation temperature range.

PART- 2 PRODUCTS

2.1 MATERIALS

- A. Sealant: MasterSeal NP 1 by BASF or accepted equal. One component polyurethane sealant complying with ASTM C920; Type S, Grade NS, Class 35 and Use NT.
- B. Silicone Sealant: Silpruf 2000 by General Electric or accepted equal. Single component silicone sealant complying with ASTM C920; type S, Grade NS, Class 25 and Use NT.

- C. Concrete Slab Joint Sealant: MasterSeal SL1 sealant by BASF or accepted equal. One component elastomeric, self-leveling polyurethane sealant complying with ASTM C920; Type S, Grade P, Class 25, and Use T.
- D. Joint Primer/Sealer: As recommended by sealant manufacturer for joint surfaces to be primed or sealed.
- E. Backer Rod: Closed cell polyethylene Sonofoam backer rod joint filler and backing by Sonneborn or accepted equal.
 - 1. Colors:
 - a. Exterior - match exterior surface to adjacent color.
 - b. Windows - match window surface.
 - c. All Other Locations - color as selected by Architect.

PART- 3 EXECUTION

3.1 INSPECTION

- A. The Installer must examine the substrate and the conditions under which caulking work is to be performed, and notify the Contractor in writing of unsatisfactory conditions. Do not proceed with the work until satisfactory conditions have been corrected in a manner acceptable to the Installer.

3.2 JOINT SURFACE PREPARATION

- A. Clean joint surfaces immediately before installation of sealant. Remove dirt, insecure coatings, moisture and other substances, which would interfere with bond of sealant or caulking compound.
- B. Use masking tape where required to prevent contact of sealant with adjoining surfaces which otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION

- A. Comply with sealant manufacturer's printed instructions except where manufacturer's technical representative directs otherwise.
- B. Prime or seal the joint surfaces wherever recommended by the sealant manufacturer. Do not allow primer/sealer to spill or migrate onto adjoining surfaces.
- C. Install sealant backer rod for liquid elastomeric sealants, except where shown to be omitted or recommended to be omitted by sealant manufacturer for the application shown.
- D. Install bond breaker tape wherever shown and wherever required by manufacturer's recommendations to ensure that elastomeric sealants will perform properly.

- E. Employ only proven installation techniques, which will ensure that sealants will be deposited in uniform, continuous ribbons without gaps or air pockets, with complete “wetting” of the joint bond surfaces equally on opposite sides. Fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface and a vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt.
- F. Install sealants to depths as recommended by the sealant manufacturer but within the following general limitations, measured at the center (thin) section of the bead.
- G. For normal moving joints sealed with elastomeric sealants, but not subject to traffic, fill joints to a depth equal to 50% of joint width, but neither more than 1/2” deep nor less than 1/4” deep.
- H. Tool non-sag sealants immediately after sealant application and prior to skinning or curing begin; tool sealants to form smooth, uniform beads of configuration indicated eliminating air pockets and ensuring contact and adhesion of sealant with side of joint. Do not use tooling agents which discolor sealants or adjacent surfaces, or that are not approved by sealant manufacturer.
- I. Provide concave joint configuration per figure 5A, ASTM C 1193, unless noted otherwise.

1. Spillage:

- a. Do not allow sealants or compounds to overflow or spill onto adjoining surfaces, or to migrate into the voids of adjoining surfaces including rough textures such as exposed aggregate panels. Use masking tape or other precautionary devices to prevent staining of adjoining surfaces, by either the primer/sealer to the sealant/caulking compound.
- b. Remove excess and spillage of compounds promptly as the work progresses. Clean the adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage, without damage to the adjoining surfaces or finishes.

2. Polysulfide Sealant Installation:

- a. Comply with standards issued by manufacturer, except where more stringent requirements have been issued by the sealant manufacturer as either requirements or recommendations.

3.4 CURE AND PROTECTION

- A. Cure sealants in compliance with manufacturer’s instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability.
- B. Protect joint sealers from contaminants and damage during and after curing period, so that they are without damage or deterioration at the time of substantial completion. Cutout and remove damaged or deteriorated joint sealers immediately and replace with new materials producing a repair that is indistinguishable from the original work.

END OF SECTION 07 9000

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Section, apply to work specified in this section.
- B. Refer to other sections of the specification, drawings, and detail to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 DEFINITIONS

- A. Acoustic Joint Sealant: "Acoustic Joint Sealant or Spray: Material or combination of materials used to achieve specified acoustical rating of non fire-rated assembly by providing an effective barrier against sound transmission through construction joint and through penetration openings."

1.3 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

- A. Only tested acoustic systems shall be used in specific locations as follows:
- B. Top and bottom of gypsum board partitions.
- C. Top of masonry walls.
- D. Through-penetrations in gypsum and masonry walls.

1.4 RELATED WORK OF OTHER SECTIONS

- A. Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
- B. Section 03 3000 – Concrete
- C. Section 07 8443 - Joint Firestopping
- D. Section 07 9000 - Sealants
- E. Section 09 2500 - Gypsum Drywall
- F. Section 21 0000 – Fire Suppression
- G. Section 22 0000 – Plumbing

- H. Section 23 0000 – Heating, Ventilating, and Air-Conditioning
- I. Section 26 0000 – Electrical
- J. Section 27 0000 – Communications

1.5 REFERENCES

- A. Test Requirements:
- B. ASTM C734, Standard Test Method for Low-Temperature Flexibility of Latex Sealants After Artificial Weathering
- C. ASTM C834, Standard Specification for Latex Sealants
- D. ASTM C919, Standard Practice for Use of Sealants in Acoustical Applications
- E. ASTM D217, Standard Test Methods for Cone Penetration of Lubricating Grease
- F. ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials
- G. ASTM E90, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
- H. ASTM G21, Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi
- I. ISO 11600, Building construction -- Jointing products -- Classification and requirements for sealants
- J. All major building codes: IBC

1.6 QUALITY ASSURANCE

- A. Installing contractor shall arrange for the acoustic joint sealant manufacturer's direct representative (not distributor or agent) to be on-site during initial installation of acoustic sealant and spray systems to train appropriate contractor personnel in proper selection and installation procedures.
- B. Acoustical sealants shall be installed per manufacturer's written recommendations published in their literature and drawing details.

1.7 SUBMITTALS

- A. Submit Product Data: Manufacturer's specifications and technical data for each material including documentation of STC testing and manufacturer's installation instructions in accordance with Section 01 3000.
- B. Submit material safety data sheets provided with product delivered to jobsite.

- C. VOC Content Limitations: Submit documentation of conformance with LEED EQ Credit 4.1 "Low-Emitting Materials, Adhesives, and Sealants."

1.8 INSTALLER QUALIFICATIONS

- A. Engage an experienced Installer who is certified, licensed, or otherwise qualified by the acoustic sealant and acoustic spray manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements. A manufacturer's willingness to sell its acoustical sealant products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers.
- B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at jobsite.
- C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.
- D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.
- E. Do not use damaged or expired materials.

1.10 PROJECT CONDITIONS

- A. Do not use materials that contain flammable solvents.
- B. Schedule installation of acoustical sealants after completion of gypsum wall board but prior to covering or concealing of joints.
- C. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.
- D. Weather conditions: Do not proceed with installation of acoustical sealant materials when temperatures are outside the manufacturers recommended limitations.
- E. During installation, provide masking and drop cloths to prevent acoustical sealant materials from contaminating any adjacent surfaces.

PART- 2 PRODUCTS

2.1 ACOUSTICAL SEALANTS

- A. Acoustic Sealant for Exposed and Concealed Joints and annular spaces around through-penetrations: Provide manufacturer's standard non-sag, paintable, non-staining latex sealant complying with ASTM C834, ASTM C919 and the following:
1. Sealant effectively reduces airborne sound transmission through head-of-wall and bottom-of-wall joints and openings to accommodate through-penetrations in building construction as demonstrated by testing representative assemblies in accordance with ASTM E90.
 2. Acoustical Sealant to maintain STC ratings at sound rated partitions as indicated on the drawings.
 3. Sealant has flame-spread and smoke-developed ratings of less than 25 as tested in accordance with ASTM E84.
 4. Sealant is mold and mildew resistant per ASTM G21 with a rating of zero (0), "no growth".
 5. Sealant has movement capability of minimum 12.5% in accordance with ISO 11600.
 6. Latex sealant according to ASTM C 834 class OP -18°C with shrinkage according to ASTM C 1241 < 25 % C.
 7. Proposed acoustic sealant materials and methods shall conform to applicable governing codes having local jurisdiction.

2.2 ACOUSTICAL SPRAYS

- A. Acoustic Spray for exposed and concealed joints: Provide manufacturer's standard sprayable latex material complying with ASTM C919 and the following:
1. Spray effectively reduces airborne sound transmission through head-of-wall joints in building construction as demonstrated by testing representative assemblies in accordance with ASTM E90.
 2. Acoustical Spray to maintain STC ratings at sound rated partitions as indicated on the drawings.
 3. Spray has flame-spread and smoke-developed ratings of less than 25 as tested in accordance with ASTM E84.
 4. Spray is mold and mildew resistant per ASTM G21 with a rating of zero (0), "no growth".
 5. Spray has movement capability of minimum 12.5%.
 6. Proposed acoustic spray materials and methods shall conform to applicable governing codes having local jurisdiction.

2.3 ACCEPTABLE MANUFACTURERS

- A. Basis of Design:
Hilti, Inc., Plano, Texas
800-879-8000
www.hilti.com
- B. Substitution requests shall be considered in accordance with contract provisions and the performance requirements outlined in this document.

2.4 MATERIALS

- A. Products: Subject to compliance with requirements, provide the following:
 - 1. Hilti CP 506 Smoke and Acoustic Sealant
 - 2. Hilti CP 572 Smoke and Acoustic Spray
 - 3. Hilti CP605 bottom of wall sealant

2.5 ACCESSORIES

- A. Mineral wool

PART- 3 EXECUTION

3.1 PREPARATION

- A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
 - 1. Verify acoustic joints are properly sized and in suitable condition for application of materials.
 - 2. Surfaces to which acoustic sealant and spray materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
 - 3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by acoustic sealant and spray materials.
 - 4. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of acoustic sealant and spray.
 - 5. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with acoustic sealant and spray manufacturer's written installation instructions for products and applications indicated.
- B. Standards: Comply with recommendations of ASTM C919 for use of joint sealants in acoustical applications as applicable to materials, applications and conditions indicated.
- C. Install acoustic sealant backings of type indicated to support sealant and spray during application in accordance with manufacturer's written installation instructions.
- D. Install acoustic sealant and spray free of air pockets, embedded foreign matter, sags and ridges.
- E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess acoustic sealant from surfaces adjacent to joint.
 - 2. Remove excess acoustic spray from surfaces adjacent to joint as indicated on the drawings.
 - 3. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 4. Provide concave joint configuration per Figure 8A in ASTM C1193, unless otherwise indicated.

3.3 FIELD QUALITY CONTROL

- A. Examine acoustic joints and penetrations to ensure proper installation before concealing or enclosing areas.
- B. Keep areas of work accessible until inspection by applicable code authorities.

3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturer of acoustical joint sealants.
- B. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises.

3.5 PROTECTION

- A. Protect acoustic joints during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Contract Completion.

END OF SECTION 07 9219

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings, and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section references specification sections relating to commercial door hardware for the following:
 - 1. Swinging doors.
 - 2. Other doors to the extent indicated.
- B. Commercial door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
 - 2. Electromechanical and access control door hardware.
 - 3. Electromechanical and access control door hardware power supplies, back-ups and surge protection.
 - 4. Automatic operators.
 - 5. Cylinders specified for doors in other sections.
- C. Related Sections:
 - 1. Division 08 Section "Door Hardware".
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 70 - National Electrical Code.
 - 4. NFPA 80 - Fire Doors and Windows.
 - 5. NFPA 101 - Life Safety Code.

6. NFPA 105 - Installation of Smoke Door Assemblies.
 7. State Building Codes, Local Amendments.
- E. Standards: Reference Related Sections for requirements regarding compliance with applicable industry standards.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

- C. Keying Schedule: Prepared under the supervision of the Owner, separate schedule detailing final keying instructions for locksets and cylinders in writing. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner to approve submitted keying schedule prior to the ordering of permanent cylinders.
- D. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals. The manual to include the name, address, and contact information of the manufacturers providing the hardware and their nearest service representatives. The final copies delivered after completion of the installation test to include "as built" modifications made during installation, checkout, and acceptance.
- F. Warranties and Maintenance: Special warranties and maintenance agreements specified in the Related Sections.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.5 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

1.6 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART- 2 PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. Refer to "PART 3 – EXECUTION" for required specification sections.

PART- 3 EXECUTION

3.1 DOOR HARDWARE SETS

- A. The door hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
1. Quantities listed are for each pair of doors, or for each single door.
 2. The supplier is responsible for handing and sizing all products.
 3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
 4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.
- B. Products listed in the hardware sets shall be supplied by and in accordance with the requirements described in the specification section as noted for each item.
1. Section 08 71 00 – Door Hardware.
- C. Manufacturer's Abbreviations:
1. MK - McKinney
 2. PE - Pemko
 3. RO - Rockwood
 4. YA - Arrow, formerly known as Yale
 5. HS - HES
 6. RF - Rixson
 7. OT - Other
 8. SU - Securitron

Hardware Sets

Set: 1.0

Doors: 1-101

1 Continuous Hinge	CFM_HD1-M		PE
1 Storeroom or Closet Lock	MOR3 8805FL Temp Core	626	YA
1 Core	Match existing; field verify	626	YA
3 Silencer	608		RO
1 Wall Stop	RM860/RM861 (As required)	US32D0	RO

Set: 2.0

Doors: 1-103

1 Door Hardware	Hardware by door manufacturer (Cylinder as required)		OT
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END OF SECTION 08 0671

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specifications, apply to this Section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. Section Includes:
 - 1. Standard and custom hollow metal doors and frames.
 - 2. Steel sidelight, borrowed lite and transom frames.
 - 3. Louvers installed in hollow metal doors.
 - 4. Light frames and glazing installed in hollow metal doors.
- B. Related Sections:
 - 1. Division 01 Section "General Conditions".
 - 2. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
 - 3. Division 08 Section "Glazing" for glass view panels in hollow metal doors.
 - 4. Division 08 Section "Door Hardware".
 - 5. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.
- C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
 - 2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.

3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
8. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
9. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
10. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.
11. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
12. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
13. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
14. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
15. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
16. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.
- B. Quality Standard: In addition to requirements specified, furnish SDI-Certified manufacturer products that comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".
- C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL10C (neutral pressure at 40" above sill) or UL 10C.

1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction label certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.
2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
3. Smoke Control Door Assemblies: Comply with NFPA 105.
 - a. Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.
- D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.
- E. Storm Shelter Openings: Provide complete door systems for hurricane or tornado storm shelters, and other areas of refuge, complying and tested according to ICC 500 (2014/2020), ICC/NSSA Standard for the Design and Construction of Storm Shelters.
 1. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.
- F. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.
 1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.6 COORDINATION

- A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Building Information Modeling (BIM) Support: Utilize designated BIM software tools and obtain training needed to successfully participate in the Project BIM processes. All technical disciplines are responsible for the product data integration and data reliability of their Work into the coordinated BIM applications.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
- B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

PART-2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide steel doors and frames from a SDI Certified manufacturer:
 - 1. CECO Door Products (C).
 - 2. Curries Company (CU).
 - 3. Pioneer Industries (PI).

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
- C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

2.3 HOLLOW METAL DOORS

- A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8 and ANSI/NAAMM HMMA 867.

- B. Interior Doors: Face sheets fabricated of commercial quality cold rolled steel that complies with ASTM A 1008/A 1008M. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
1. Design: Flush panel.
 2. Core Construction: Manufacturer's standard kraft-paper honeycomb, or one-piece polystyrene core, securely bonded to both faces.
 - a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
 3. Level/Model: Level 2 and Physical Performance Level B (Heavy Duty), Minimum 18 gauge (0.042-inch - 1.0-mm) thick steel, Model 2.
 4. Vertical Edges: Vertical edges to have the face sheets spot welded and filled full height with an epoxy filler. Welds are to be ground, filled and dressed smooth. Beveled Lock Edge, 1/8 inch in 2 inches (3 mm in 50 mm).
 5. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet.
 6. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
 7. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
- C. Manufacturers Basis of Design:
1. CECO Door Products (C) Polystyrene Core - Legion Series.

2.4 HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- B. Thermal Break Frames: Subject to the same compliance standards and requirements as standard hollow metal frames. Tested for thermal performance in accordance with NFRC 102, and resistance to air infiltration in accordance with NFRC 400. Where indicated provide thermally broken frame profiles available for use in both masonry and drywall construction. Fabricate with 1/16" positive thermal break and integral vinyl weatherstripping.
- C. Exterior Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.
1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
 2. Frames: Minimum 14 gauge (0.067-inch -1.7-mm) thick steel sheet.
 3. Manufacturers Basis of Design:

- a. CECO Door Products (C) – Thermal Break TQB Series.
- D. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.
 - 1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
 - 2. Frames: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.
 - 3. Manufacturers Basis of Design:
 - a. CECO Door Products (C) - DU Series.
 - b. CECO Door Products (C) - SU Series.
- E. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.
- F. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

2.5 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
 - 2. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.
 - 3. Compression Type for Drywall Slip-on (Knock-Down) Frames: Adjustable compression anchors.
- B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.
- C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.6 LOUVERS

- A. Metal Louvers: Unless otherwise indicated provide louvers to meet the following requirements.
 - 1. Blade Type: Vision proof inverted V or inverted Y.
 - 2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.
- B. Louvers for Fire Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire protection rating of 1-1/2 hours and less.
 - 1. Manufacturers: Subject to compliance with requirements, provide louvers to meet rating indicated.

2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

2.7 LIGHT OPENINGS AND GLAZING

- A. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricator's shop. Fixed and removable stops to allow multiple glazed lites each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.
- B. Moldings for Glazed Lites in Doors and Loose Stops for Glazed Lites in Frames: Minimum 20 gauge thick, fabricated from same material as door face sheet in which they are installed.
- C. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames.
- D. Preformed Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated. Match pre-finished door paint color where applicable.

2.8 ACCESSORIES

- A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.9 FABRICATION

- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.
- C. Hollow Metal Doors:
 1. Glazed Lites: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where indicated.
 2. Astragals: Provide overlapping astragals as noted in door hardware sets in Division 08 Section "Door Hardware" on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.
 3. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
- D. Hollow Metal Frames:

1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
 - a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.
3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
7. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
8. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
9. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - i. Two anchors per jamb up to 60 inches high.
 - ii. Three anchors per jamb from 60 to 90 inches high.
 - iii. Four anchors per jamb from 90 to 120 inches high.
 - iv. Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
 - b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - i. Three anchors per jamb up to 60 inches high.
 - ii. Four anchors per jamb from 60 to 90 inches high.

- iii. Five anchors per jamb from 90 to 96 inches high.
 - iv. Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
 - v. Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
- 10. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".
- 11. Bituminous Coating: Where frames are fully grouted with an approved Portland Cement based grout or mortar, coat inside of frame throat with a water based bituminous or asphaltic emulsion coating to a minimum thickness of 3 mils DFT, tested in accordance with UL 10C and applied to the frame under a 3rd party independent follow-up service procedure.
- E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
 - 1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
 - 2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
 - 3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
 - 4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

2.10 STEEL FINISHES

- A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.
 - 1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).

- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.
- C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."
- D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.
- E. Verify tolerances against manufacturers installations instructions for tornado and hurricane storm shelter openings.

3.3 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.
 - 1. Set frames accurately in position, plumbed, leveled, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
 - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
 - 3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
 - 4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.
- C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
 - 1. Non-Fire-Rated Standard Steel Doors:
 - a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
 - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
 - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.

- d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
- 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
- D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow metal work immediately after installation.
- C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

3.5 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
 - 1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

END OF SECTION 08 1113

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required completing this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section includes the following types of access doors: Locations of doors shall be coordinated with all trades and shall be the responsibility of the contractor to furnish and install access doors as may be required. Door shall be located at any concealed mechanical device requiring access. Provide door size as required for proper access.
 - 1. Wall access doors.

1.3 QUALITY ASSURANCE

- A. Single-Source Responsibility: Obtain access doors for entire Project from one source and by a single manufacturer.
- B. Fire-Rated Door Assemblies: Units that comply with NFPA 80, are identical to door and frame assemblies tested for fire-test-response characteristics per test method as indicated below, and are labeled and listed by UL, Warnock Hersey, or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Test Method for Vertical Installations: ASTM E 152.
 - 2. Test Method for Horizontal Installations: ASTM E 119.
- C. Size Variations: Obtain Architect's acceptance of manufacturer's standard size units, which may vary slightly from sizes indicated.

PART- 2 PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products by one of the following:

1. Karp Associates, Inc.
2. J.L. Industries.
3. Larson's Manufacturing Co.

2.2 MATERIALS

- A. Steel Sheet: ASTM A 366/A 3366M commercial-quality, cold-rolled steel sheet with baked-on, rust-inhibitive primer.

2.3 ACCESS DOORS - EXPOSED AREAS

- A. Fire-Rated Access Doors – KRP – 450 FR, as manufactured by Karp Associates Inc. or equal.
 1. Self-latching units consisting of frame, door, and hardware, including automatic-closer, interior latch release, and complying with the following requirements:
 - a. Trimless Frame.
- B. Non-insulated Doors for Walls: KDW as manufactured by Karp Associates, or equal.
 1. Self-latching units consisting of frame, door, and hardware, and complying with the following requirements:
 - a. Trimless Frame.

2.4 PARTS

- A. Access Doors: WB EXT 1350 Ultra Exterior Access Door
 1. Door: 16-gauge steel, trim 1-1/2" wide.
 2. Frame: 16-gauge steel, 2-3/8" depth.
 3. Insulation: Double layer of 1" GreenGuard Extruded Polystyrene insulation board, with R-Value @ 75 degrees F. Mean 5.0 x 2, FM approved.
 4. Gaskets: Open celled microcellular polyurethane on inside of door. Closed cell neoprene sponge SC42 W/PSA stripping gasketing on the back of the door.
 5. Hinge: Continuous piano hinge allows opening to 180 degrees; located at the top of the door.
 6. Latches: Chrome plated "T" type handle with pivot rod 3-point catch. WB 151 keycode cylinder lock.

7. Finish: Zinc dipped baked grey enamel; prepared for final paint.
8. Application: For exterior purposes.
 - a. Size: 24" x 24".

2.5 FABRICATION

- A. General: Manufacture each access door assembly as an integral unit, ready for installation.
- B. Steel Access Doors and Frames: Continuous welded construction. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required securing access panels to types of supports indicated.
 1. For gypsum board assemblies, furnish frames with edge trim for gypsum board.

PART- 3 EXECUTION

3.1 PREPARATION

- A. Advise Installer of other work about specific requirements relating to access door installation, including sizes of openings to receive access door and frame, as well as locations of supports, inserts, and anchoring devices.
- B. Furnish inserts and anchoring devices for access doors that must be built into other construction. Coordinate delivery with other work to avoid delay.

3.2 INSTALLATION

- A. Comply with manufacturer's instructions for installing access doors. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finished surfaces.
- B. Install concealed-frame access doors flush with adjacent finish surfaces.
- C. Locate access doors above ceilings wherever possible.

END OF SELECTION 08 3050

PART- 1 GENERAL

1.1 GENERAL REQUIREMENTS

- A. Provide all materials, labor, equipment and services necessary to furnish, deliver and install all work under this section as shown on the contract documents, specified herein, and as specified by the job conditions.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required completing this section whether or not it is clearly or explicitly shown.

1.3 DESCRIPTION

- A. Related work specified elsewhere:
 - 1. Metal Fabrication. Section 05 5000
 - 2. Rough Carpentry. Section 06 1000
 - 3. Access Panels & Doors: Section 08 3050
 - 4. Painting: Section 09 9000
 - 5. Electrical: Division 26

1.4 SUBMITTALS

- A. Procedures: Furnish submittals in accordance with the general requirements specified.
- B. Shop Drawing: Furnish shop drawings for architect's approval. Include elevations, sections, and details indicating dimensions, materials, finishes, conditions for anchorage and support of each coiling security grille.
- C. Product Literature: Submit manufacturer's technical literature describing the product to be used under this section.
- D. Maintenance and Operating Manuals: Furnish complete manuals describing the materials, devices and procedures to be followed in operating and maintaining all coiling security grilles under this section. Include manufacturer's brochures and parts lists describing the actual materials used in the product.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with applicable requirements of the laws, codes, ordinances and regulations of federal, state and municipal authorities having jurisdiction.
- B. Manufacturer Requirements: Coiling security grille manufacturer shall have been in the business of and have experience in manufacturing the type of product covered under this specification section as well as giving credible service for a minimum of five (5) years. Provide list of at least ten (10) completed projects which include the products covered under this section.

1.6 DELIVERY, STORAGE AND HANDLING

- A. General: Deliver and store materials in manufacturer's original packaging, labeled to show name, brand and type. Store materials in a protected dry location off the ground in accordance with manufacturer's instructions.

1.7 WARRANTY

- A. Coiling Security Grille Warranty: Provide Two (2) Year Warranty signed by the manufacturer and installer agreeing to repair or replace work which has failed as a result of defects in materials or workmanship. Upon notification within the warranty period, such defects shall be repaired at no cost to the owner.

PART- 2 PRODUCTS

2.1 COILING SECURITY GRILLES

- A. Manufacturer: Side coiling security grilles shall be the model SC3000G-SL9-A as manufactured by McKEON or equal.

2.2 MATERIALS

- A. General: Each unit shall consist of an open type grille curtain designed to travel in a horizontal plane, smoothly and without binding. Curtain shall be driven to the open and close position by a positive action sprocket drive, without the use of cables or counterbalance weights.
 - 1. Grille Curtain: Shall be the SL9 pattern consisting of 5/16" diameter solid galvanized steel rods, encased by 3/8" aluminum tubular spacers 9" long. The horizontal links shall be fabricated of 1/8" x 5/8" aluminum strips and shall be set in a straight lattice pattern. The vertical spacing shall be 1½" while the horizontal spacing shall be 9".
- B. Leading Edge: Curtain shall be furnished with an aluminum member of tubular design to provide stiffness, limit deflection and provide for a tight fitting closure.
- C. Receiving Edge: Shall be fabricated of an extruded aluminum member with sufficient depth, designed to accept the leading edge and form a tight fitting closure when the grille is the fully closed position.

- D. Head Track: Shall be of not less than 1/8" thick steel and shall be provided with integral locking bars. The faying surface shall not be less than 38% of the flat plate area when the side coiling grille is in the closed position. Locking bars shall lock and retain the coiling curtain in place. Unit shall not require or utilize any type of floor track system.
- E. Counterbalance Assemblies: The side coiling grille shall be counterbalanced by means of adjustable steel helical torsion springs attached to shaft enclosed in pipe with required mounting blocks for attachment of curtain. Torsion springs shall be anchored to the same shaft and held in position by the same adjusting wheel accessible from outside the barrel assemblies.
- F. Coil Box: Shall be provided to entirely enclose coiled curtain and counterbalance assemblies. Coil box cover shall be of a rectangular design fabricated of 22 gauge G90 galvanized sheet steel.
- G. Electric Motor Operator: Side coiling grille shall be provided with a compact power unit designed and built by the side coiling grille manufacturer. Operator shall be equipped with an adjustable screw-type limit switch to break the circuit at termination of travel. High efficiency gearing running in an oil bath, shall be furnished together with a magnetic operated brake, completely housed to protect against damage, dust and moisture. An efficient overload protection device, which will break the power circuit and protect against damage to the motor windings shall be integral with the unit. Operator is to be housed in a NEMA type 1 enclosure.
 - 1. Motor: Shall be intermediate duty, thermally protected, ball bearing type with a class A or better insulation. Horsepower of motor is to be 1/3hp minimum or of manufacturer's recommended size, which ever is greater.
 - 2. Starter: Shall be size "0" magnetic reversing starter, across the line type with mechanical and electrical interlocks, with 10 amp continuous rating and 24 volt control circuit.
 - 3. Reducer: Spiral gear type, 70% efficiency minimum.
 - 4. Brake: Magnetically activated, integral within the operator's housing.
 - 5. Control Station: Provide surface mount push button control station marked open, close and stop.
- H. Obstruction Sensing Device: The side coiling grille shall be designed with a radio activated obstruction sensing safety edge. In the event that the safety edge meets an obstruction during the normal closing operation, the grille shall stop, reverse and return to the open position.
- I. Finish After completion of fabrication, clean all metal surfaces to remove dirt and chemically treat to provide for paint adhesion. All steel components shall receive a coat of prime paint finish, all exposed aluminum shall be of a clear anodized.

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Examine surfaces and field conditions to which this work is to be performed and notify architect if conditions of surfaces exist which are detrimental to proper installation and timely completion of work.

- B. Verify all dimensions taken at job site affecting the work. Notify the architect in any instance where dimensions vary.
- C. Coordinate and schedule work under this section with work of other sections so as not to delay job progress.

3.2 INSTALLATION

- A. Perform installation using only factory approved and certified representatives of the coiling security grille manufacturer.
- B. Install coiling security grille assemblies at locations shown in perfect alignment and elevation, plumb, level, straight and true.
- C. Adjust coiling security grille installation to provide uniform clearances and smooth non-binding operation.
- D. Install wiring in accordance with applicable local codes and the National Electrical Code Standard. Materials shall be UL listed.

3.3 PROTECTION AND CLEANING

- A. Protect installed work using adequate and suitable means during and after installation until accepted by owner.
- B. Remove, repair or replace materials which have been damaged in any way.
- C. Clean surfaces of grime and dirt using acceptable and recommended means and methods.

END OF SELECTION 08 3300

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specifications, apply to this Section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section includes commercial door hardware for the following:
 - 1. Swinging doors.
- B. Door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
 - 2. Cylinders specified for doors in other sections.
- C. Related Sections:
 - 1. Division 08 Section "Hollow Metal Doors and Frames".
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 70 - National Electrical Code.
 - 4. NFPA 80 - Fire Doors and Windows.
 - 5. NFPA 101 - Life Safety Code.
 - 6. NFPA 105 - Installation of Smoke Door Assemblies.
 - 7. State Building Codes, Local Amendments.
- E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:

1. ANSI/BHMA Certified Product Standards - A156 Series.
2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
3. ANSI/UL 294 - Access Control System Units.
4. UL 305 - Panic Hardware.
5. ANSI/UL 437- Key Locks.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing, fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- D. Informational Submittals:
 1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

1.4 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).
- C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
 1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.

- F. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.
- G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
 - 1. Function of building, purpose of each area and degree of security required.
 - 2. Plans for existing and future key system expansion.
 - 3. Requirements for key control storage and software.
 - 4. Installation of permanent keys, cylinder cores and software.
 - 5. Address and requirements for delivery of keys.
- H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
 - 1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 - 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 - 3. Review sequence of operation narratives for each unique access controlled opening.
 - 4. Review and finalize construction schedule and verify availability of materials.
 - 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- I. At completion of installation, provide written documentation that components were applied according to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.
- C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.
- C. Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

PART-2 PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- C. Please note that ASSA ABLOY is transitioning the Yale Commercial brand to Arrow. This affects only the brand name; the products and product numbers will remain unchanged. The brand transition is expected to be complete in or about May of 2024, and products shipping after that time will be branded Arrow.
- D. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
1. Quantity: Provide the following hinge quantity:
 - a. Two Hinges: For doors with heights up to 60 inches.
 - b. Three Hinges: For doors with heights 61 to 90 inches.
 - c. Four Hinges: For doors with heights 91 to 120 inches.
 - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
 2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
 3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
 - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
 - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

4. Hinge Options: Comply with the following:

- a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

5. Manufacturers:

- a. McKinney (MK) - TA/T4A Series, 5 knuckle.

B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 continuous geared hinge. with minimum 0.120-inch thick extruded 6063-T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:

- a. Pemko (PE).

2.3 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: Provide products conforming to ANSI/BHMA A156.3 and A156.16, Grade 1.

- 1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
- 2. Furnish dust proof strikes for bottom bolts.
- 3. Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
- 4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.

5. Manufacturers:

- a. Ives (IV).
- b. Rockwood (RO).

B. Door Push Plates and Pulls: ANSI/BHMA A156.6 door pushes and pull units of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

- 1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.

2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
4. Pulls, where applicable, shall be provided with a 10" clearance from the finished floor on the push side to accommodate wheelchair accessibility.
5. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
6. Manufacturers:
 - a. Hiawatha, Inc. (HI).
 - b. Rockwood (RO).
 - c. Trimco (TC).

2.4 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
 1. Manufacturers:
 - a. Schlage (SC).
 - b. Match Existing, Field Verify.
- B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:
 1. Threaded mortise cylinders with rings and cams to suit hardware application.
 2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
 4. Tubular deadlocks and other auxiliary locks.
 5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
 6. Keyway: Match Facility Standard.
- C. Small Format Interchangeable Cores: Provide small format interchangeable cores (SFIC) as specified, core insert, removable by use of a special key; usable with other manufacturers' cylinders.

- D. Keying System: Each type of lock and cylinders to be factory keyed.
 - 1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
 - 2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
 - 3. Existing System: Field verify and key cylinders to match Owner's existing system.
- E. Key Quantity: Provide the following minimum number of keys:
 - 1. Change Keys per Cylinder: Two (2)
 - 2. Master Keys (per Master Key Level/Group): Five (5).
 - 3. Construction Control Keys (where required): Two (2).
 - 4. Permanent Control Keys (where required): Two (2).
- F. Construction Keying: Provide temporary keyed construction cores.
- G. Key Registration List (Bitting List):
 - 1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
 - 2. Provide transcript list in writing or electronic file as directed by the Owner.

2.5 MECHANICAL LOCKS AND LATCHING DEVICES

- A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.
 - 1. Manufacturers:
 - a. Arrow, formerly known as Yale (YA) - 8800FL Series.
 - b. Corbin Russwin Hardware (RU) - ML2000 Series.
 - c. dormakaba Best (BE) - 45H Series.
- B. Cylindrical Locksets, Grade 1 (Commercial Duty): ANSI/BHMA A156.2, Series 4000, Operational Grade 1 Certified Products Directory (CPD) listed.
 - 1. Locks are to be non-handed and fully field reversible.

2. Manufacturers:

- a. Arrow, formerly known as Yale (YA) 4700LN Series.
- b. Corbin Russwin Hardware (RU) - CL3500 Series.
- c. dormakaba (DO) - CL800 Series.

2.6 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
 - 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 - 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 - 3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
 - 4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
- B. Standards: Comply with the following:
 - 1. Strikes for Mortise Locks and Latches: BHMA A156.13.
 - 2. Strikes for Bored Locks and Latches: BHMA A156.2.
 - 3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
 - 4. Dustproof Strikes: BHMA A156.16.

2.7 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
- B. Exit devices shall have a five-year warranty.
- C. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
- D. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
- E. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.

- F. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
- G. Flush End Caps: Provide flush end caps made of architectural metal in the same finish as the devices as in the Hardware Sets. Plastic end caps will not be acceptable.
- H. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
 - 1. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
 - 2. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
- I. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
- J. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
- K. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
- L. Rail Sizing: Provide exit device rails factory sized for proper door width application.
- M. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
- N. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.
 - 1. Manufacturers:
 - a. Arrow, formerly known as Yale (YA) - 7000 Series.
 - b. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
 - c. Von Duprin (VD) - 35A/98 XP Series.

2.8 DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:
 - 1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.

2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
 3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
 4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
 5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
 6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.
- B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.
1. Heavy duty surface mounted door closers shall have a 30-year warranty.
 2. Manufacturers:
 - a. Arrow, formerly known as Yale (YA) - 4400 Series.
 - b. Corbin Russwin Hardware (RU) - DC6000 Series.
 - c. Norton Rixson (NO) - 7500 Series.
- C. Door Closers, Surface Mounted (Unitrol): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted closers with door stop mechanism to absorb dead stop shock on arm and top hinge. Hold-open arms to have a spring loaded mechanism in addition to shock absorber assembly. Arms to be provided with rigid steel main arm and secondary arm lengths proportional to the door width.
1. Manufacturers:
 - a. Arrow, formerly known as Yale (YA) - Unitrol Series.
 - b. Corbin Russwin Hardware (RU) - Unitrol Series.
 - c. Norton Rixson (NO) - Unitrol Series.

2.9 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
4. Protection Plates: ANSI/BHMA A156.6 protection plates (kick, armor, or mop), fabricated from the following:
 - a. Stainless Steel: 300 grade, .050-inch thick.
5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Manufacturers:
 - a. Hiawatha, Inc. (HI).
 - b. Ives (IV).
 - c. Rockwood (RO).

2.10 DOOR STOPS AND HOLDERS

- ### **A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.**
- ### **B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.**
1. Manufacturers:
 - a. Hiawatha, Inc. (HI).
 - b. Ives (IV).
 - c. Rockwood (RO).

- C. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

- 1. Manufacturers:

- a. dormakaba (DO).
- b. Norton Rixson (RF).
- c. Rockwood (RO).

2.11 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

- 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

- 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.

- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

- F. Manufacturers:

- 1. Pemko (PE).

2.12 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.13 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. DHI TDH-007-20: Installation Guide for Doors and Hardware.

3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
 - 1. Quantities listed are for each pair of doors, or for each single door.
 - 2. The supplier is responsible for handing and sizing all products.
 - 3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
 - 4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.
- B. Refer to Section 08 0671, Door Hardware Sets, for hardware sets.

END OF SECTION 08 7100

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown

1.2 DESCRIPTION OF WORK

- A. Gypsum drywall work is hereby defined to include all gypsum board work and a tape-and compound joint treatment system known as “drywall finishing” work.
- B. The types of work required includes but is not limited to the following:
 - 1. Gypsum drywall including metal support system.
 - 2. Gypsum shaft wall construction.
 - 3. Gypsum backing boards for application of other finishes.
 - 4. Cementitious backer units.
 - 5. Gypsum drywall ceilings.
 - 6. Sound dampening gypsum drywall.
 - 7. Drywall finishing (joint tape-and-compound treatment).
 - 8. Metal support systems for cementitious backer panels.
 - 9. Installing access doors.
 - 10. Acoustical Sealants.

1.3 QUALITY ASSURANCE

- A. Fire-Resistance Rating: Where work is indicated for fire-resistance ratings, including those required to comply with governing regulations, provide materials and installations identical with applicable assemblies

which have been tested and listed by recognized authorities and acceptable to authorities having jurisdiction, including UL, WH and the Gypsum Association.

- B. Fire Resistance Ratings: Refer to Drawings.
- C. Industry Standard: Comply with applicable requirements of GA-216 "Application and Finishing of Gypsum Board" by the Gypsum Association, except where more detailed or more stringent requirements are indicated, including the recommendations of the manufacturer.
- D. Allowable Tolerance:
 - 1. 1/16" offsets between planes of board faces, and 1/8" in 10'-0" for plumb, level, warp and bow.

1.4 PRODUCT HANDLING

- A. Deliver gypsum drywall materials in sealed containers and bundles, fully identified with manufacturer's name, brand, type and grade; store in a dry, well-ventilated space, protected from the weather, under cover and off the ground.

1.5 JOB CONDITIONS

- 1. Temperature and Humidity Conditions: Do not install joint treatment compounds unless installation areas comply with the minimum temperatures and ventilation requirements recommended by the manufacturer and conditions are acceptable to the installer.
- 2. During the period of laminating and of finishing wallboard joints, maintain a temperature within the building uniformly between 55 deg and 70 deg F. Provide adequate ventilation to eliminate excessive moisture. Avoid drafts during hot, dry weather to prevent finishing materials from drying to rapidly.
- 3. Coordinate with installation of metal stud wall systems and insulation.

PART- 2 PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products by one of the following:
 - 1. Steel Framing and Furring:
 - a. United States Gypsum.
 - b. National Gypsum Co. - Gold Bond Building Products Div.
 - c. Dietrich Industries, Inc.
 - 2. Grid Suspension Assemblies:

- a. Chicago Metallic Corp.
 - b. Armstrong World Industries, Inc.
 - c. United States Gypsum.
- 3. Interior and Exterior Gypsum Board and Related Products:
 - a. United States Gypsum.
 - b. Georgia-Pacific Corp.
 - c. National Gypsum Co., Gold Bond Building Products Div.
- 4. Gypsum Shaftwall Studs and Liner Panel:
 - a. United States Gypsum.
 - b. Domtar Gypsum.
 - c. Georgia-Pacific Corp.

2.2 METAL SUPPORT MATERIALS

- A. Wire for Hangers and Ties:
 - 1. ASTM A 641, soft temper, #8 gauge galvanized annealed steel wire for hangers, 16- gauge minimum annealed steel wire for ties.
- B. Hanger Rods: Mild steel and zinc-coated or protected with rust-inhibitive paint.
- C. Flat Hangers: Mild steel and zinc-coated or protected with rust-inhibitive paint.
- D. Studs: (non-load bearing) ASTM C 645; 20 gauge by 3-5/8", or as required for interior partitions and column enclosures; ASTM A 570, 33 KSI steel, G60 hot-dip galvanized coating per ASTM A 525. Note: Use heavy gauge structural studs as noted on the drawings. At door jambs use double 16-gauge studs strapped together.
- E. Steel Studs for Furring Walls: Provide same material as specified for studs, 3-5/8" depth or as indicated.
- F. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes due to deflection of structure above.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Blazeframe Industries.
 - b. Fire Trak Corp.

- c. MBA Building Supplies.
 - d. Metal-Lite.
- G. Firestop Tracks: Manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness, not less than indicated for studs and in width to accommodate depth of studs.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. BlazeFrame Industries.
 - b. CEMCO; California Expanded Metal Products Co.
 - c. Fire Trak Corp.
- H. Steel Rigid Furring Channels: ASTM C 645, hat-shaped, depth of 7/8", and minimum 25 gauge, G 60 hot-dip galvanized coating per ASTM A 525.
- I. Steel Resilient Furring Channels: Manufacturer's standard product designed to reduce sound transmission, fabricated from steel sheet complying with ASTM A 525 or ASTM A 568 to form 1/2" deep channel with single-Leg Configuration, asymmetric-shaped channel with face connected to a single flange by a single slotted leg [web].
- J. Runners: Match studs, type recommended by stud manufacturer for floor and ceiling support of studs, and for vertical abutment of drywall work at other work.
- K. Stud System Accessories: Provide stud manufacturer's standard clips, shoes, ties, reinforcements, fasteners, and other accessories as needed for a complete stud system.
- L. Runner: J-Type for floor ceiling support of studs.

2.3 ACCESSORY MATERIALS

- A. Metal Backer Plates: Provide 20-gauge metal plate, 6" wide or as indicated on drawings, in lengths required.
- B. Drywall Sealant: At sound partitions and rated walls required to meet the ratings shown, provide non-drying, non-shrinking, non-migrating sealant recommended by the drywall manufacturer.
- C. Trim Accessories: Provide trim accessories of the sizes required for the drywall applications shown and specified, fabricated from galvanized steel, rolled Zinc or plastic and other following types.
- D. At external corners, provide metal/plastic corner bead with smooth rigid nose and perforated and knurled metal flanges.
- E. Control Joint: Formed with vee-shaped slot per Fig. 1 in ASTM C 1047, with slot opening covered with removable strip maximum 30' o.c. VSG control joint No. 93 or equivalent.

- F. Cold-Rolled Channels: #16-gauge steel, galvanized for 3/4" sizes and black asphalt painted for all other sizes.
- G. Fasteners: Provide fasteners of type, material, size, corrosion resistance, holding power and other properties required to fasten steel framing and furring members securely to substrates involved; complying with the recommendations of gypsum drywall manufacturers for application indicated.
 - 1. Type S –12, fluted tip, aluminum of 1-1/4" long, with organic-polymer coating or other corrosion-protective coating.
 - 2. Where drywall abuts, or intersects dissimilar construction, and for protection of exposed wallboard edges around openings, provide metal casing bead trim of the following design:
 - 3. Beaded nose with exposed flange knurled for joint treatment: USG No. 200-A or equivalent.
- H. Cold-Rolled Channel Bridging: Steel, 0.053-inch minimum base-metal thickness, with minimum 1/2-inch-wide flanges.
 - 1. Depth: 1-1/2 inches.
 - 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch- thick, galvanized steel.
- I. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1 1/2" inch, wall attachment flange of 7/8 inch, minimum uncoated-metal thickness of 0.018 inch, and depth required to fit insulation thickness indicated.

2.4 STEEL FRAMING COMPONENTS FOR SUSPENDED AND FURRED CEILINGS AND SOFFITS SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- diameter wire, or double strand of 0.048-inch- diameter wire.
- B. Hanger Attachments to Concrete:
 - 1. Anchors: Capable of sustaining a load equal to 5 times that imposed as determined by ASTM E 488.
 - a. Type: Cast-in-place anchor, designed for attachment to concrete forms
 - 2. Powder-Actuated Fasteners: Capable of sustaining, a load equal to 10 times that imposed as determined by ASTM E 1190.
- C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.
- D. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.053 inch and minimum 1/2-inch- wide flanges.
 - 1. Depth: As indicated on Drawings.

2.5 AUXILIARY MATERIALS

- A. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

2.6 GYPSUM BOARD PRODUCTS

- A. Exposed Interior Gypsum Board:

- 1. ASTM C 36, regular type with tapered long edges for walls and ceilings.
 - a. Sheet Size: Maximum length available which will minimize end joints.
 - b. Thickness: As noted.
 - c. Type: Type X.

- B. Moisture Resistant Gypsum Board:

- 1. ASTM C 630, regular type with long edges for walls, not permitted at ceilings.
 - a. Sheet Size: Maximum length available which will minimize end joints.
 - b. Thickness: As noted.
 - c. Type: Type X.
 - i. Provide at all areas to receive tile and at all sink areas. (Not resident bathrooms, spa and shower rooms)

- C. Cementitious Backer Board: Durock by United States Gypsum or accepted equal – (bathrooms and shower rooms).

- D. Exterior Gypsum Ceiling Board: ASTM C 931, 5/8" thick, Type "X", fire resistant, treated gypsum core with chemically treated fiber paper. Material shall be made specifically for exterior use on ceilings and provide extra resistance to moisture and sagging required for outdoor conditions.

2.7 JOINT TREATMENT MATERIALS

- A. Interior Gypsum Board:

- 1. Joint Tape: Plain or perforated complying with ASTM C 475.
- 2. Joint Compound: Ready-mixed vinyl tape for interior use.
- 3. Grade: Two separate grades: one specifically for bedding tapes and filling depressions, and one for topping and sanding.

- B. Exterior Joint Compound: Special moisture-resistant, chemical-hardening type.
- C. High Impact Compound: As recommend by manufacturer.

2.8 ACOUSTICAL SEALANT

- A. Acoustical Sealant: Paintable, non-staining, latex sealant complying with ASTM C834.
- B. Manufacturer: Hilti CP506 Smoke and Acoustical Sealant or equal.

PART- 3 EXECUTION

3.1 PREPARATION AND COORDINATION

- A. Install supplementary stripping, backing, blocking, and bracing, at locations required to support fixtures, equipment, services, heavy trim, furnishings and similar work which cannot be adequately supported directly on gypsum board and applied finishes as indicated.
 - 1. Provide framed openings as required for Ductwork penetrations thru walls as required.

3.2 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.
- E. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
- F. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 - 1. Install two studs at each jamb strapped together. Stud shall be full height to deck above.

2. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
- G. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
- H. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
1. Firestop Track: Where indicated, install to maintain continuity of fire-resistance rated assembly indicated.
- I. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
- J. Curved Partitions:
1. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
 2. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches o.c.
- K. Direct Furring:
1. Screw to wood framing.
 2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
- L. Z-Furring Members:
1. Erect insulation vertically and hold in place with Z-furring members spaced 24 inches o.c.
 2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
 3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.
- M. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.3 INSTALLING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
- D. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
- E. Do not attach hangers to steel roof deck.
- F. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
- G. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
- H. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- I. Fire-Resistance-Rated Assemblies:
 - 1. Wire tie-furring channels to supports.
- J. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

3.4 INSTALLATION OF GYPSUM BOARD

- A. General Standards: In addition to compliance with GA-216, comply with manufacturer's instructions and requirements for fire-resistance ratings, whichever is most stringent.
- B. Provide moisture resistant gypsum board at wall of all bathrooms, and toilet rooms, do not use on ceilings.

3.5 SINGLE LAYER APPLICATIONS

A. Ceilings:

1. Apply gypsum board with long dimension at right angles to supports with end joints located over supports. Use maximum practical length boards to minimize end joints. Stagger end joints in alternate courses of boards and locate as far away from center of ceiling as possible. Fasteners shall be spaced not more than 8" o.c. Fasten with zinc-screws.
2. Gypsum board shall be attached to steel studs in accordance with ASTM Specification C 840, except that the steel drill screws (Specification ASTM C 954) shall be spaced not more than 8" o.c. at the edges and ends, and not more than 12" o.c., in the field on the board. On exterior walls, field screwing shall be at 8" o.c. Fasten with zinc-coated screws.

3.6 SOUND RATED APPLICATIONS

A. For sound-rated construction, comply with the following:

1. Partitions: Provide continuous beads of sealant at juncture of both faces of runner with floor construction, and wherever drywall abuts dissimilar materials. Install sealant prior to installation of gypsum boards.

3.7 GYPSUM SHAFTWALL CONSTRUCTION

- A. Install gypsum board shaft wall systems to comply with performance and other requirements indicated as well as with manufacturer's installation instructions and the following:
- B. ASTM C 754 for installation of steel framing. Fasten face layer of shaft wall system with screws through base layer and into supports. Do not bridge building expansion joints with shaft wall system, frame both sides of joints with furring and other support as indicated.
- C. Install supplementary framing, blocking, and bracing to support gravity and pullout loads of fixtures, equipment, services, heavy trim, furnishings and similar work which cannot be adequately supported directly by regular framing of gypsum board shaft wall system.
- D. Where handrails are indicated for direct attachment to gypsum board shaft wall system, provide not less than 0.0341" thick by 4" wide galvanized steel reinforcement strip, accurately positioned and secured behind not less than one gypsum board face layer of 5/8" thickness.
- E. At penetration in shaft wall, maintain fire resistance rating of entire shaft wall assembly by installing supplementary fire protection behind boxes containing wiring devices, elevator call buttons, elevator floor indicators, and similar items.
- F. Isolate shaft wall system from transfer of structural loading to system, both horizontally and vertically. Provide slip or cushioned type joints to attain lateral support and avoid axial loading. Comply with details shown and with manufacturer's instructions.

- G. Seal gypsum board shaft walls at perimeter of each section, which abuts work, and at joints and penetration within each section. Install acoustical sealant to withstand discoloration by air pressure differential between shaft and external spaces; comply with manufacturer's instructions and ASTM C 919.

3.8 DRYWALL ACCESS DOORS

- A. Install in an opening cut between two adjacent studs. The frame shall be positioned in the opening and screw attached to the studs.

3.9 DRYWALL FINISHING

- A. Finish exposed drywall surfaces with joints, corners and exposed edges reinforced or trimmed as specified, and with all joints, fasteners heads, trim accessory flanges and surface defects filled with joint compound in accordance with manufacturer's recommendations for a smooth, flush surface.
- B. Form true, level or plumb lines, without joints, fastener heads, flanges of trim accessories or defects visible after application of field-applied decoration.
- C. Use joint tape to reinforce joints formed by tapered edges or butt ends of drywall units and at interior corners and angles. Set tape in joint compound then apply skin coat over tape in one application.
- D. Where open spaces of more than 1/16" width occur between abutting drywall units, (except at control joints), prefill joints with joint compound and allow prefill to dry before application of joint tape.
- E. Reinforce external corners of drywall work with corner beads.
- F. Securely fasten metal corner beads as recommended by the manufacturer. Use fasteners which will be fully concealed by joint compound fill applied over flanges.
- G. Edge Trim:
 - 1. Provide specified type of metal casing bead trim. Install in single unjointed lengths wherever possible.
- H. Application of Joint Compounds:
 - 1. Allow drying time between applications of joint compound in accordance with manufacturer's recommendations for the relative humidity and temperature levels at the time of application. In no case, allow less than 24 hours drying time between applications of joint compound. Apply not less than 3 separate coats of joint compound over joints, fastener heads and metal flanges.
 - 2. Topping coat and sanding is not required above suspended ceilings where partition/walls are shown to extend to structural deck.
 - 3. Seal airtight all locations where pipes, ducts, conduits and other devices penetrate partitions above suspended ceiling. Seal both sides of partitions using joint treatment compounds and plastic tape as required.

4. Sealing of joints between tops of partitions that extend to metal roof deck and corrugations of metal roof deck is specified in Section 078413 "Penetration Fire Stopping".
- I. Protect gypsum sheathing that will be exposed to weather for more than one month as follows:
 1. Protect cutouts, corners, and joints in the sheathing by filling with a flexible sealant or by applying tape recommended by sheathing manufacturer at the time sheathing is applied.

3.10 CLEAN-UP

- A. At completion of each stage of the work, all excess materials, cuttings, scrap, etc. shall be removed from the site, and all spatters, droppings, etc., shall be cleaned up.

END OF SECTION 09 2500

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 DESCRIPTION OF WORK

- A. The extent of each type of tile work is shown on the drawings or herein specified including, but not necessarily limited to the following:
 - 1. Porcelain Wall Tile.
 - 2. Glass Tile.
 - 3. Waterproof Membrane (Walls).

1.3 REFERENCES

- A. Tile Council of America - Installation Handbook.
- B. American National Standards Institute (ANSI):
 - 1. ANSI A108 Series/A118 Series – American National Standard Specifications for Installation of Ceramic Tile.
 - 2. ANSI A108.19 – American National Standard Specifications for Gauged Porcelain Tiles and Gauged Porcelain
 - 3. Tile Panels/Slabs.
 - a. ANSI A108.20 – American National Standard Specifications for Exterior Installation of Vertical and Overhead Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method Bonded with Improved Modified Dry-Set Cement Mortar.
 - b. ANSI A137.1 – American National Standard Specifications for Ceramic Tile.
 - c. ANSI A137.3 – American National Standard Specifications for Gauged Porcelain Tile and Gauged Porcelain Tile
- C. Panels/Slab

1. ANSI A138.1 – American National Standard Specifications for Green Squared Certification for Tiles and
- D. Installation Materials.
1. ASTM International (ASTM):
 - a. ASTM A1064 – Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
 - b. ASTM C144 – Standard Specification for Aggregate for Masonry Mortar. Jobsite mix.
 - c. ASTM C150 – Standard Specification for Portland Cement. Jobsite mix.
 - d. ASTM C645 – Standard Specification for Nonstructural Steel Framing Members.
 2. NSI (DSDM) – Dimension Stone Design Manual; Natural Stone Institute.
 3. TCNA (HB) – Handbook for Ceramic Tile, Glass, and Stone Installation; Tile Council of North America.
 4. TTMAC – Specifications Guide 09 30 00 Tile Installation Manual.
 5. International Organization for Standardization (ISO):
 - a. ISO 13007 – Ceramic tiles – Grout and adhesives.
 6. Leadership in Energy and Environmental Design (LEED®) – U.S. Green Building Council.

1.4 SUBMITTALS

- A. Prior to starting work, provide Architect with a "Master Grade Certificate" stating grade, type and quantity of material and bearing signature of tile manufacturer and Contractor. Covering order shall show name of Owner, Architect, the Project and project location.
- B. Installation Instructions: Manufacturer's printed instructions for each product
- C. Submit 2 samples of each type, class, and color of tile required. Architect's review will be for colors, pattern, and texture only. Compliance with all other requirements is the exclusive responsibility of the Contractor.
- D. Obtain approval of job sample submittals before delivering any products to job site.
- E. Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.
- F. Maintenance Data: Include recommended cleaning methods, cleaning materials, and maintenance coatings.

- G. Manufacturer's Certificates: Certify products meet or exceed specified requirements. When applicable, submit a Master Grade Certificate signed by the manufacturer and the installer certifying that products meet or exceed the specified requirements of ANSI A137.1 and/or ANSI A137.3.

1.5 QUALITY ASSURANCE

- A. To ensure single-source warranty requirements and compatibility of products: Please provide cleaners, sealing and maintenance products as well as tile grout, setting materials, underlayments, additives, accessories and factory- prepared dry-set mortars from the same manufacturer.
- B. Installer Qualifications:
 - 1. Engage an experienced installer who has completed tile installations similar in material, design, and extent to that indicated for this project and with a record of successful in-service performance. Installer to have a minimum of five years' experience.
 - 2. Five-Star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.
 - 3. Contractors' Association of America.
 - a. Installer's supervisor for the project must hold the International Masonry Institute's Foreman Certification.
 - b. Installer employs Ceramic Tile Education Foundation Certified Installers or installers recognized by the U.S.
- C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution

1.6 PRODUCT DELIVERY, STORAGE HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels legible and intact until time of use identifying brand name and contents. Prevent damage or contamination to materials by water, freezing, foreign matter and other causes.
- B. Store tile and setting materials on elevated platforms, under cover and in a dry location and protect from contamination, dampness, freezing and overheating in accordance with manufacturer's instructions.
- C. Do not use frozen materials unless specifically allowed by manufacturer.
- D. Deliver and store materials on site at least 24 hours before work begins.
- E. Provide heated and dry storage facilities on site
- F. Tile cartons grade-sealed by manufacturer in accordance with TCA 137.1. Grade-seals unbroken.

- G. Manufactured mortars and grouts to contain hallmarks certifying compliance with reference standards and be types recommended by tile manufacturer for application.
- H. Deliver mastic grout ready for use.
- I. Deliver dry-set mortar in sealed, moisture-proof containers.

1.7 ENVIRONMENTAL CONDITIONS

- A. Comply with requirements of referenced standards and recommendations of material manufacturers for environmental conditions before, during, and after installation.
- B. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.
- C. Maintain substrate and ambient temperatures in tiled areas between 50°F and 95°F during installation and for at least 7 days after completion, unless otherwise indicated in the product instructions and/or ANSI A108 installation standards.
- D. Provide adequate lighting for good grouting and clean-up.
- E. Setting products must be kept in a dry area prior to use.

PART- 2 PRODUCTS

2.1 PORCELAIN

- A. CT-1 Bespoke Collection, Stacked Celestine, Silver Polished Glass Mosaic.
 - 1. Size: 2" x 6" (12" x 12" sheet)
 - 2. Grout Joint: 1/16"

2.2 ADHESIVE

- A. Walls: Laticrete or equal, Glass Tile Adhesive Lite.

2.3 SEALANT

- A. Walls: Sanitary 1700 Sealant by General Electric or accepted equal. One part mildew resistant silicone sealant. Color as selected by Architect.

2.4 COLORED GROUT

- A. Colored grout shall be as manufactured by Laticrete International, Inc., or approved equivalent. Color selected by Architect.
- B. "SpectraLoc" Pro Premium or "SpectraLoc" Pro Premium Translucent Grout as chosen by Architect.

2.5 EDGE BAND

- A. As manufactured by Schluter Systems, Interior Finish Schedule.
 - 1. Outside Corner: RONDEC
 - 2. Cap: RONDEC

2.6 ACCESSORIES

- A. Temporary Setting Shims: Ridged plastic shims, size to suit joint thickness.
- B. Setting Shims: Strips of resilient plastic or neoprene, of thickness to prevent point loading of stone on anchors and of depths to suit anchors without intruding into required depths of pointing materials.
- C. Cleaner: Cleaner specifically formulated for tile types, finishes, and applications indicated, as recommended by tile producer. Do not use cleaning compounds containing acids, caustics, harsh fillers, or abrasives.

PART- 3 EXECUTION

3.1 PREPARATION

- A. Beginning work on any surface constitutes acceptance of the surface as suitable to receive work of this section and acceptance of full responsibility for the quality and appearance of finished work.
- B. Do not start until work of other trades, which goes through or in the space behind tile, has been completed.
- C. Examine substrates for compliance with requirements for conditions affecting performance of the work. Refer to ANSI A108.01, ANSI A108.02 and if applicable ANSI A108.19 and/or ANSI A108.20. This includes, but is not limited to squareness and plumbness of walls and variations in floor.
- D. Do not proceed with tilework until surfaces and conditions comply with requirements indicated in reference tile installation standard and manufacturer's printed instructions
- E. Work shall not be started on concrete surfaces until surfaces are thoroughly cured and dry.

- F. Surfaces to receive thin-bed mortar shall not vary more than 1/8" above and 1/8" below required plane in any undivided space; nor shall there be more than 1/16" variation within any single running foot.
1. Cementitious Backer Board Substrate:
 - a. Verify board fastening at 8 inches on center with screws firmly anchored into stud backing.
 - b. All horizontal and vertical joints and corners are to have 1/8 inch spacing to be filled solid with mortar. Apply 2-inch glass fiber mesh tape embedded in a skim coat of the mortar at all joints and corners.
 2. Expansion Joints:
 - a. Notify Architect if concrete slab expansion joints are located within work areas. Install tile at expansion joints in conformance with TCA EJ171.
- G. Close off spaces in which tile is being set to traffic and other work during installation and for at least 72 hours after completion of tile work.
- H. Floor tile operations in spaces receiving wall tile shall not be started until after wall tile installation has been completed.
- I. Before installing base tile, seal areas around pipes penetrating the backing material. Sealer used shall be compatible with material which will be used to install the tile.

3.2 WORKMANSHIP

- A. All tile shall be installed by skilled mechanics thoroughly competent to execute the work in accordance with best practices and methods common to the trade and in accordance with Tile Council of America "Handbook for Ceramic Tile Installation", latest edition.
- B. Accurate pitch of setting bed to floor drains to be maintained.
- C. Porcelain tile shall be set with constant 1/8" joints. Marble shall be set at 1/16" joints. Adjust factory mounted tile as required to align joints squarely. Tile shall be firmly secured in place in straight lines and level plans. The finished work shall be free from scratched, broken, inverted, cracked, or misplaced tiles.
- D. Grind and fit tile carefully at intersections, against trim finish, and at built-in fixtures and accessories. Fit tile closely around outlets, pipes, fixtures, and fittings so that plates, escutcheons and collars will overlap cuts. Cut and drill tile and trim shapes accurately without damage. Rub all exposed cut edges smooth with abrasive stone.
- E. Layout shall be symmetrical at all spaces and preclude the use of less than half tile sizes. Tile shall accurately align in all directions, vertically and horizontally, and shall be flush throughout the field.
- F. Except where otherwise shown or specified, make joints in floor tile perpendicular and parallel to walls.
- G. Prevent rapid evaporation of moisture from the mortar bed. Do not set tile on dry bed.

3.3 APPLICATION

- A. Install tile in accordance with manufacturer's printed instructions and the applicable requirements of ANSI A108 Series for the materials being used.
- B. Protect surrounding finish materials during application of waterproofing. Clean spillage's immediately with solvent recommended by manufacturer and flush with clear water.
- C. For installation on existing wall tile, verify existing tile is soundly secured to wall. If needed removed loose tile and fill with mortar filler. Degrease existing tile before installing new tile.
- D. Install all floor, wall and base tile in strict accordance with ANSI specifications for the particular applications scheduled on the drawings. Comply with manufacturer instructions.
- E. Extend tile work into recesses and under or behind equipment and fixtures, to form a complete covering without interruptions, except as otherwise shown. Terminate work neatly at obstructions, edges and corners without disrupting pattern or joint alignments.
- F. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures and other penetrations so that plates, collards or covers overlap tiles,
 - 1. Jointing pattern:
 - a. Unless otherwise shown, lay tile in grid pattern. Align joints when adjoining tiles on the floor, base, walls, and trim are same size. Layout tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting.
 - 2. Sealant:
 - a. Seal junction of plumbing fixtures, exposed pipe penetrations, fitting and expansion joints with sealant after grouting.
 - 3. Trim:
 - a. Install metal cap trim on wainscot tile wall as recommended by manufacturer. All corners shall be mitered.

3.4 GROUTING

- A. Grout joints in accordance with manufacturer's instructions and ANSI A108.6 and/or ANSI A108.10.
- B. Remove standing water, dust, and foreign substances from joints to be grouted
- C. Clean and dry tile surfaces.
- D. After grouting, remove all grout residue promptly.

- E. Dry-set grout may be applied over dry tile without wetting of tile. Grout for floors shall be, color to be selected by Owner. Factory premixed colored grouts may be used. Colored grout for walls shall be as selected by Architect.
 - 1. Allow mortar to attain initial set before placing joint grout.
 - 2. Before grout is set, strike or tool joints to depth of cushion.
 - 3. Fill all gaps and skips.
 - 4. Clean excess grout from all surfaces before grout sets.

3.5 CURING AND CLEANING

- A. Floors shall be covered with waterproof paper with all joints lapped at least 4" and the laps tape-sealed or held down with planks or weights and allowed to damp cure for at least 72 hours before foot traffic is permitted thereon.
- B. Sponge and wash all tile thoroughly. Acid or acid type cleaners not permitted.
- C. Tile which is stained, broken or damaged in any way is not acceptable and must be replaced.
- D. Upon completion of all work, tile contractor shall remove all unused material and rubbish from the site.

3.6 PROTECTION

- A. Floors: Protect from all traffic for at least 72 hours after installation.
 - 1. Do not step on floor for at least 24 hours; if traffic is unavoidable after that, use plywood stepping boards.
 - 2. Protect from heavy traffic for at least 7 days after installation.
 - 3. When fast-setting materials are used to allow faster occupancy, comply with the manufacturer's recommendations.
- B. Protect from impact, vibration and heavy hammering on adjacent and opposite walls for at least 14 days after installation, unless manufacturer's instructions allow a shorter period.
- C. Protect from stain-causing food products and chemicals for at least 14 days.
- D. Tiled vertical outside corners (external angles) shall be protected with board corner strips in areas used as passageways by workmen.
- E. Protect tile work from damage until project completion or acceptance.

END OF SECTION 09 3000

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 DESCRIPTION OF WORK

- A. The types of acoustical panel ceilings specified in this section includes, but is not limited to, the following:
 - 1. Suspended mineral fiber panel systems.
 - 2. Exposed grid suspension system for acoustical ceilings
 - 3. Grid suspension systems for gypsum board ceilings and soffits
 - 4. Wire hangers, fasteners, main runners, cross tees and wall angle moldings
 - 5. Perimeter trim

1.3 QUALITY ASSURANCE

- A. Fire Resistance Ratings: As indicated by reference to design designation in UL "Fire Resistance Directory" for floor, roof or beam assemblies in which acoustical ceilings function as a fire protective membrane; tested per ASTM E 119. Provide protection materials for lighting fixtures and air ducts to comply with requirements indicated UL design assemblies as shown on drawings.
- B. Surface Burning Characteristics: As follows, tested per ASTM E 84.
 - 1. Flame Spread: 25 or less.
 - 2. Smoke Developed: 50 or less.
- C. Coordination of Work: Coordinate layout and installation of acoustical ceiling units and suspension system components with other work supported by, or penetrating through, ceilings, including light fixtures, HVAC equipment, fire-suppression system components (if any), and partition system (if any). Reflected ceiling plans may vary due to variations in room size. Contractor's bid shall include all such variations.

- D. Single source responsibility: Provide acoustical panel units, grid components, and trim by a single manufacturer.

1.4 SUBMITTALS

- A. For information only, submit 2 copies of manufacturer's product specifications and installation instructions for each acoustical ceiling material required, and for each suspension system, including certified laboratory test reports and other data as required to show compliance with these specifications. Distribute one additional copy of each installation instruction to the Installer.
- B. Include manufacturer's recommendations for cleaning and refinishing acoustical units, including precautions against materials and methods, which may be detrimental to finishes and acoustical performances.
- C. Submit 2 sets of 6" square samples for each acoustical unit required. In each set of samples, show the full range of exposed color and texture to be expected in the completed work. Sample submittal and Architect's review will be for color and texture only. Compliance with other requirements is the exclusive responsibility of the Contractor.
- D. When work is completed, deliver stock of replacement material to Owner for each type of acoustical unit used in the work. Furnish full size units, matching installed materials, packaged and marked for identification. Furnish not less than two cases of each type of acoustical unit installed.

1.5 WARRANTY

- A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace acoustical panels that fail within the warranty period. Failures include but are not limited to:
 - 1. Acoustical Panels: Sagging and warping as a result of defects in materials or factor workmanship.
 - 2. Grid System: Rusting and manufacturer's defects.
 - 3. Acoustical Panels with BioBlock Plus or designated as inherently resistive to the growth of micro-organisms installed with Armstrong suspension systems: Visible sag and will resist the growth of mold/mildew and gram positive and gram negative odor and stain causing bacteria.
- B. Warranty Period Humiguard:
 - 1. Acoustical panels: Ten (10) years from date of substantial completion.
 - 2. Grid: Ten (10) years from date of substantial completion.
 - 3. Acoustical panels and grid systems with HumiGuard Plus or HumiGuard Max performance supplied by one source manufacturer is thirty (30) years from date of substantial completion.

- C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.6 PRODUCT HANDLING

- A. Deliver acoustical panels in manufacturer's original unopened packages, fully identified with type, finish, performance data and compliance labels. Handle and store in accordance with manufacturer's instructions and recommendations.

1.7 JOB CONDITIONS

- A. Do not install acoustical units until installation areas meet the following requirements: exterior openings have been closed and roofs are weathertight; mechanical, electrical, and other work above ceilings have been completed; wet work has been installed; temperature and relative humidity have reached levels which comply with acoustic materials manufacturer's recommendations for the units to be used and are acceptable to the Installer.
- B. Coordinate all work with Mechanical and Electrical trades. Prior to layout work, it shall be the responsibility of the Contractor to meet with the General Contractor and Electrical Contractor to properly coordinate the installation of the ceiling and electrical fixtures.
- C. Examine related sections of these specifications for hangers, inserts, etc. provided under those sections.
- D. Suspension system shall be coordinated with metal stud and/or demountable partitions. Bracing, etc., required for stiffening of partition system shall be provided by this Contractor.

1.8 EXTRA MATERIALS

- A. Deliver extra materials to Owner. Furnish new extra materials described below that match products installed. Package with protective covering for storage and identified with appropriate labels.
 - 1. Acoustical Ceiling Units: Furnish quantity of full-size units equal to 1 percent of the amount installed.
 - 2. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed.

1.9 ALTERNATE CONSTRUCTION WASTE DISPOSAL

- A. Ceiling material being reclaimed must be kept dry and free from debris.
- B. Contact the Armstrong Recycle Center a consultant will verify the condition of the material and that it meets the Armstrong requirements for recycling. The Armstrong consultant will provide assistance to facilitate the recycling of the ceiling.

PART-2 PRODUCTS

2.1 MATERIALS – GENERAL

- A. The following specified acoustical materials shall have the minimum requirements listed below, in addition to the requirements of the “Quality Assurance” Section.
- B. Examine related sections of these specifications for hangers, inserts, etc. provided under those sections.
- C. Suspension system shall be coordinated with metal stud and/or demountable partitions. Bracing, etc., required for stiffening of partition system shall be provided by this Contractor.

2.2 EXTRA MATERIALS

- A. Deliver extra materials to Owner. Furnish extra materials (1% of amount installed), packaged with protective covering for storage and identified with appropriate labels.

2.3 ACOUSTICAL

- A. The following specified acoustical materials shall have the minimum requirements listed below, in addition to the requirements of Quality Assurance Section.
 - 1. NRC: .55
 - 2. CAC 40
 - 3. CSTC: 35
 - 4. L.R.: 75%
 - 5. Flame Spread - 0 -25, Class A per ASTM E 1264.

2.4 CEILING MATERIALS

- A. Basis of Design Product: Subject to compliance with requirements, provide products as indicated by Armstrong World Industries, Inc. or an equal product by one of the following:
 - 1. Armstrong World Industries
 - 2. Celotex Corporation
 - 3. USG Corporation
- B. Except as noted, the materials as manufactured by Armstrong World Industries are specified. Equal patterns and textures furnished by one of the above companies will be considered.

2.5 CEILING TYPES

- A. Provide units of the composition, patterns, finishes, sizes, thickness, edge profiles and other characteristics as indicated and recommended by the manufacturer for the indicated application. Tile must comply with UL design systems as previously noted. The manufacturer based Armstrong ceiling solutions or equal.
 - 1. A.C.T. 1
 - a. Tile: Tectum DesignArt - Lines, 24" X 24" X 1".
 - b. Suspension System: 15/16" – Square Tegular #7301 with Angle molding #7800 to match.
 - c. Color as chosen by Architect from manufacturer's full range of colors.
 - d. Grid to be color matched.
- B. Armstrong Contact: Lynda Caccamo (315) 399-8257 - lmcaccamo@armstrongceilings.com

2.6 SUSPENSION SYSTEM MATERIALS – GENERAL

- A. Acceptable Manufacturers: Materials of the following manufacturers are acceptable where applicable:
 - 1. Armstrong World Industries or Equal.
- B. Except as noted, the materials as manufactured by Armstrong World Industries are specified. Equal grid system furnished by one of the above companies will be acceptable, provide it is a component complying with the UL design system previously noted.
- C. Standard: Comply with the requirements of ASTM C 635, as applicable to the suspended acoustical ceilings system materials indicated. Provide fire-rated system throughout.
- D. Structural Classification: Intermediate-duty system.
- E. Coordination of Components
 - 1. Provide suspension system which is coordinated with partitions, and which is coordinated with the indicated limitations and requirements for hanging from structure and supporting light fixtures,
 - 2. HVAC components and similar work indicated to be supported by or located in suspended acoustical panel ceilings. Include the necessary components for a complete suspension system including (as applicable) inserts, anchors, hangers, carrying channels, main runners, cross runners, splines, edge moldings, splices, clips, fasteners, springs, tie wires, hold-down devices, and similar members, devices and accessories.
- F. Corrosion Protection: Electro galvanized steel meeting requirements of ASTM C 635 for normal use environments.
- G. Attachment Devices: Type recommended by suspension system manufacturer for attachment or anchorage of ceiling hangers to structure above ceiling, sized for not less than 5-times the hanger design load for the structural classification indicated; ASTM C 635, Table 1, Direct Hung.

- H. Hanger Wire: Galvanized carbon steel wire, ASTM A 641, soft temper, prestretched, Class 1 coating.
- I. Gauge: Provide wire sized so that stress at 5-times hanger design load (ASTM C 635, Table 1, Direct Hung) will be less than yield stress of wire, but provide not less than 12 gauge (0.106") wire.

2.7 RUNNERS, CROSS RUNNERS EDGE MOLDINGS AND TRIM

- A. General: Except as otherwise indicated, provide manufacturer's standard units of the metal, finish and shapes recommended for the applications indicated.
- B. Type of System: Either direct-hung or indirect-hung suspension system, at Contractor's option.
- C. Exposure of System: Provide fully exposed suspension system (for lay-in panels), with lower flanges of both main runners and cross runners exposed.
- D. Finish of Exposed Members: Provide uniform white matte baked enamel factory-applied finish on exposed surfaces of ceiling suspension system including moldings, trim and accessories.
- E. Edge Molding: Square Edge or shadow as noted in ceiling types.
- F. Trim: Armstrong Ceiling Systems, Axiom trim profiles or equal. Provide Axiom Classic and Vector trim rails with all required accessories.

2.8 TECTUM PANELS

- A. Panels mechanically attached to steel framing shall be installed per manufactures installation instructions.
- B. Panels shall be installed in an ashlar pattern. Whenever panel a butts another panel, edge shall be beveled.
- C. Screens shall be as defined in manufactures installation instructions. Screw head should be flush with surface.
- D. Paint screw head prior to installation to match natural finish.

2.9 MISCELLANEOUS MATERIALS

- A. Trapeze: Cold rolled steel channels, 16 MSG, 1-1/2".

PART- 3 EXECUTION

3.1 INSPECTION AND PREPARATION WORK

- A. Examine the conditions under which the acoustical panel ceiling work is to be performed. Do not proceed with the work until satisfactory conditions have been corrected.

- B. Plan each layout to balance border widths at opposite edges of each ceiling area. Avoid use of less-than-half width units wherever possible. Comply with Architect's reflected ceiling plans to the greatest extent possible.

3.2 INSTALLATION

- A. Install acoustical tile ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- B. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders and comply with layout shown on reflected ceiling plans.
- C. Suspend ceiling hangers from building's structural members, plumb and free from contact with insulation or other objects within ceiling plenum. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, counterplaying, or equally effective means. Where widths of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers, use trapezes or equivalent devices.
 - 1. Do not support ceilings directly from permanent metal forms or floor deck; anchor into concrete slabs.
 - 2. Do not attach hangers to steel deck tabs or steel roof deck.
- D. Install edge moldings and trim at perimeter of acoustical tile ceiling area and where necessary to conceal edges of acoustical units. Screw attached moldings to substrate with concealed fasteners at intervals not more than 16 inches o.c. and not more than three inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
- E. Lighting fixtures shall be installed according to reflected ceiling plans. All lighting fixtures shall have hanger wires at each corner. Provide rated enclosure for fixtures.
- F. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- G. Install acoustical tiles in coordination with suspension system and exposed moldings and trim. Place splines or suspension system flanges into kerfed edges so tile-to-tile joints are closed by double lap of material. Fit adjoining tile to form flush, tight joints. Scribe and cut tile for accurate fit at borders and around penetrations through tile. Where reveal edge tile meets border, kerf tile to provide recess. Where cut edge is exposed, paint to match tile. Hold tile field in compression by inserting leaf-type, spring-steel spacers between tile and moldings, spaced 12 inches o.c.

3.3 CLEANING AND PROTECTION

- A. Clean exposed surfaces of acoustical panels, trim, edge moldings, and suspension members; comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work, which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 5100

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. Section Includes:
 - 1. Resilient Wall Base.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. LEED Submittals:
 - 1. Product Data for Credit EQ 4.1: For adhesives, include printed statement of VOC content and chemical components.
- C. Samples for Initial Selection: For each type of product indicated.
- D. Samples for Verification: For each type of product indicated, in manufacturer's standard-size samples of each resilient product color, texture, and pattern required.
- E. Product Schedule: For resilient products. Use same designations indicated on Drawings.

1.4 QUALITY ASSURANCE

- A. Installation Qualification: Contractors for floor covering installation should be experienced in managing commercial flooring projects and provide professional installers, qualified to install the various flooring materials specified. An installer is "qualified" if trained, or a certified by Tarkett or a certified INSTALL (International Standards & Training Alliance) resilient floor covering installer.
- B. Mockups: Provide resilient products with mockups specified in other Sections.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by Tarkett, but not less than 55 deg F or more than 85 deg F.

1.6 PROJECT CONDITIONS

- A. Install resilient products after other finishing operations, including painting, have been completed.
- B. Maintain ambient temperatures within range recommended by Tarkett, but not less than 65 deg F or more than 85 deg F in spaces to receive resilient products during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- C. Maintain the ambient relative humidity between 40% and 60% during installation.
- D. Until Substantial Completion, maintain ambient temperatures within range recommended by Tarkett, but not less than 55 deg F or more than 85 deg F.

PART- 2 PRODUCTS

2.1 RESILIENT WALL BASE

- A. Provide vinyl base complying with FS SS-W-40, Type II, as follows:
 - 1. Manufacturers:
 - a. Johnsonite
 - b. Burke Flooring

2.2 RESILIENT TRADITIONAL VINYL WALL BASE (VB-1)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Johnsonite – Millwork plastic Vinyl Wall Base.
- B. Performance requirements meets ASTM F1861 Standard Specification for Resilient Vinyl Wall Base, Type TV, Group 1.
- C. Height: 4 1/4"
- D. Thickness: .25"

- E. Style: Reveal MW-XX-F
- F. Colors and Patterns: As selected by Architect from full range of industry colors.
- G. Test Data:
 - 1. Flexibility, ASTM F137: Passes 1/4 inch mandrel
 - 2. Resistance to light, ASTM F1515: Passes
 - 3. Resistance to chemicals, ASTM F925: Passes
 - 4. ASTM E 648, Standard Test Method for Critical Radiant Flux of 0.45 watts/cm² or greater, Class 1.

2.3 RESILIENT TRADITIONAL VINYL WALL BASE (VB-1)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Johnsonite plastic Vinyl Wall Base.
- B. Performance requirements meets ASTM F1861 Standard Specification for Resilient Vinyl Wall Base, Type TV, Group 1.
- C. Height: 4".
- D. Length: Roll - 120' long.
- E. Thickness: 1/8" gauge.
- F. Style: Standard top-set cove
- G. Colors and Patterns: As selected by Architect from full range of industry colors.
- H. Test Data:
 - 1. Flexibility, ASTM F137: Passes 1/4 inch mandrel
 - 2. Resistance to light, ASTM F1515: Passes
 - 3. Resistance to chemicals, ASTM F925: Passes
 - 4. ASTM E 648, Standard Test Method for Critical Radiant Flux of 0.45 watts/cm² or greater, Class 1.

2.4 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

- B. Flooring products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.5 INSTALLATION MATERIALS

- A. Adhesives: as recommended by Tarkett to meet site conditions
 - 1. Tarkett 960 Cove Base Adhesive (Porous applications)
 - 2. Tarkett 946 Premium Contact Bond Adhesive (Non-porous applications)

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the work.
- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to Tarkett's written instructions to ensure adhesion of resilient wall base.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- C. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- D. Vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 RESILIENT BASE INSTALLATION

- A. Comply with Tarkett's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

- D. Tightly adhere resilient wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.

3.4 CLEANING AND PROTECTION

- A. Comply with Tarkett's written instructions for cleaning and protection of resilient products.
- B. Perform the following operations immediately after completing resilient product installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

END OF SECTION 09 6513

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings, and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. This section includes the following Linoleum Modular Flooring:
 - 1. Marmoleum® Modular Striato
- B. Sections related to this section include:
 - 1. Concrete: Refer to Division 3 Concrete Sections for cast-in-place concrete, concrete toppings, and cementitious underlayments.
 - 2. Resilient Flooring Accessories: Refer to Division 9 Finishes Sections for resilient wall bases, reducer strips, metal edge strips and other resilient flooring accessories.

1.3 REFERENCES

- A. Forbo Technical Data Sheets
- B. Forbo Installation Guide
- C. Forbo Floor Care Guide
- D. Safety Data Sheets (MSDS or SDS)
- E. American Society for Testing and Materials (ASTM):
 - 1. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials
 - 2. ASTM E 492 – Standard Test Method for Laboratory Measurement of Impact Sound Transmission through Floor-Ceiling Assemblies Using the Tapping Machine
 - 3. ASTM E 648 – Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
 - 4. ASTM E 662 – Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
 - 5. ASTM E 989 – Standard Classification for Determination of Impact Insulation Class (IIC)

6. ASTM E 1745 – Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs
 7. ASTM F 141 – Standard Terminology Relating to Resilient Floor Coverings
 8. ASTM F 710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
 9. ASTM F 1482 – Standard Practice for Installation and Preparation of Panel Type Underlayments to Receive Resilient Flooring
 10. ASTM F 1861 – Standard Specification for Resilient Wall Base
 11. ASTM F 1869 – Standard Test Method for Measuring Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
 12. ASTM F 2195 – Standard Specification for Linoleum Tile Floor Covering
 13. ASTM F 2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
 14. ASTM F 2419 – Standard Practice for Installation of Thick Poured Gypsum Concrete Underlayments and Preparation of the Surface to Receive Resilient Flooring
 15. ASTM F 2471 – Standard Practice for Installation of Thick Poured Lightweight Cellular Concrete Underlayments and Preparation of the Surface to Receive Resilient Flooring
 16. ASTM F 2659 – Standard Guide for Preliminary Evaluation of Comparative Moisture Condition of Concrete, Gypsum Cement and other Floor Slabs and Screeds Using a Non- Destructive Electronic Moisture Meter
 17. ASTM F 2678 – Standard Practice for Preparing Panel Underlayments, Thick Poured Gypsum Concrete Underlayments, Thick Poured Lightweight Cellular Concrete Underlayments, and Concrete Subfloors with Underlayment Patching Compounds to Receive Resilient Flooring
 18. ASTM F 3191 – Standard Practice for Field Determination of Substrate Water Absorption (Porosity) for Substrates to Receive Resilient Flooring
- F. National Fire Protection Association (NFPA):
1. NFPA 253 – Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
 2. NFPA 258 – Test Method for Specific Optical Density of Smoke Generated by Solid Materials

1.4 SUBMITTALS

- A. Submit the following in accordance with conditions of contract and Division 1 specification section 01 3300 "Submittal Procedures".
- B. Product Data: Submit three (3) copies of the manufacturer's technical data and installation recommendations for each type of flooring and accessory products specified.
- C. Shop Drawings:

1. Submit shop drawings showing layout, locations of seams, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
 2. Show details of profiles and product components, including anchorage, accessories, finish colors, patterns and textures.
- D. Samples: Submit three (3) sets of samples of each type, color and finish of flooring and accessory products specified, with an indication of full range of color, pattern and texture variation. Provide samples with a minimum size of 6" x 9" for flooring products and 6" in length for accessories.
- E. Quality Assurance Submittals:
1. Submit three (3) copies of the manufacturer's Product Technical Data Sheet, specifying performance characteristics, criteria and physical requirements.
 2. Submit three (3) copies of the manufacturer's written installation recommendations.
- F. Closeout Submittals:
1. Submit three (3) copies of the maintenance and operations data. This should include methods for maintaining the installed products and any precautions against cleaning materials or methods that are detrimental to the product and their performance.
 2. Submit three (3) copies of the warranty as specified herein.
 3. Installer Certification: Submit proof of certification from the manufacturer certifying that the installers comply with the specified requirements.
- G. Replacement Material: After completion of work, deliver to project site replacement materials from the same manufactured lot as materials installed. Package materials with protective covering and identify each with descriptive labels.
1. Flooring Materials: No less than 50 square feet of each type, pattern and color installed.
 2. Accessories: No less than 10 linear feet for each 500 linear feet or fraction thereof each different type and color installed.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Whenever possible, provide each type of flooring as provided by a single manufacturer, including recommended primers, adhesives, sealants, patching and leveling compounds.
- B. Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation and floor care recommendations and manufacturer's warranty requirements. Comply with requirements according to the "Project Management and Coordination" in Division 1 Project Meetings Section.
- C. Pre-Installation Testing: Conduct and document pre-installation testing as specified by manufacturer in accordance with the latest version of the specified test methods.
1. Substrate Porosity Testing: ASTM F 3131 – Standard Practice for Field Determination of Substrate Water Absorption (Porosity) for Substrates to Receive Resilient Flooring.

2. pH testing: ASTM F 710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
 3. In-situ Relative Humidity Testing: ASTM F 2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
 4. Calcium Chloride Testing: ASTM F 1869 – Standard Test Method for Measuring Moisture Vapor Emissions Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
 5. Surface Moisture Testing: ASTM F 2659 – Standard Guide for Preliminary Evaluation of Comparative Moisture Condition of Concrete, Gypsum Cement and other Floor Slabs and Screeds Using a Non-Destructive Electronic Moisture Meter.
 6. Bond Testing: Conduct testing and document results in accordance with the manufacturer's recommendations.
- D. Flooring Contractor Qualifications:
1. The awarded flooring contractor shall be an established firm, experienced in the installation of the specified product and shall have access to all manufacturer's required specifications, technical, installation and maintenance related documents.
- E. Installer Qualifications: Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
1. Engage installers certified by Forbo as a "Forbo Certified Modular Technician."
 2. Proof of valid certification must be submitted to the General Contractor and verified by Forbo prior to the start of the project.
 3. Forbo Certified Modular Technicians must be present on the jobsite daily.
- F. Regulatory Requirements: Provide flooring products with the following fire performance characteristics as determined by testing identical products in accordance with the latest version of ASTM method indicated below by a certified testing laboratory or another testing and inspecting agency acceptable to authorities having jurisdiction.
1. ASTM E 648 – Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source or NFPA 253 – Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
 2. ASTM E 662 – Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials or NFPA 258 – Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
- G. Standard of Quality Mock-Up: For the purpose of evaluating the quality of workmanship, install a mock-up of the specified flooring completed by the pre-qualified installers following the manufacturer's installation recommendations. Obtain Owner's and Architect's acceptance of finish color, texture and pattern, and workmanship standard. Comply with requirements according to the "Quality Control" in Division 1 Mock-Up Requirements Section.
1. Size and Location of Mock-Up: As directed in field by Owner and Architect.
 2. Maintenance of Mock-Up: Maintain mock-up during construction for workmanship comparison; remove and legally dispose of mock-up when no longer required.

3. Approval of Mock-Up: Upon approval of the mock-up, this installation shall be considered the standard of quality and basis of comparison for the balance of the project. Areas to be found deficient by specification standards or application procedures shall be repaired or replaced at the contractor's expense.
 4. Incorporation of Mock-Up: The mock-up may be incorporated into final construction upon Owner's approval.
- H. Post-Installation Meetings: Conduct post-installation meetings to review methods and procedures related to floor care and warranty requirement.

1.6 WARRANTY

- A. Project Warranty: Comply with requirements according to the "Conditions of the Contract" in Division 1 Closeout Submittals Warranty Section for project warranty provisions.
- B. Manufacturer's Warranty: Submit the manufacturer's standard warranty document executed by authorized company official for Owner's acceptance. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.
 1. Warranty Period: Thirty (30) year limited warranty commencing on Date of Original Purchase from manufacturer.
- C. Installation Warranty: Submit the flooring contractor's installation warranty signed by the General Contractor and Installer for Owner's Acceptance, agreeing to repair or replace work which has failed as a result of defects in workmanship. Failure shall include, but not limited to, tearing, cracking, separation, deterioration or loosening from substrate, seam failure, ripples, bubbling or puckering. Upon notification of such installation deficiencies, within the warranty period, make necessary repairs or replacement at the convenience of the Owner. Other guaranties or warranties may not be substituted by the Contractor for the terms of this warranty. Installation warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.
 1. Warranty Period: Two (2) year limited warranty commencing on Date of Substantial Completion from flooring contractor.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with the Division 1 Product Requirements Sections.
- B. Ordering: Comply with the manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- C. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- D. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.
 1. All materials (flooring, adhesives, weld rod and accessories) should be stored in areas that are fully enclosed and weathertight. The permanent HVAC should be fully operational and controlled and set at a minimum temperature 65° F. If this is not possible, the areas should be acclimated and controlled by means of temporary HVAC to the service level conditions expected during occupancy. The temperature and humidity should range from 75° F ± 10°F with a 50% ± 10% ambient relative humidity.
 2. Store modular cartons stacked per the manufacturer's recommendations.

3. Comply with the manufacturer's recommendation for the acclimation of all materials in the space where they will be installed for at least 48 hours prior to the installation unless longer conditioning periods are required by the manufacturer.

1.8 PROJECT CONDITIONS

A. Environmental Requirements/Conditions:

1. Areas to receive material should be clean, fully enclosed and weather tight. The permanent HVAC should be fully operational and controlled and set at a minimum temperature 65° F. If this is not possible, the areas should be acclimated and controlled by means of temporary HVAC to the service level conditions expected during occupancy. The temperature and humidity should range from 75° F $\pm$ 10°F with a 50% $\pm$ 10% ambient relative humidity. These conditions **MUST** be established at least seven days prior to beginning the installation, maintained during the installation, and continued for at least seven days following the installation.
2. The flooring material should be conditioned in the same manner for at least 48 hours prior to the installation.
3. Substrate evaluation and preparation should not begin until a stable, conditioned environment has been established as described in this section.
4. Areas to receive flooring must have adequate lighting to allow for proper inspection and preparation of the substrate, installation of the flooring and final inspection.

B. Temperature Requirements: Maintain air temperature in spaces where products will be installed for time period before, during, and after installation as recommended by manufacturer.

1. Temperature Conditions: 65° F for at least seven days prior to beginning the installation, maintained during the installation, and continued for at least seven days following the installation.

C. Substrate Conditions:

1. Existing Conditions.
2. Concrete Curing: Do not install flooring over concrete substrates until substrates have cured and are dry to bond with adhesive as determined by the concrete and flooring manufacturer's recommendations.
3. Testing Results: Conduct and document pre-installation testing as specified by manufacturer in accordance with the latest version of the specified test methods.
 - a. Substrate Porosity Testing: ASTM F 3131 – Standard Practice for Field Determination of Substrate Water Absorption (Porosity) for Substrates to Receive Resilient Flooring.
 - b. pH testing: ASTM F 710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
 - c. In-situ Relative Humidity Testing: ASTM F 2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
 - d. Calcium Chloride Testing: ASTM F 1869 – Standard Test Method for Measuring Moisture Vapor Emissions Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

- e. Surface Moisture Testing: ASTM F 2659 – Standard Guide for Preliminary Evaluation of Comparative Moisture Condition of Concrete, Gypsum Cement and other Floor Slabs and Screeds Using a Non- Destructive Electronic Moisture Meter.
 - f. Bond Testing: Conduct testing and document results in accordance with the manufacturer's recommendations.
4. Close spaces to traffic during flooring installation and for time period after installation recommended in writing by the manufacturer.
 5. Installation should not begin until the work of all other trades has been completed, especially overhead trades.
 6. Where demountable partitions and other items are indicated for installation on top of flooring material, install flooring material before these items are installed.
- D. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

PART- 2 PRODUCTS

2.1 LINOLEUM MODULAR FLOORING

- A. Basis of Design:
1. FORBO - Marmoleum® Modular Striato
US Headquarters
8 Maplewood Dr.
Hazleton, PA 18202
Phone: 1-800-842-7839
www.forboflooringNA.com
 2. Substitution requests shall be considered in accordance with contract provisions.

2.2 MATERIALS

- A. Material Name: Marmoleum® Modular Striato
1. Description: Homogeneous linoleum tile made primarily of natural materials consisting of linseed oil, wood flour, and rosin binders, mixed and calendared onto a polyester backing. Pattern and color shall extend throughout total thickness of material.
 2. Finish: Topshield2™ applied during the manufacturing process
 3. Size: Match Existing
 4. Gauge: 2.5mm (1/10")
 5. Backing: Polyester
 6. Color and Pattern: Colors and patterns shall be selected by Architect. Patterns shall be defined in any given area, applied in stripes, diagonals, checkerboard pattern and other designs as determined by the

Architect. All selections shall be made from the manufacturer's full product lines (including premium colors).

a. Existing: Marmoleum Striato, Rocky Ice #T5232.

B. Adhesive: Forbo T 940 Adhesive or as recommended by manufacturer.

2.3 ACCESSORIES

A. Resilient Edge Strips: Strips shall be homogeneous vinyl or rubber composition with a tapered or bull nose edge no less than 1" wide, colored to match flooring or as selected by Architect from standard colors available.

B. Metal Edge Strips: Strips shall be of width shown and of required thickness to protect the exposed edge of the flooring with units in maximum length available to minimize the number of joints.

C. Floor Care Products: Provide products as required in Section 3.7 Cleaning.

2.4 SOURCE QUALITY

A. Source Quality: Obtain flooring product materials from a single manufacturer.

PART- 3 EXECUTION

3.1 MANUFACTURER'S RECOMMENDATIONS

A. Compliance: Comply with manufacturer's product technical data, including product technical bulletins, installation recommendations and floor care recommendations.

3.2 INSPECTION

A. Site Verification of Conditions: The Flooring Contractor and Installer shall examine and verify conditions previously described in other sections under which flooring and accessories are to be installed to be in accordance with the manufacturer's installation recommendations and must notify the General Contractor in writing of conditions detrimental to proper and timely completion of work. Work shall not proceed until all unsatisfactory conditions are corrected to acceptable conditions to the Owner and Architect.

B. Material Inspection: Visually inspect all materials prior to installation in accordance with the manufacturer's installation recommendations. Material with visual defects shall not be installed and shall not be considered as a legitimate claim if they are installed.

3.3 PREPARATION

A. General: Comply with manufacturer's written installation recommendations for preparing substrates indicated to receive flooring products and accessories.

B. Adjacent Surfaces Protection: Protect adjacent work areas and finish surfaces from damage during product installation.

C. Surface Preparation:

1. General: Prepare substrate in accordance with manufacturer's recommendations and ASTM industry standards. Work shall not proceed until all unsatisfactory conditions are corrected to acceptable conditions to the Owner and Architect.
 2. Substrate: Substrates to receive flooring must be structurally sound, rigid, smooth, flat, clean, and permanently dry. The substrates must be free of all foreign materials including, but not limited to, dust, solvent, paint, wax, oils, grease, residual adhesive, adhesive removers, film-forming curing compounds, silicate penetrating curing compounds, sealing, hardening or parting compounds, alkaline salts, excessive carbonation or laitance, mold, mildew, and other foreign materials that might affect the rate of moisture dissipation from the concrete, the adhesion of flooring to the concrete or cause a discoloration of the flooring from below.
 3. Concrete Substrates: Concrete substrates shall be cured per the concrete manufacturer's recommendations. They must have a minimum compressive strength of 3,000 psi and a minimum dry density of 150 pounds per cubic foot. Refer to Division 3 Concrete Sections for patching, repairing crack materials and leveling compounds with Portland cement-based compounds.
 - a. Refer to Division 3 Concrete Sections for cast-in-place concrete, concrete toppings, and cementitious underlayments.
 - b. Reference Standard: Comply with the latest version of ASTM F 710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
- D. Wood Substrates: Wood substrates must be double construction with a minimum total thickness of 1 inch. Wood substrates must be rigid, free from movement and have at least 18" of well-ventilated air space below. Forbo products should not be installed over wooden subfloors built on sleepers over on or below grade concrete floors without first making sure that adequate precautions have been taken to ensure the structural integrity of the system, and to prevent moisture migration from the concrete slab.
1. Refer to Division 6 Carpentry Section for wood substrates and wood underlayment.
 2. Reference Standard: Comply with the latest version of ASTM F 1482 – Standard Practice for Installation and Preparation of Panel Type Underlayments to Receive Resilient Flooring.
- E. Substrate Testing: In order to ensure that the moisture condition of concrete substrates is within acceptable limits, it is essential that moisture testing be conducted and documented on ALL concrete substrates regardless of age or grade level, including those where resilient flooring has already been installed. Moisture testing should only be conducted once a stable, conditioned environment has been established in accordance with the latest version of the specified test methods. All other testing types shall be conducted on all substrate types. A diagram of the area showing the location and results of each test should be submitted to the Architect, General Contractor or End User. If at the time of testing the test results exceed the limitations set forth by the flooring manufacturer, the installation must not proceed until the problem has been corrected. The Contractor responsible for the substrate shall be responsible for the costs associated with analysis of the substrate and subsequent remediation requirements.
1. Surface Moisture Testing: ASTM F 2659 – Standard Guide for Preliminary Evaluation of Comparative Moisture Condition of Concrete, Gypsum Cement and other Floor Slabs and Screeds Using a Non-Destructive Electronic Moisture Meter.
 - a. Conduct testing at each calcium chloride test location as the calcium chloride test is being placed.

- b. The concrete surface must be dry and have a value of 5 or less when using Forbo Sustain 1299 adhesive.
- 2. In-situ Relative Humidity Testing: ASTM F 2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
 - a. Conduct three (3) tests for the first 1,000 square feet (100 square meters) and at least one additional test for each additional 1,000 square feet (100 square meters).
 - b. The concrete internal relative humidity must not exceed 75% when using Forbo T 940 adhesive.
 - c. The concrete internal relative humidity must not exceed 85% when using Forbo Sustain 885m adhesive.
 - d. The concrete internal relative humidity must not exceed 95% when using Forbo Sustain 1195 adhesive.
 - e. The concrete internal relative humidity must not exceed 95% when using Forbo Sustain 1299 adhesive.
 - f. The concrete internal relative humidity must not exceed 80% when using Forbo 660 adhesive.
- 3. Calcium Chloride Testing: ASTM F 1869 – Standard Test Method for Measuring Moisture Vapor Emissions Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
 - a. Conduct three (3) tests for the first 1,000 square feet (100 square meters) and at least one additional test for each additional 1,000 square feet (100 square meters).
 - b. The concrete moisture vapor emissions must not exceed 5.0 lbs. per 1,000 square feet in 24 hours when using Forbo T 940 adhesive.
 - c. The concrete moisture vapor emissions must not exceed 8.0 lbs. per 1,000 square feet in 24 hours when using Forbo Sustain 885m adhesive.
 - d. The concrete moisture vapor emissions must not exceed 10.0 lbs. per 1,000 square feet in 24 hours when using Forbo Sustain 1195 adhesive.
 - e. The concrete moisture vapor emissions must not exceed 6.0 lbs. per 1,000 square feet in 24 hours when using Forbo 660 adhesive.
- 4. Substrate Porosity Testing: ASTM F 3131 – Standard Practice for Field Determination of Substrate Water Absorption (Porosity) for Substrates to Receive Resilient Flooring.
 - a. Conduct testing in accordance with the manufacturer's recommendations in various locations throughout the area where flooring is to be installed. Although the number of tests required may vary, enough tests should be performed to allow an evaluation of the entire area where material will be installed.
 - b. Water should penetrate into the substrate within 5 – 20 minutes to be considered acceptable. If water penetrates too rapidly or too slowly, adjustments to the substrate must be made to provide the proper surface profile. Substrates determined to be overly porous, dusty or generally insufficient may need to be primed using a primer according to the manufacturer's recommendations to regulate the porosity level of the substrate.

5. pH testing: ASTM F 710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
 - a. Conduct testing at each calcium chloride test location as the calcium chloride tests are removed.
 - b. The surface pH of the concrete must not exceed a pH of 10.0 when using Forbo [T 940] [Sustain 885m] adhesive. Concrete surfaces with pH readings less than 7.0 or above 10.0 will require remediation prior to installation.
 - c. The surface pH of the concrete must not exceed a pH of 11.0 when using Forbo Sustain 1195 adhesive. Concrete surfaces with pH readings less than 7.0 or above 11.0 will require remediation prior to installation.
 - d. The surface pH of the concrete must not exceed a pH of 12.0 when using Forbo Sustain 1299 adhesive. Concrete surfaces with pH readings less than 8.0 or above 12.0 will require remediation prior to installation.
 - e. The surface pH of the concrete must not exceed a pH of 9.0 when using Forbo 660 adhesive. Concrete surfaces with pH readings less than 7.0 or above 9.0 will require remediation prior to installation.

F. Bond Testing

1. Conduct testing in accordance with the manufacturer's recommendations in various locations throughout the area where flooring is to be installed. Although the number of tests required may vary, enough tests should be performed to allow an evaluation of the entire area where material will be installed.

3.4 INSTALLATION

- A. Material Installation: Measure the area to be installed and determine the direction in which the material will be installed. Marmoleum® Modular and MCT flooring products are fit using conventional tile fitting techniques. It is customary to start from the center of the room. In corridors and small spaces, it may be simpler to work lengthwise from one end, using the center line as a guide. After establishing the starting lines, spread the adhesive using a 1/16" x 1/16" x 1/16" square notch trowel. Be sure to spread adhesive all the way to the starting line without leaving any voids. Begin laying tiles at the starting point, ensuring that the tile is placed exactly along the layout lines. If the first few tiles are not installed accurately, the entire installation will be affected. The tiles must be installed into wet adhesive. Do not spread adhesive in an area larger than can be installed while ensuring 100% wet transfer to the backing of the material. Immediately roll the flooring in all directions using a 100 lb. roller to ensure proper adhesive transfer. Additional rolling is required during adhesive setup to ensure that the material is flat and fully adhered. The use of a three-section wall roller or steel seam roller is required at walls, under toe kicks or anywhere the full weight of a 100 lb. roller cannot access or be applied.
- B. Adhesive Application: Use trowel recommended by flooring manufacturer for adhesive.
 1. Square notch trowel as recommended by flooring manufacturer.
 2. Spread rate as recommended by flooring manufacturer.
- C. Flash Cove Installation: Extend the flooring up the wall in a flash-coved method to a height of 4 inches, as indicated.
- D. Installation Techniques:

1. Where demountable partitions and other items are indicated for installation on top of finished flooring, install flooring before these items are installed.
 2. Scribe, cut, fit flooring to butt tightly to vertical surfaces, permanent fixtures and built-in furniture, including pipes, outlets, edgings, thresholds, nosings, and cabinets.
 3. Extend flooring into toe spaces, door reveals, closets, and similar openings.
 4. Install flooring on covers for telephone and electrical ducts, and similar items occurring within finish floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed on these covers.
 5. Do not install resilient flooring over expansion joints. Use expansion joint covers manufactured for use with resilient flooring. Refer to other specification sections for expansion joint covers.
 6. Adhere resilient flooring to substrate without producing open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections in completed installation.
 7. Use adhesive applied to the substrate in compliance with the flooring manufacturer's recommendations, including those for proper spreading of the adhesive, adhesive missing and adhesive open and working times.
 8. Immediately roll the flooring in all directions using a 100 lb. roller to ensure proper adhesive transfer. Additional rolling is required during adhesive setup to ensure that the material is flat and fully adhered. The use of a three-section wall roller or steel seam roller is required at walls, under toe kicks or anywhere the full weight of a 100 lb. roller cannot access or be applied.
- E. Finish Flooring Patterns: As detailed on drawings and/or directed by Architect.

3.5 FIELD QUALITY REQUIREMENTS

- A. Manufacturer's Field Services: Upon request of the Owner, General Contractor or Architect, and with at least 72 hours' notice, provide manufacturer's field service consisting of product use recommendations and periodic site visit for inspection of product installation in accordance with manufacturer's recommendations.
1. Site Visits: 2

3.6 PROTECTION

- A. Protection: Do not allow heavy traffic or rolling loads for at least 72 hours following the installation. Additional time may be necessary if the installation is over a non-porous substrate. Protect installed product and finish surfaces from damage during construction. Remove and legally dispose of protective covering at time of Substantial Completion.

3.7 CLEANING

- A. Initial Maintenance: In order to allow the adhesive to dry and cure properly, wait a minimum of five days following the installation before conducting wet cleaning procedures or initial maintenance. Additional time may be necessary if the installation is over a non-porous substrate.
- B. Procedure:

1. Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's recommendations prior to Owner's acceptance. Remove construction debris from project site and legally dispose of debris.
2. Remove visible adhesive and other surface blemishes using cleaning methods recommended by floor manufacturer.
3. Marmoleum® with Topshield 2™ is pre-sealed and pre-finished. It is occupancy ready and no additional finish is required at the time of installation. See manufacturers' recommendations for further information.
4. Remove all surface soil, debris, sand and grit by dust mopping, sweeping or vacuuming the floor.
5. Mix a neutral pH cleaning solution according to the label directions and apply the solution to the floor. Do NOT flood the floor. Allow the solution to dwell on the floor for 5 – 10 minutes.
6. Scrub the floor using a 3M™ Red Buffer Pad #5100 or equivalent.
7. Pick up the scrubbing solution with a wet vacuum or an automatic scrubber.
8. Rinse the entire floor surface with a clean mop using clean, cool water.
9. Allow the floor to dry thoroughly before allowing traffic.

3.8 INITIAL MAINTENANCE PROCEDURES

- A. General: Include in Contract Sum Amount cost for initial maintenance procedures, and execute procedures after flooring installation as recommended by flooring manufacturer.
- B. Initial maintenance to be conducted by awarded Flooring Contractor.

END OF SECTION 09 6516

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. This section includes the following:
 - 1. Resinous flooring system as shown on the drawings and in schedules.
- B. Related sections include the following:
 - 1. Cast-in-Place Concrete, section 03 30 00

1.3 SYSTEM DESCRIPTION

- A. The work shall consist of preparation of the substrate, the furnishing and application of a cementitious urethane and a squeegee-applied resinous flooring system with decorative chip broadcasts and topcoat. The system shall have the color and texture as specified by the Owner with a nominal thickness of 3/16 inch. It shall be applied to the prepared area(s) as defined in the plans strictly in accordance with the Manufacturer's recommendations.
- B. Cove base to be applied where noted on plans and per manufacturers standard details unless otherwise noted.

1.4 SUBMITTALS

- A. Product Data: Latest edition of Manufacturer's literature including performance data and installation procedures.
- B. Manufacturer's Safety Data Sheet (SDS) for each product being used.
- C. Samples: A 3 x 3 inch square sample of the proposed system. Color, texture, and thickness shall be representative of overall appearance of finished system subject to normal tolerances.

1.5 QUALITY ASSURANCE

- A. The Manufacturer shall have a minimum of 10 years experience in the production, sales, and technical support of epoxy and urethane industrial flooring and related materials.

- B. The Applicator shall have experience in installation of the flooring system as confirmed by the manufacturer in all phases of surface preparation and application of the product specified.
- C. No requests for substitutions shall be considered that would change the generic type of the specified System.
- D. System shall be in compliance with requirements of United States Department of Agriculture (USDA), Food, Drug Administration (FDA), and local Health Department.
- E. A pre-installation conference shall be held between Applicator, General Contractor and the Owner to review and clarification of this specification, application procedure, quality control, inspection and acceptance criteria and production schedule.
- F. System shall be in compliance with the Indoor Air Quality requirements of California section 01350 as verified by a qualified independent testing laboratory.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Packing and Shipping
 - 1. All components of the system shall be delivered to the site in the Manufacturer's packaging, clearly identified with the product type and batch number.
- B. Storage and Protection
 - 1. The Applicator shall be provided with a storage area for all components. The area shall be between 60 F and 90 F, dry, out of direct sunlight and in accordance with the Manufacturer's recommendations and relevant health and safety regulations.
 - 2. Copies of Safety Data Sheets (SDS) for all components shall be kept on site for review by the Engineer or other personnel.
- C. Waste Disposal
 - 1. The Applicator shall be provided with adequate disposal facilities for non-hazardous waste generated during installation of the system.

1.7 PROJECT CONDITIONS

- A. Site Requirements
 - 1. Application may proceed while air, material and substrate temperatures are between 60 F and 85 F providing the substrate temperature is above the dew point. Outside of this range, the Manufacturer shall be consulted.
 - 2. The relative humidity in the specific location of the application shall be less than 85 % and the surface temperature shall be at least 5 F above the dew point.
 - 3. The application of Accelera where jobsite relative humidity is less than 30% is not recommended.
 - 4. Use Accelera LH resin where jobsite relative humidity is between 10% and 30%.
 - 5. The Applicator shall ensure that adequate ventilation is available for the work area.

6. The Applicator shall be supplied with adequate lighting equal to the final lighting level during the preparation and installation of the system.

B. Conditions of new concrete to be coated with cementitious urethane material.

1. Concrete shall be moisture cured for a minimum of 3 days and have fully cured a minimum of 5 days in accordance with ACI-308 prior to the application of the coating system pending moisture tests.
2. Concrete shall have a flat rubbed finish, float or light steel trowel finish (a hard steel trowel finish is neither necessary nor desirable).
3. Sealers and curing agents should not to be used.
4. Concrete shall have a minimum design strength of 3,500 psi. and a maximum water/cement ratio of 0.45
5. Concrete surfaces on grade shall have been constructed with a vapor barrier to protect against the effects of vapor transmission and possible delamination of the system.

C. Safety Requirements

1. All open flames and spark-producing equipment shall be removed from the work area prior to commencement of application.
2. "No Smoking" signs shall be posted at the entrances to the work area.
3. The Owner shall be responsible for the removal of foodstuffs from the work area.
4. Non-related personnel in the work area shall be kept to a minimum.

1.8 WARRANTY

- A. Dur-A-Flex, Inc. warrants that material shipped to buyers at the time of shipment substantially free from material defects and will perform substantially to Dur-A-Flex, Inc. published literature if used in accordance with the latest prescribed procedures and prior to the expiration date.
- B. Dur-A-Flex, Inc. liability with respect to this warranty is strictly limited to the value of the material purchase.

PART- 2 PRODUCTS

2.1 FLOORING

- A. Dur-A-Flex, Inc, ACCELERA HC self-leveling, decorative chip broadcast, cementitious urethane/blended polymer seamless flooring system
 1. System Materials:
 - a. Topping: Dur-A-Flex, Inc, Poly-Crete SL resin, hardener and SL aggregate.
 - b. The broadcast aggregate shall be Dur-A-Flex, Inc. Micro or Macro chips.

- c. 2nd Broadcast Coat: Dur-A-Flex, Inc, ACCELERA resin and hardener.
- d. Topcoat: Dur-A-Flex, Inc. ACCELERA resin and hardener.
- e. Integral Cove Base: Dur-A-Flex, Inc. Dur-A-Glaze #4 Cove Rez resin and Dur-A-Glaze #4 hardener.

2. Patch Materials

- a. Shallow Fill and Patching: Use Dur-A-Flex, Inc. Poly-Crete SL (up to 1/2 inch).
- b. Deep Fill and Sloping Material (over 1/4 inch): Use Dur-A-Flex, Inc. Poly-Crete WR.

- B. Substitution requests shall be considered in accordance with contract provisions and the performance requirements outlined in this document.

2.2 MANUFACTURER

- A. Dur-A-Flex, Inc., 95 Goodwin Street, East Hartford, CT 06108, Phone: (860) 528-9838, Fax: (860) 528-2802
- B. Manufacturer of Approved System shall be single source.

2.3 PRODUCT REQUIREMENTS

A. Topping

1. Membrane

- a. ELAST-O-COAT Waterproofing Membrane
- b. Film Thickness: 30 mils
- c. VOC: 4.34 g/L
- d. Tensile Strength, ASTM D-412: 2,400 psi
- e. Hardness, Shore A ASTM D2240: 90
- f. Tensile Strength: ASTM D-412

2. Cove Base

- a. DUR-A-GLAZE #4 COVE-REZ
- b. VOC: 3.83 g/L
- c. Bond Strength to Concrete ACI-403: Concrete fails before loss of bond
- d. Compressive Strength, ASTM D-695: 17.5-19,000 psi
- e. Tensile Strength, ASTM D 638: 12-13,000 psi
- f. Flexural Strength, ASTM D 790: 18-19,000 psi

- g. Hardness, Shore D ASTM D2240: 75-80
- h. Flame Spread / NFPA-101, ASTM E-84: Class A

3. Poly-Crete SL

- a. Percent Reactive: 100 %
- b. VOC: 0 g/L
- c. Bond Strength to Concrete ASTM D 4541: 400 psi, substrates fails
- d. Compressive Strength, ASTM C579: 9,000 psi
- e. Tensile Strength, ASTM D 638: 2,175 psi
- f. Flexural Strength, ASTM D 790: 5,076 psi
- g. Impact Resistance @ 125 mils, MIL D-3134: 160 inch lbs

B. Broadcast and Topcoat

1. ACCELERA

- a. Percent Solids: 100 %
- b. VOC: 0 g/L
- c. Bond Strength to Concrete ASTM D 4541: 400 psi, substrates fails
- d. Hardness, Shore D ASTM D2240: 70
- e. Compressive Strength, ASTM C579: 18,000 psi
- f. Tensile Strength, ASTM D638: 2,600 psi
- g. Abrasion Resistance, ASTM D4060: 27 mg loss, C-17 Wheel, 1,000 gm load, 1,000 cycles
- h. Pot life @ 70 F: 7 – 10 minutes
- i. Gloss (ASTM D523) 60°: 90
- j. Coefficient of Friction (ASTM D2047): 0.6

C. Primer and Topcoat

1. ACCELERA EXT

- a. Percent Solids: 96 %
- b. VOC: 33 g/L
- c. Bond Strength to Concrete ASTM D 4541: 400 psi, substrates fails

- d. Hardness, Shore D ASTM D2240: 70
- e. Compressive Strength, ASTM C579: 18,000 psi
- f. Tensile Strength, ASTM D638: 2,600 psi
- g. Abrasion Resistance, ASTM D4060: 27 mg loss, C-17 Wheel, 1,000 gm load, 1,000 cycles
- h. Potlife @ 70 F: 10 – 15 minutes
- i. Gloss (ASTM D523) 60: 90
- j. Coefficient of Friction (ASTM D2047) : >0.6

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas and conditions, with Applicator present, for compliance with requirements for maximum moisture content, installation tolerances and other conditions affecting flooring performance.
 - 1. Verify that substrates and conditions are satisfactory for flooring installation and comply with requirements specified.

3.2 PREPARATION

- A. General
 - 1. New and existing concrete surfaces shall be free of oil, grease, curing compounds, loose particles, moss, algae growth, laitance, friable matter, dirt, and bituminous products.
 - 2. Moisture Testing: Perform tests recommended by manufacturer and as follows.
 - a. Perform anhydrous calcium chloride test ASTM F 1869-98. Application will proceed only when the vapor/moisture emission rates from the slab is less than and not higher than 20 lbs/1,000 sf/24 hrs.
 - b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 99% relative humidity level measurement.
 - c. If the vapor drive exceeds 99% relative humidity or 20 lbs/1,000 sf/24 hrs then the Owner and/or Engineer shall be notified and advised of additional cost for the possible installation of a vapor mitigation system that has been approved by the manufacturer or other means to lower the value to the acceptable limit.
 - 3. There shall be no visible moisture present on the surface at the time of application of the system. Compressed oil-free air and/or a light passing of a propane torch may be used to dry the substrate.
 - 4. Mechanical surface preparation

- a. Shot blast all surfaces to receive flooring system with a mobile steel shot, dust recycling machine (Blastrac or equal). All surface and embedded accumulations of paint, toppings hardened concrete layers, laitance, power trowel finishes and other similar surface characteristics shall be completely removed leaving a bare concrete surface having a minimum CSP of 3 as described by the International Concrete Repair Institute.
- b. Floor areas inaccessible to the mobile blast machines shall be mechanically abraded to the same degree of cleanliness, soundness and profile using diamond grinders, needle guns, bush hammers, or other suitable equipment.
- c. Where the perimeter of the substrate to be coated is not adjacent to a wall or curb, a minimum 1/4 inch
- d. key cut shall be made to properly seat the system, providing a smooth transition between areas. The detail cut shall also apply to drain perimeters and expansion joint edges.
- e. Cracks and joints (non-moving) greater than 1/8 inch wide are to be chiseled or chipped-out and repaired per manufacturer's recommendations. Refer to Dur-A-Flex joint guidelines.
- f. At spalled or worn areas, mechanically remove loose or delaminated concrete to a sound concrete and patch per manufactures recommendations.

3.3 APPLICATION

A. General

1. The system shall be applied in four distinct steps as listed below:
 - a. Substrate preparation
 - b. Topping/overlay application with decorative chip broadcast.
 - c. Resin application with decorative chip broadcast
 - d. Topcoat application
2. Immediately prior to the application of any component of the system, the surface shall be dry and any remaining dust or loose particles shall be removed using a vacuum or clean, dry, oil-free compressed air.
3. The handling, mixing and addition of components shall be performed in a safe manner to achieve the desired results in accordance with the Manufacturer's recommendations.
4. The system shall follow the contour of the substrate unless pitching or other leveling work has been specified by the Architect.
5. A neat finish with well-defined boundaries and straight edges shall be provided by the Applicator.

B. Membrane

1. The membrane shall be applied on suitable substrates and molded up onto vertical areas, over curbs, etc. as a seamless elastomeric membrane.

2. For use underneath epoxy flooring systems to provide a vibration resilient cushion and to deaden sound and as a crack & joint filler.
3. Fiberglass mat to be embedded into ELAST-O-COAT over control joints or where the floor meets the wall.
4. DUR-A-GLAZE #4 COVE-REZ
 - a. Prime the wall with a light coat of the mixed resin and hardener.
 - b. Trowel up a mixture of 1 qt. DUR-A-GLAZE COVE RESIN to 1 pt. DUR-A-GLAZE #4 Hardener to 25lbs FLINTSHOT, DUR-A-QUARTZ Q-11 or Q-28.
 - c. After curing, use a brush to topcoat.
 - d. Remove any excess material with a squeegee. This should be done by pulling the material down to the bottom of the cove radius, then back up to the top edge of the cove.

C. Topping

1. The topping shall be applied as a self-leveling system as specified by the Architect. The topping shall be applied in one lift with a nominal thickness of 1/8 inch.
2. The topping shall be comprised of three components, a resin, hardener and aggregate as supplied by the Manufacturer at a rate of 55 sq ft per kit
3. The hardener shall be added to the resin and thoroughly dispersed by suitably approved mechanical means. SL Aggregate shall then be added to the catalyzed mixture and mixed in a manner to achieve a homogenous blend.
4. The topping shall be applied over horizontal surfaces using a 1/2" V-notched squeegee, trowels or other systems approved by the Manufacturer.
5. Immediately upon placing, the topping shall be degassed with a loop roller.
6. Chip aggregate shall be broadcast to excess into the wet resin, Macro chip at the rate of 0.1 lbs/sf and Micro chip at the rate of 0.15 lbs/sf.
7. Allow material to fully cure. Vacuum, sweep and/or blow to remove all loose aggregate.

D. Second Broadcast Coat

1. The second broadcast coat shall be comprised of two components: a resin and a hardener as supplied by the Manufacturer and mixed per manufacturer instructions.
2. The hardener shall be added to the resin and thoroughly mixed by suitably approved mechanical means.
3. The second broadcast coat shall be applied over horizontal surfaces using a flat squeegee and cross rolled with a 3/8 inch nap roller at the rate of 65 SF/kit.
4. Chip aggregate shall be broadcast to excess into the wet resin, Macro chip at the rate of 0.1 lbs/sf and Micro chip at the rate of 0.15 lbs/sf.

5. Allow material to fully cure. Vacuum, sweep and/or blow to remove all loose aggregate.

E. Topcoat

1. The topcoat shall be comprised of ACCELERA resin and hardener mixed per the manufacturer's instructions.
2. The topcoat shall be applied using a flat squeegee and cross rolled with a 3/8 inch nap roller at the rate of 65 SF/kit.
3. The finished floor will have a nominal thickness of 3/16 inch.

3.4 FIELD QUALITY CONTROL

A. Tests, Inspection

1. The following tests shall be conducted by the Applicator:
 - a. Temperature
 - i. Air, substrate temperatures and, if applicable, dew point.
 - b. Coverage Rates
 - i. Rates for all layers shall be monitored by checking quantity of material used against the area covered.

3.5 CLEANING AND PROTECTION

- A. Cure flooring material in compliance with manufacturer's directions, taking care to prevent their contamination during stages of application and prior to completion of the curing process.
- B. Remove masking. Perform detail cleaning at floor termination, to leave cleanable surface for subsequent work of other sections.

END OF SECTION 09 6723

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings, and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. Section Includes: Stainless Steel Wall Panels.

1.3 REFERENCES

- A. National codes (IBC, UBC, SBCCI, BOCA and Life Safety)
- B. American Society for Testing and Materials (ASTM)

1.4 SUBMITTALS

- A. Submit the following in accordance with conditions of contract and Division 1 specification Section 01 3300 "Submittal Procedures".
- B. Product Data: Manufacturer's printed product data and detailed specifications for each system component and installation accessory required, including installation methods for each type of substrate.
- C. Shop drawings showing locations, extent, installation and mounting details with the appropriate adhesives for specific project substrates.
- D. Manufacturer's Installation Instruction: Printed installation instructions for stainless steel wall panels.
- E. Maintenance data for wall protection system components for inclusion in the operating and maintenance manuals specified in Division 1.

1.5 QUALITY ASSURANCE

- A. Installer qualifications: Engage an installer who has no less than 3 years' experience in installation of systems similar in complexity to those required for this project.
- B. Manufacturer's qualifications: Not less than 5 years' experience in the production of specified products and a record of successful in-service performance.
- C. Code compliance: Assemblies should conform to all applicable codes including IBC, UBC, SBCCI, BOCA and Life Safety.

- D. Fire performance characteristics: Provide stainless steel components tested in accordance with ASTM E84 for Class A/1 fire characteristics.
- E. Single source responsibility: Provide all components of the wall protection system manufactured by the same company to ensure compatibility of color, texture and physical properties.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in unopened factory packaging clearly labeled to show manufacturer to the jobsite.
- B. Inspect materials at delivery to assure that specified products have been received.
- C. Store in original packaging in a climate-controlled location away from direct sunlight.
- D. Materials must be stored flat.

1.7 PROJECT CONDITIONS

- A. Environmental Requirements: Products must be installed in an interior climate-controlled environment.

1.8 WARRANTY

- A. Standard Limited Lifetime Warranty against material and manufacturing defects.

PART- 2 PRODUCTS

2.1 MANUFACTURER

- A. Acceptable Manufacturer: CS Acrovyn Stainless Steel Sheet.
- B. Substitution requests shall be considered in accordance with contract provisions
- C. Provide all stainless-steel wall panels and wall protection from a single source.

2.2 MANUFACTURED UNITS

- A. Wall Panels
- B. Stainless Steel Wall Panels
- C. Provide stainless steel wall panel systems furnished as a complete packaged system that include panels, outside corners and inside corners. Panel system shall include stainless steel panels that have recessed overlap joints that maintain panel flatness and minimizes panel protrusion.
- D. Panel Size – Custom, Maximum 4' x 10'
- E. Panel Thickness - 16 gauge with standard Smooth texture.
- F. Stainless Steel - Type 304 (type 304 conforms to NSF Standard 51)

- G. Stainless Steel Outside Corners
- H. 1. 2" x 2", 16 gauge. Maximum Height 96", edges shall have an 11° taper
- I. Stainless Steel - Type 430 or type 304 (type 304 conforms to NSF Standard 51)
- J. Attachment: Adhesive mount or screw mount
- K. Stainless Steel Inside Corners
- L. 1. 2" x 2" 16 gauge. Maximum Height 96", edges shall have an 11° taper
- M. Stainless Steel - Type 430 or type 304 (type 304 conforms to NSF Standard 51)
- N. Attachment: Adhesive mount or screw mount

2.3 MATERIALS

- A. Stainless Steel
- B. Wall panels shall be manufactured from Type 304, 16 gauge. Stainless Steel.
- C. Outside and Inside Corners
- D. Thickness - 16 gauge
- E. Type 4304 (conforms to NSF Standard 51)

2.4 COMPONENTS

- A. Attachment
- B. Panels
- C. Panels shall be adhered with field applied heavy duty adhesive.
- D. Corner Guards
- E. Adhesive mount - Corner guards shall be adhered with field applied heavy duty adhesive and foam tape.
- F. Screw mount – Corner guards shall be attached with stainless steel Phillips head screws into counter sunk beveled mounting holes.
- G. Edge finish – Edges shall be finished with color-matched caulk.

2.5 FINISH

- A. Stainless Steel: Panels and corner guards shall have a No. 4 satin finish.

- B. Comply with NAAMM "Metal Finishes Manual" for recommendations relative to applications and designations of finishes.

2.6 FABRICATION

- A. Fabricate wall protection products to comply with requirements indicated for design, dimensions, detail, finish and sizes.

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions in which the wall panel systems will be installed.
- B. Complete all finishing operations, including painting, before beginning installation of wall panel system materials.
- C. Identify conditions detrimental to proper or timely completion. Do not proceed until unsatisfactory conditions have been corrected.
- D. Wall surface shall be dry and free from dirt, grease and loose paint.

3.2 PREPARATION

- A. General: Prior to installation, clean substrate to remove dust, debris and loose particles.
- B. Perform additional preparation procedures as required by manufacturer's instructions.
- C. Take all necessary steps to prevent damage to material during installation as required in manufacturer's installation instructions.

3.3 INSTALLATION

- A. Install the work of this section in strict accordance with the manufacturer's recommendations using only approved hardware and locating all components firmly into position, level and plumb.

3.4 CLEANING

- A. Immediately upon completion of installation, clean wall protection products and accessories in accordance with manufacturer's recommended cleaning method.
- B. Remove surplus materials, rubbish and debris resulting from installation as work progresses and upon completion of work.

3.5 PROTECTION

- A. Protect installed materials to prevent damage by other trades. Use materials that may be easily removed without leaving residue or permanent stains

END OF SECTION 09 7813

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 DESCRIPTION OF WORK

- A. The work includes the painting of all interior exposed items and surfaces throughout the project, except as herein specified. Surface preparation, priming and coats of paint specified are in addition to shop priming and surface treatment specified under other sections, except as otherwise specified.
- B. The work includes the field painting or finishing of all miscellaneous exposed surfaces, and primed metal surfaces of equipment in the following locations.
 - 1. Interior Painting: Panel board covers, etc. mounted in exposed areas.
 - 2. Gypsum board walls & ceilings, Woodwork, Metal Doors & Metal Frames.
 - 3. All other items in finished areas that previously have been painted.
 - 4. Plastic trim and paneling.
 - 5. Interior painting of exposed steel
 - 6. Exterior painting of exposed steel.
 - 7. Painting exterior face of overhead door.
 - 8. Painting exterior metal doors and frames, steel handrails, all exterior lintels and other miscellaneous ferrous metals.
 - 9. Painting of all new work.
- C. The term "paint" as used herein means all coating systems materials, which includes primers, emulsions, enamels, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.

- D. Paint all exposed surfaces except where the natural finish of the material is obviously intended. Where items or surfaces are not specifically mentioned, paint these the same as adjacent similar materials or areas.
- E. Operating Parts and Labels:
 - 1. Do not paint any moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sensing devices, motor and fan shafts, unless otherwise indicated.
 - 2. Do not paint over any code-required labels, such as Underwriters Laboratories and Factory Mutual, or any equipment identification performance rating, name, or nomenclature plates.

1.3 QUALITY ASSURANCE

- A. Provide the best quality grade of the various types of coatings as regularly manufactured by approved paint materials manufacturers listed below. Materials not displaying the manufacturer's identification as a standard, best-grade product will not be acceptable.
- B. Submit manufacturer's specifications, including paint label analysis and application instructions for each material specified.
- C. List each material and cross-reference to the specific paint and finish system and application. Identify by manufacturer's catalog number and general classification.
- D. Submit samples for Architect's review of color and texture only. Compliance with all other requirements is the exclusive responsibility of the Contractor.
- E. Provide finish coats, which are compatible with the prime paints used. Review other sections of these specifications in which paints are to be provided to ensure compatibility of the total coatings system for the various substrates. Upon requests from other subcontractors, furnish information on the characteristics of the specified finish materials to ensure that compatible prime coats are used.
- F. Provide barrier coats over incompatible primers or remove and re-prime as required. Notify the Architect in writing of any anticipated problems using the coating systems as specified with substrates primed by others.
- G. Fire Hazard Classification:
 - 1. Provide coatings which have been tested in accordance with ASTM E 84, maximum of 25 all surfaces, and are listed in Underwriters Laboratories "Building Materials Directory".

1.4 DELIVERY AND STORAGE

- A. Deliver all materials to the job site in original, new and unopened packages and containers bearing manufacturer's name and label, and application instructions thereon.

- B. Provide labels on each container with the following information:
1. Name or title of material.
 2. Fed. Spec. Number, if applicable.
 3. Manufacturer's stock number.
 4. Manufacturer's name.
 5. Contents by volume, for major pigment and vehicle constituents.
 6. Thinning instructions.
 7. Application instructions.
- C. Coating Maintenance Manual: Upon conclusion of the project, the contractor or manufacturer/supplier shall furnish a coating maintenance manual, such as Sherwin Williams "Custodian Project Color and Product Information" or equal. Manual shall include an Area Summary with finish schedule. Area Detail designating where each product/color/finish was use product data pages, Material Safety Data Sheets, care and cleaning instructions, touch up procedures and color samples of each color and finished used.

1.5 JOB CONDITIONS

- A. Work under this Section shall be scheduled and coordinated with other trades and shall not proceed until other work and/or job conditions are as required to achieve satisfactory results.
- B. Do not apply paints when the temperature of surfaces to be painted and the surrounding air temperatures are below 55° F unless otherwise permitted by the paint manufacturer's printed instructions.
- C. Do not apply paint when the relative humidity exceeds 85% or to damp or wet surfaces; unless permitted by the manufacturer's printed instructions. Painting may be continued during inclement weather only if the areas and surfaces to be painted are enclosed and heated within the temperature limits specified by the paint manufacturer during application and drying periods.
- D. Environmental conditions shall be maintained in compliance with the recommendation of the manufacturers for respective finishes required and the following criteria:
1. Before painting is started in any area, it shall be broom cleaned and excessive dust shall be removed.
 2. After painting operations begin in a given area, broom cleaning will not be allowed; cleaning shall then be done only with commercial vacuum cleaning equipment.
 3. Adequate illumination shall be provided in all areas where painting operations are in progress.

- E. All materials shall be stored in a single place, as directed. Such storage place shall be kept neat and clean, and all damage thereto or its surroundings shall be made good. Any soiled or used rags; waste and trash must be removed from the building every night. Every precaution must be taken to avoid the danger of fire.

PART- 2 PRODUCTS

2.1 MATERIALS

A. General:

1. Paint products, shall be of type specified under Finish Schedule. Basic painting materials such as linseed oil shellac, turpentine, thinners, driers, etc., shall be of highest quality and have identifying labels on containers.
2. Approved manufacturers of painting and textured finish products materials are listed in following paragraph. Match the colors as required and submit samples for approval before proceeding with the work.

2.2 MANUFACTURERS

A. Paint:

1. Sherwin Williams
2. Benjamin Moore Paint Co.
3. ICI

B. Structural steel exposed (exterior & interior).

2.3 INTERIOR PAINT AND COATING COMMERCIAL SYSTEMS

A. (PT-1) Metal doors and frames and miscellaneous metal surfaces:

1. 1 coat Industrial Metal Primer (unprimed surfaces) Dining Room – Sherwin Williams Pro-Cryl Primer B66W01310.
2. 2 coats (pre-primed surfaces) - Pro Industrial DTM Acrylic.
3. Finish- Eggshell
4. Patch all surfaces as required to achieve smooth finish and sand smooth. Hand sand all surfaces to be painted with extra fine sandpaper on painted or sealed surfaces.

B. (PT-2) Gypsum board ceilings and soffits:

1. 1 coat - Pro Mar 200 Primer Zero VOC B28W02600.
 2. 2 coats - Pro Mar 200 Zero VOC B30W12651
 3. Finish: Flat
- C. **(PT-3)** Gypsum wallboard wall surfaces:
1. 1 coat - Pro Mar 200 Zero VOC B28W02600
 2. 2 coats - Pro Mar 200 Zero VOC B20W01951
 3. Finish: Low gloss Egg-Shel
- D. **(PT-4)** Interior Metal: (Piping, hangers, and other miscellaneous metals)
1. 1st coat- Polyamidoamine Epoxy, Tnemec Series N69. Sherwin Williams Duraplate 235 B67W00235.
 2. 2nd and 3rd coat- Aliphatic Polyurethane, Tnemec Series 1075V Endurashield II. Sherwin Williams Hi Solids Polyurethane 100 B65-630.

PART- 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions under which painting work is to be performed. Do not proceed with the work until unsatisfactory conditions have been corrected.
- B. Starting of painting work will be construed as the applicator's acceptance of the surfaces within any particular area.
- C. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, runs in shop prime coats, or conditions otherwise detrimental to the formation of a durable paint film.

3.2 SURFACE PREPARATION

- A. General: Perform all preparation and cleaning procedures in strict accordance with the paint manufacturer's instructions and as herein specified, for each particular substrate condition.
- B. Patch all surfaces as required to achieve smooth finish and sand smooth.
- C. Hand sand all surfaces to be painted with extra fine sandpaper on painted or sealed surfaces.
- D. Remove all hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish painted, or provide surface applied protection prior to surface preparation and painting operations. Remove, if necessary, for the complete painting of the items and

adjacent surfaces. Following completion of painting of each space or area, reinstall the removed items by workmen skilled in the trades involved.

- E. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease with clean cloths and cleaning solvents prior to mechanical cleaning. Program the cleaning and painting so that dust and other contaminants from the cleaning process will not fall in wet, newly painted surfaces.

F. Wood, Composite Panels and Mineral Profile Panels:

- 1. Hand sand wood surfaces to be painted of all existing finishes, as required. Clean surface prior to painting.
- 2. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sandpaper smooth when dried.
- 3. Spray coating to a smooth and uniform finish, with no orange peel effect.

G. Gypsum Drywall:

- 1. Repair all holes exposed tape joints or other irregularity in surface.
- 2. Touch sand all joint compound to remove surface irregularities and "tooth" wipe free of dust. Do not permit sanding to raise paper surface of gypsum board. Wipe surface clean.

H. Ferrous Metals:

- 1. Surface preparation of Steel.
 - a. Prepare steel surfaces in accordance with manufacturer's instructions.
 - b. Fabrication Defects:
 - i. Correct steel and fabrication defects revealed by surface preparation.
 - ii. Remove weld spatter and slag.
 - iii. Round sharp edges and corners of welds to a smooth contour.
 - iv. Smooth weld undercuts and recesses.
 - v. Grind down porous welds to pinhole-free metal.
 - vi. Remove weld flux from surface.
 - c. Ensure surfaces are dry.
 - d. Removed visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter in accordance with SSPC-SP 6/NACE 3, unless otherwise specified.
 - e. Abrasive Blast-Cleaned Surfaces: Coat abrasive blast-cleaned surfaces with primes before visible rust forms on surface. Do not leave blast-cleaned surfaces uncoated for more than 8 hours.

- f. Shop Primer: Prepare shop primer to receive filed coat in accordance with manufacturer's instructions.

I. Plastic Surfaces:

1. Hand sand surface with fine sandpaper. Wipe surface clean.

3.3 MATERIALS PREPARATION

- A. General: Mix and prepare painting materials in strict accordance with the manufacturer's directions.
- B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing, and application of paint in a clean condition, free of foreign materials and residue.
- C. Stir all materials before application to produce a mixture of uniform density, and as required during the application of the materials. Do not stir any film, which may form on the surface into the material. Remove the film and, if necessary, strain the material before using.
- D. Tinting:
 1. Tint each undercoat a lighter shade to facilitate identification of each coat where multiple coats of the same material are to be applied. Tint undercoats to match the color of the finish coat but provide sufficient difference in shade of undercoats to distinguish each separate coat. Provide a code number to identify material tinted by the manufacturer.

3.4 APPLICATION

- A. General:
 1. Apply paint to brush, roller or spray in accordance with the manufacturer's directions. Use brushes best suited for the type of material being applied. Use rollers of carpet, velvet back, or high pile lamb's wool as recommended by the paint manufacturer for material and texture required. Spray paint uniformly with suitable equipment.
 2. On gypsum board surfaces, primer may be sprayed, but remaining coats are to be rolled. Metal doors, frames, HVAC wall diffusers and radiator covers shall be sprayed all coats.
 3. The number of coats and paint film thickness required is the same regardless of the application method. Do not apply succeeding coats until the previous coat has completely dried.
 4. Sand between coat applications with fine sandpaper or rub surfaces with pumice stone where required to produce an even, smooth surface in accordance with the coating manufacturer's directions.
 5. Apply additional coats when undercoats, or other conditions show through the final coat of paint, until the paint film is of uniform finish, color and appearance.

B. Minimum Coating Thickness:

1. Apply each material at not less than the manufacturer's recommended spreading rate, to provide a total dry film thickness of not less than 5.0 mils for the entire coating system of prime and finish coats for 3-coat work.

C. Prime Coats:

1. Before application of finish coats, apply a prime coat to material which is required to be painted or finished, and which has not been prime coated by others.

D. Re-coat primed and sealed walls and ceilings where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.

E. Pigmented (Opaque) Finishes:

1. Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance, and coverage.
2. Provide semi-gloss finish for final coats, unless otherwise indicated.

F. Brush Application:

1. Brush-out and work all brush coats onto the surfaces in an even film. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable. Neatly draw all glass lines.

G. Completed Work:

1. Match approved samples for color, texture and coverage. Remove, refinish, or repaint work not in compliance with specified requirements.

3.5 PROTECTION

- A. Protect work of other trades, whether to be painted or not, against damage by the painting and finishing work. Leave all such work undamaged. Correct any damages by cleaning, repairing or replacing, and repainting, as directed by the Architect.
- B. Provide "Wet Paint" signs as required to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.

3.6 CLEAN-UP

- A. During the progress of the work, remove from the project all discarded paint materials, rubbish, cans and rags.

- B. Upon completion of painting work, clean all window glass and other paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

3.7 ACCEPTANCE

- A. It shall be distinctly understood that by using materials specified and going over surface number of times specified, acceptance will not be assured.
- B. Acceptance at final inspection will be governed by body finish and effect produced. Additional coats shall be applied as required to produce proper finish and coverage, if required, at no additional cost to Owner.
- C. Any wall, which is touched up, and the area remains noticeable, the entire wall shall be repainted, at no additional cost to the Owner.

END OF SECTION 09 9000

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provision of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings, and details to determine type and extent of work there if affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SECTION INCLUDES

- A. Exterior high-performance paint and coatings systems including surface preparation.

1.3 RELATED SECTIONS

- A. Section 05 5000 - Metal Fabrications.
- B. Section 05 1200 Structural Steel
- C. Section 05 3100 Steel Decking

1.4 REFERENCES

- A. Steel Structures Painting Council (SSPC):
 - 1. SSPC-SP 1 - Solvent Cleaning.
 - 2. SSPC-SP 2 - Hand Tool Cleaning.
 - 3. SSPC-SP 3 - Power Tool Cleaning.
 - 4. SSPC-SP5/NACE No. 1, White Metal Blast Cleaning.
 - 5. SSPC-SP6/NACE No. 3, Commercial Blast Cleaning.
 - 6. SSPC-SP7/NACE No. 4, Brush-Off Blast Cleaning.
 - 7. SSPC-SP10/NACE No. 2, Near-White Blast Cleaning.
 - 8. SSPC-SP11, Power Tool Cleaning to Bare Metal.
 - 9. SSPC-SP12/NACE No. 5, Surface Preparation and Cleaning of Metals by Waterjetting Prior to Recoating.
 - 10. SSPC-SP 13 / NACE No. 6 Surface Preparation for Concrete.

- B. Material Safety Data Sheets / Environmental Data Sheets: Per manufacturer's MSDS/EDS for specific VOCs (calculated per 40 CFR 59.406). VOCs may vary by base and sheen.
- C. California Department of Public Health (CDPH):
 - 1. CDPH v1.1-2010 and V1.2-2017

1.5 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data: For each paint system indicated, including.
 - 1. Product characteristics.
 - 2. Surface preparation instructions and recommendations.
 - 3. Primer requirements and finish specification.
 - 4. Storage and handling requirements and recommendations.
 - 5. Application methods.
 - 6. Cautions for storage, handling and installation.
- C. Selection Samples: Submit a complete set of color chips that represent the full range of manufacturer's products, colors and sheens available.
- D. Verification Samples: For each finish product specified, submit samples that represent actual product, color, and sheen.
- E. Coating Maintenance Manual: Upon conclusion of project, the Contractor or paint manufacturer/supplier shall furnish a coating maintenance manual, such as Sherwin-Williams, "Custodian Project Color and Product Information" report or equal. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product/color/finish was used, product data pages, Material Safety Data Sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used. "
- F. Only submit complying products based on project requirements (i.e. LEED). One must also comply with the regulations regarding VOCs (CARB, OTC, SCAQMD, LADCO). To ensure compliance with district regulations and other rules, businesses that perform coating activities should contact the local district in each area where the coating will be used.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

- B. Paint exposed surfaces. If a color of finish, or a surface is not specifically mentioned, Architect will select from standard products, colors and sheens available.
- C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels unless indicated.
- D. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Finish surfaces for verification of products, colors and sheens.
 - 2. Finish area designated by Architect.
 - 3. Provide samples that designate primer and finish coats.
 - 4. Compatibility and Adhesion: Check after one week of drying and curing by testing in accordance with ASTM D3359; Adhesion by tape test. If coating system is incompatible, additional surface preparation up to and including complete removal may be required.
 - 5. Do not proceed with remaining work until the Architect approves the mock-up.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver manufacturer's unopened containers to the work site. Packaging shall bear the manufacturer's name, label, and the following list of information.
 - 1. Product name, and type (description).
 - 2. Application and use instructions.
 - 3. Surface preparation.
 - 4. VOC content.
 - 5. Environmental handling.
 - 6. Batch date.
 - 7. Color number.
- B. Storage: Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.
- C. Store materials in an area that is within the acceptable temperature range, per manufacturer's instructions. Protect from freezing.
- D. Handling: Maintain a clean, dry storage area, to prevent contamination or damage to the coatings.

1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.9 EXTRA MATERIALS

- A. Furnish extra paint materials from the same production run as the materials applied and in the quantities described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to Owner.
- B. Furnish Owner with an additional one percent of each material and color, but not less than 1 gal (3.8 l) or 1 case, as appropriate.

PART-2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Sherwin-Williams, which is located at: 101 Prospect Ave.; Cleveland, OH 44115; ASD Toll Free Tel: 800-524-5979; Tel: 216-566-2000; Fax: 440-826-1989; Email: request infospecifications@sherwin.com; Web: www.swspecs.com.
- B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 APPLICATIONS/SCOPE

- A. High Performance Exterior Paint and Coating Systems:
 - 1. Metal: Miscellaneous iron, ornamental iron, ferrous metal.
 - 2. Formed, Poured in Place Concrete.

2.3 PAINT MATERIALS - GENERAL

- A. Paints and Coatings:
 - 1. Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
 - 2. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color. Or follow manufactures product instructions for optimal color conformance.
- B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

- C. Coating Application Accessories: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required, per manufacturer's specifications.
- D. Color: Refer to Finish Schedule for paint colors, and as selected by Owner.

2.4 HIGH PERFORMANCE EXTERIOR PAINT AND COATING SYSTEMS

- A. **(PT-5) Metal** - (Structural Steel Columns, Joists, Trusses, Beams, Miscellaneous and Ornamental Iron, Structural Iron, Ferrous Metal).
 - 1. Urethane System; Solvent Base:
 - a. Gloss Finish:
 - i. 1st Coat: S-W Macropoxy 646-100 Fast Cure Epoxy, B58 Series (7.0-13.5 mils wet, 5.0-10.0 mils dry per coat).
 - ii. 2nd Coat: S-W Hi-Solids Polyurethane 250 Gloss or Semi-Gloss, B65-Series.
 - iii. 3rd Coat: S-W Hi-Solids Polyurethane 250 Gloss or Semi-Gloss, B65-Series. (4.5-8.0 mils wet, 3.0-5.0 mils dry per coat).

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared; notify Architect of unsatisfactory conditions before proceeding. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- B. Proceed with work only after conditions have been corrected and approved by all parties, otherwise application of coatings will be considered as an acceptance of surface conditions.
- C. Previously Painted Surfaces: Verify that existing painted surfaces do not contain lead based paints, notify Architect immediately if lead based paints are encountered.

3.2 SURFACE PREPARATION

- A. General: Surfaces shall be dry and in sound condition. Remove oil, dust, dirt, loose rust, peeling paint or other contamination to ensure good adhesion.
 - 1. Prior to attempting to remove mildew, it is recommended to test any cleaner on a small, inconspicuous area prior to use. Bleach and bleaching type cleaners may damage or discolor existing paint films. Bleach alternative cleaning solutions are advised.
 - 2. Remove mildew before painting by washing with a solution of 1 part liquid household bleach and 3 parts of warm water. Apply solution and scrub the mildewed area. Allow solution to remain on the surface for 10 minutes. Rinse thoroughly with clean water and allow surface to dry before painting. Wear protective

glasses or goggles, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

3. Remove items including but not limited to thermostats, electrical outlets, switch covers and similar items prior to painting. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
 4. No exterior painting should be done immediately after a rain, during foggy weather, when rain is predicted, or when the temperature is below 50 degrees F (10 degrees C), unless products are designed specifically for these conditions. On large expanses of metal siding, the air, surface and material temperatures must be 50 degrees F (10 degrees F) or higher to use low temperature products.
- B. Aluminum: Remove all oil, grease, dirt, oxide and other foreign material by cleaning per SSPC-SP1, Solvent Cleaning.
- C. Block (Cinder and Concrete): Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement, and hardeners. Concrete and mortar must be cured at least 30 days at 75 degrees F (24 degrees C). The pH of the surface should be between 6 and 9 unless the products are designed to be used in high pH environments. On tilt-up and poured-in-place concrete, commercial detergents and abrasive blasting may be necessary to prepare the surface. Fill bug holes, air pockets, and other voids with a cement patching compound.
- D. Concrete, SSPC-SP13 or NACE 6: This standard gives requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems. The requirements of this standard are applicable to all types of cementitious surfaces including cast-in-place concrete floors and walls, precast slabs, masonry walls, and shotcrete surfaces. An acceptable prepared concrete surface should be free of contaminants, laitance, loosely adhering concrete, and dust, and should provide a sound, uniform substrate suitable for the application of protective coating or lining systems.
- E. Copper and Stainless Steel: Remove all oil, grease, dirt, oxide and other foreign material by cleaning per SSPC-SP 2, Hand Tool Cleaning.
- F. Galvanized Metal: Clean per SSPC-SP1 using detergent and water or a degreasing cleaner to remove greases and oils. Apply a test area, priming as required. Allow the coating to dry at least one week before testing. If adhesion is poor, Brush Blast per SSPC-SP16 is necessary to remove these treatments.
- G. Steel: Structural, Plate, And Similar Items: Should be cleaned by one or more of the surface preparations described below. These methods are used throughout the world for describing methods for cleaning structural steel. Visual standards are available through the Society of Protective Coatings. A brief description of these standards together with numbers by which they can be specified follow.
1. Solvent Cleaning, SSPC-SP1: Solvent cleaning is a method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants. Solvent cleaning does not remove rust or mill scale. Change rags and cleaning solution frequently so that deposits of oil and grease are not spread over additional areas in the cleaning process. Be sure to allow adequate ventilation.
 2. Hand Tool Cleaning, SSPC-SP2: Hand Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this

process. Before hand tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.

3. Power Tool Cleaning, SSPC-SP3: Power Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before power tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.
4. White Metal Blast Cleaning, SSPC-SP5 or NACE 1: A White Metal Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
5. Commercial Blast Cleaning, SSPC-SP6 or NACE 3: A Commercial Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 33 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
6. Brush-Off Blast Cleaning, SSPC-SP7 or NACE 4: A Brush-Off Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, loose mill scale, loose rust, and loose paint. Tightly adherent mill scale, rust, and paint may remain on the surface. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP 1 or other agreed upon methods.
7. Power Tool Cleaning to Bare Metal, SSPC-SP11: Metallic surfaces that are prepared according to this specification, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxide corrosion products, and other foreign matter. Slight residues of rust and paint may be left in the lower portions of pits if the original surface is pitted. Prior to power tool surface preparation, remove visible deposits of oil or grease by any of the methods specified in SSPC-SP1, Solvent Cleaning, or other agreed upon methods.
8. Near-White Blast Cleaning, SSPC-SP10 or NACE 2: A Near White Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 5 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
9. High- and Ultra-High Pressure Water Jetting for Steel and Other Hard Materials: SSPC-SP12 or NACE 5: This standard provides requirements for the use of high- and ultra-high pressure water jetting to achieve various degrees of surface cleanliness. This standard is limited in scope to the use of water only without the addition of solid particles in the stream.

10. Water Blasting, SSPC-SP12/NACE No. 5: Removal of oil grease dirt, loose rust, loose mill scale, and loose paint by water at pressures of 2,000 to 2,500 psi at a flow of 4 to 14 gallons per minute.

3.3 INSTALLATION

- A. Apply all coatings and materials with the manufacturer's specifications in mind. Mix and thin coatings according to manufacturer's recommendations.
- B. Do not apply to wet or damp surfaces. Wait at least 30 days before applying to new concrete or masonry. Or follow manufacturer's procedures to apply appropriate coatings prior to 30 days. Test new concrete for moisture content. Wait until wood is fully dry after rain or morning fog or dew.
- C. Apply coatings using methods recommended by manufacturer.
- D. Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen.
- E. Apply coatings at spreading rate required to achieve the manufacturers recommended dry film thickness.
- F. Regardless of number of coats specified, apply as many coats as necessary for complete hide, and uniform appearance.
- G. Inspection: The coated surface must be inspected and approved by the Architect just prior to the application of each coat.

3.4 PROTECTION

- A. Protect finished coatings from damage until completion of project.
- B. Touch-up damaged coatings after substantial completion, following manufacturer's recommendation for touch up or repair of damaged coatings. Repair any defects that will hinder the performance of the coatings.

END OF SECTION 09 9100

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. Work Included;
 - 1. Stencil Warning Sign.
 - 2. Fire Extinguisher Cabinet Signs

1.3 QUALITY ASSURANCE

- A. Uniformity: For each sign form and graphic image process indicated, furnish products of a single manufacturer.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions for each type of sign required.
- B. Samples: Submit samples of each sign form and material showing finishes, colors, surface textures and qualities of manufacturer and design of each sign component including graphics.
- C. Shop Drawings: Provide drawings indicating layout and construction with full size selections of typical members.

PART- 2 PRODUCTS

2.1 MATERIALS

- 1. Stencil Warning Sign:

- a. Provide custom cut out stencil on walls above ceiling of all one hour rated walls, font to be 2" high, sign to read:

"ONE HOUR FIRE RATED SMOKE BARRIER – SEAL ALL OPENINGS".

2. Fire Extinguisher Cabinet Sign

- a. 9"x7" 2D projection panel, 2 viewable sides; reflective.
- b. As manufactured by Compliance signs, model # NHE-27897PROJ (or equal.)

PART- 3 EXECUTION

3.1 INSTALLATION

- A. Securely install plumb and level in conformance with approved submittals and manufacturer's recommendations.
- B. Interior Panel Signs: Wall mount adjacent to door at 5'-0" above finished floor to centerline of sign.
- C. Provide custom cut out stencil on walls above ceiling of all smoke walls, sign to read:
 - 1. **"ONE HOUR FIRE RATED SMOKE BARRIER – SEAL ALL OPENINGS".**
 - 2. Use red spray paint to create sign.
 - 3. Space Stencil Waring Sign at 10' – 0" o.c. visible above ceiling.

3.2 CLEANING AND PROTECTION

- A. After installation, clean soiled sign surfaces in according to manufacturer's instructions. Protect from damage until acceptance.

END OF SECTION 10 1400

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to, complete this section whether or not it is clearly or explicitly shown.

1.2 DESCRIPTION OF WORK

- A. The extent of miscellaneous specialties work is as shown on the drawings and specified herein, including:
 - 1. Fire Extinguishers & Cabinets.

1.3 SUBMITTALS

- A. Submit manufacturer's cuts, installation details and/or shop drawings of all items specified in accordance with the Supplementary Conditions.

PART- 2 PRODUCTS

2.1 FIRE EXTINGUISHER AND CABINETS

- A. Manufacturer: Subject to compliance with requirements, provide Fire Extinguisher and Cabinets from one of the following:
 - 1. Potter-Roemer
 - 2. Lausen Manufacturing Co.
 - 3. J.L. Industries
- B. Fire Extinguisher Cabinets: Potter-Roemer, or equal, 7025 - DV-6-SS -VB, recessed, Stainless Steel 304 #6 dull satin finish. Cartridge operated by wet chemical
- C. Fire extinguishers for cabinets shall be Model 3202 Class K extinguisher as manufactured by Potter Roemer or approved equivalent, red enamel.
- D. All fire extinguishers shall be fully loaded just prior to acceptance of building.

PART- 3 EXECUTION

3.1 INSTALLATION

- A. Install specialty items as recommended by the manufacturer. Provide all required accessories, sealant, hardware, fasteners, etc. for complete installation.
- B. Assemble items and associated fittings and trim in accordance with manufacturer's instructions.
- C. Install supports attached to building structure for equipment requiring supports.
- D. Install equipment level, plumb, and firmly in place in accordance with manufacturer's rough-in drawings.

3.2 CLEANING AND PROTECTION

- A. Repair or replace defective work, including damaged equipment and components.
- B. Clean unit surfaces, and leave in ready-to-use condition.

3.3 TESTING AND ADJUSTING

- A. Test each piece of equipment provided with moving parts to assure proper operation, freedom of movement, and alignment.
- B. Repair or replace malfunctioning equipment, or equipment with parts that bind or are misaligned.

END OF SECTION 10 1800

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. This section includes the following types of wall protection systems:
 - 1. Corner Guards.
 - 2. End Mount Wall Protectors.
 - 3. Crash Rails.
 - 4. High Impact Wall Panels.
 - 5. Door Frame Guards.

1.3 SUBMITTALS

- A. General:
 - 1. Submit the following in accordance with conditions of contract and Division1 specification section 01 3300 "Submittal Procedures".
 - 2. Product data and detailed specifications for each system component and installation accessory required, including installation methods for each type of substrate.
 - 3. Shop drawings showing locations, extent and installation details of corner guards. Show methods of attachment to adjoining construction.
 - 4. Samples for verification purposes: Submit the following samples, as proposed for this work, for verification of color, texture, pattern, finish and end cap attachment and alignment.
 - a. 12" long sample of each model specified including end cap and mounting hardware.

- B. Product test reports from a qualified independent testing laboratory showing compliance of each component with requirements indicated.
- C. Maintenance data for wall protection system components for inclusion in the operating and maintenance manuals specified in Division 1.

1.4 QUALITY ASSURANCE

- A. Coordinate carpentry work to assure proper installation of solid fire-retardant wood blocking for all accessories. Use of toggle or expansion type anchors in gypsum board shall not be permitted.
- B. Coordinate accessory locations with other work to avoid interface and to assure proper and serving of accessory units.
- C. Provide products of same manufacturer for each type of accessory unit and for units exposed in same areas, unless otherwise acceptable to Architect.
 - 1. Material shall be UL classified: Identified upon shipment with appropriate marking and shall be supported by Underwriter's Laboratories, Inc. follow up procedures.
 - 2. Impact Strength: Provide assembled wall protection units that have been tested in accordance with the applicable provisions of ASTM F476.
 - 3. Chemical and stain resistance: Provide wall protection system components with chemical and stain resistance in accordance with ASTM D543.
 - 4. Color match: Provide wall protection components that are color matched in accordance with the following:
 - a. Delta Ecmc of no greater than 1.0 using CIELab color space.
 - b. Single source responsibility: Provide all components of the wall protection system manufactured by the same company to ensure compatibility of color, texture and physical properties.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the project site in unopened original factory packaging clearly labeled to show manufacturer.
- B. Store materials in original, undamaged packaging in a cool, dry place out of direct sunlight and exposure to the elements. A minimum room temperature of 40°F and a maximum of 100°F should be maintained.
- C. Material must be stored flat.

1.6 PROJECT CONDITIONS

- A. Materials must be acclimated in an environment of 65°-75°F for at least 24 hours prior to beginning the installation.
- B. Installation areas must be enclosed and weatherproofed before installation commences.

PART- 2PRODUCTS

2.1 MANUFACTURERS

- A. Interior surface protection products specified herein and installed on the submittal drawings shall be manufactured by:
 - 1. C/S Group, Inc.
 - 2. InPro Corp.
 - 3. MM Systems Corp.

2.2 MATERIALS

- A. Engineered PETG: Extruded material should be high impact polyvinyl chloride with shadow grain texture, nominal .078" thickness. Chemical and stain resistance should be per ASTM D543 standards as established by the manufacturer. Colors to be selected by Architect from one of manufacturer's standard color range.

2.3 CORNER GUARDS (CG.1)

- A. Engineered SM-20N surface mount, as manufactured by C/S Group. or equal. Surface mounted guards consisting of continuous retainer with snap-on vinyl cover. Color matched end caps to be provided for both partial and full height applications. Attachment hardware shall be appropriate for wall construction.
 - 1. 4'-0" high in locations with no handrail.
 - 2. Height: Bottom of handrail or chair rail to top of base.
 - 3. Provide end mount wall protectors as required.

2.4 END MOUNT WALL PROTECTORS

- A. Engineered SSM-20N/SS-10N and sheet backer, surface mount, as manufactured by C/S Group. or equal. Surface mounted guards consisting of continuous retainer with snap-on vinyl cover. Color matched end caps to be provided for both partial and full height applications. Attachment hardware shall be appropriate for wall construction.

1. 4'-0" high in locations with no handrail.
2. Bottom of handrail or chair rail to top of base.
3. Provide end mount wall protectors as required.

2.5 RIGID WALL PANELS

- A. Engineered rigid panel, as manufactured by C/S Group or equal. Panel shall be .040 thick roll product factory cut to 24" in height. Provide all required adhesives and accessories, in solid color to match. Vertical joint shall be allowed, color match caulked. Provide inside and outside corner trims as required.
 1. RWP- 1- Acrovyn Solid Color Collections
 2. RWP- 2- Acrovyn by Design Collection

2.6 DOOR FRAME GUARDS

- A. Engineered model G2 Custom formed door frame guard as manufactured by InPro Corp. Vacuum form to frame size. Height to be equal to top of chair rail. Provide adhesives as recommended by manufacturer.

2.7 FABRICATION

- A. General: Fabricate wall protection systems to comply with requirements indicated for design, dimensions, detail, finish and member sizes.

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Verification of conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
 1. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface preparation: Prior to installation, clean substrate to remove dirt, debris and loose particles. Perform additional preparation procedures as required by manufacturer's instructions.
- B. Provide wall backing as required per manufacturers recommendation in new and existing walls.
- C. Protection: Take all necessary steps to prevent damage to material during installation as required in manufacturer's installation instructions.

3.3 INSTALLATION

- A. Install the work of this section in strict accordance with the manufacturer's recommendations, using only approved mounting hardware for each wall type, adhesives etc. and locating all components firmly into position, level and plumb.
- B. Temperature at the time of installation must be between 65°-75°F and be maintained for at least 48 hours after the installation.
- C. Adjust installed end caps as necessary to ensure tight seams.

3.4 CLEANING

- A. General: Immediately upon completion of installation, clean guards and accessories in accordance with manufacturer's recommended cleaning method.
- B. Remove surplus materials, rubbish and debris resulting from installation as work progresses and upon completion of work.

3.5 PROTECTION

- A. Protect installed materials to prevent damage by other trades. Use materials that may be easily removed without leaving residue or permanent stains.

END OF SECTION 10 2600

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Section, apply to work specified in this section.
- B. Refer to other sections of the specification, drawings, and detail to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 WORK INCLUDED IN THIS SECTION

- A. Supply, deliver and set in place al new l food service equipment at identified locations, and level before and after final connections by related trades.
- B. Furnish and install all food service equipment as specified herein, including that which is reasonably inferred, with all related items necessary to complete work shown on contract drawings and/or required by these specifications
- C. Electrical Work
 - 1. Interwiring of food service equipment between components with equipment such as heating elements, switches, thermostats, motors, etc., complete with junction box as is applicable, ready for final connections
 - 2. Voltages shall be indicated on the contract drawings, any differences in electrical characteristics at job site from those shown on contract documents must be submitted th Architect for consideration prior to ordering equipment
- D. Plumbing Work:
 - 1. Furnish all equipment with faucets, sink waste assemblies, and trim as specified in this section
- E. Mechanical Work:
 - 1. Provide exhaust hoods with connection collars ready for final connection by HVAC section
 - 2. Provide stainless steel exposed ducts to ceiling for dish machine
- F. Existing Equipment:
 - 1. Contractor shall remove and store existing equipment at their expense in a controlled environment storage facility until such time as job site is ready for reinstallation.
 - 2. Relocated those items of existing equipment noted as being reset to new position as shown on plan drawings. Coordinate resetting so as to minimize disruptions of operation of kitchen operations,
 - 3. Remove remaining existing equipment from premises and dispose of as required.
 - 4. All piping taps etc. for set equipment shall be new

1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, which is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.
- C. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by Contract Documents. Substitutions require approval by Architect for use or implementation.
 - 1. Substitutions provisions are handled under Division 01 Section.

1.4 REFERENCES

- A. All Food Service Equipment provided and installed must comply with below agencies, state department of health and county or local laws and ordinance.
- B. American Society for Testing Materials (ASTM):
 - 1. ASTM A167, Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
 - 2. ASTM A446, Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.
 - 3. ASTM C1036, Specification for Flat Glass.
 - 4. ASTM C1048, Specification for Heat Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.
- C. American Welding Society (AWS).
- D. National Electrical Manufacturers Association (NEMA).
- E. National Fire Protection Association (NFPA 96).
- F. National Sanitation Foundation (NSF).

- G. Underwriters Laboratories Listing (UL).

1.5 SUBMITTALS

- A. Electronically submit (PDFs) assembly drawings, electrical and mechanical rough-in connection plans, details for plumbing, electrical, air conditioning and ventilation services for all kitchen equipment and brochures, catalog cut-sheets, specifications and operating characteristics for buy-out equipment. Clearly indicate any deviations from contract Documents, such as arrangement of piping, connections, wiring method of fabrication, manner of structural conditions, standard shop practices, or other reasons, and note in Cover Sheet accompanying submittals.
- B. Drawing of fabricated equipment shall not be less than $\frac{3}{4}$ " equal one foot scale.
- C. Rough-in drawings shall not be less than $\frac{1}{4}$ " equal one foot scale.
- D. Product Data: Provide data on appliances; indicate configuration, sizes, materials, finishes, locations, utility connections and locations.
- E. Samples: Submit samples of stainless steel and other finish materials for color selection.
- F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- G. Manufacturer's Certificate: Certify that exhaust system and tests meet or exceed specified requirements.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data:
 - 1. Operation Data: Provide manuals with a sequence of operation and utility connection diagram explaining system operation and corresponding to actual devices. After approval, submit 2 sets of three ring binders.
 - 2. Maintenance Data: Provide lubrication and periodic maintenance requirement schedules.

1.7 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Conform to applicable State and local codes for utility requirements.
 - 2. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories, Inc. as suitable for the purpose specified and indicated.
- B. Energy Ratings: Provide appliances with energy guide labels with energy cost analysis (annual operating costs) and efficiency information as required by Federal Trade Commission.
 - 1. Provide all appliances that are Energy Star Rated.

1.8 QUALIFICATIONS

- A. Installer: Must have a minimum of 5 years documented installation experience with projects similar to this project.

- B. Fabricator: Must specialize in manufacture of commercial food services equipment with minimum 5 years documented experience.
- C. Manufacturer: Must specialize in manufacturing products specified in this section with a minimum of 5 years documented equipment manufacturing experience.
- D. One site superintendent all be satisfactory to the Owner and Architect in all respects, and owner shall have the right to require Contractor to dismiss from the project any superintendent whose performance is not satisfactory to Owner and Architect except with another superintendent satisfactory to the Owner and Architect in all respects. At the request of the Architect, the Contractor's superintendent shall attend project meetings, whether the project meetings are prior to the start of the Contractor's work.
 - 1. Contractor shall provide a superintendent with experience in managing project of this size and complexity with minimum three (3) projects including projects completed on time per contract. Experience shall be documents in writing from end user and design consultant.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Store products clear of floor in a manner to prevent damage.
- B. Coordinate size of access and route to place of equipment installation.
- C. Coordinate equipment delivery and installation with all other trades.
- D. Contractor takes all responsibility for equipment damage incurred before, during and after installation, until Substantial Completion has been determined by Architect.

1.10 COORDINATION

- A. Coordinate existing equipment with Owner per Part 3 Existing Equipment.
- B. Coordinate with other trades to ensure existing equipment is disconnected prior to removal by this contractor. Supply and install all necessary drain traps, steam traps, vents, shut-offs, valves, pipe fittings, and/or other materials to complete final plumbing and electrical or steam connections between the rough-in and the connection or connections on each piece of equipment.
- C. Ductwork and ductwork connections from hoods unless otherwise indicated.
- D. Install all drain fittings, tailpieces, faucets, operating switches, and/or starters.
- E. Coordinate sequencing of equipment installation with other trades prior to installing any piece of equipment.
- F. Coordinate special conditions with other trades, i.e. floor depression, soda line conduit requirements, roof curbs, control wiring, etc.

1.11 WARRANTY

- A. Provide a one (1) year parts and labor guarantee on all new equipment and a 5-year parts guarantee on refrigeration components.
- B. Components of equipment subject to replacement prior to one year's use and those items which may fail due to

improper or inadequate periodic maintenance by the Owner/Operator are not intended to be included within the scope of warranty.

- C. For all commercially manufactured equipment that has refrigeration systems and semi-hermetic compressors, furnish an additional four (4) year warranty on all compressors.
- D. Guarantee/Warranty period shall commence with the date of Substantial Completion.
- E. Warranty includes all costs incurred for removal and re-installation of the replacement component or equipment.

PART-2 PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
 - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 - 2. All products shall be new. Use salvaged materials only where specifically directed to do so.
 - 3. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 - 4. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 - 5. Where products require color selection the Architect will make the selection.
 - 6. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 - 7. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product
- B. Product Selection Procedures:
 - 1. Products:
 - a. Non-restricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in

"Comparable Products" Article for consideration of an unnamed product.
 - 2. Manufacturers:
 - 3. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on

Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
1. Evidence that the proposed product does not require revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 5. Samples, if requested.
 6. All comparable products consideration must be submitted at the time of bidding. All other considerations after time of bid will not be considered.

2.3 MATERIALS / PRODUCTS OF MANUFACTURED EQUIPMENT

- A. All like types of equipment such as all refrigerated and heated cabinets, all ovens and all mixers shall be by the same manufacture.
- B. Except as may be specified otherwise under individual item specifications in the "Equipment Schedule," all items of standard manufactured equipment shall be complete in accord with manufacturer's standard specifications for specific unit or model called for including finishes, components, attachments appurtenances etc. except as follows
1. All items of standard equipment shall be that manufacture's latest model at time of delivery.
 2. Substitutions for manufactured equipment specified will be accorded consideration under terms set forth in "Comparable Products".
- C. Fabricated equipment Details are to be followed unless otherwise noted or specified.
1. Stainless steel shall be US standard gauges as called for 18-8 or 304 type, #4 finish.
 2. Galvanized iron shall be Armco or equal. Framework of galvanized iron shall be welded construction having weld smooth and where galvanizing has been burned off, touched up with high grad aluminum

bronze

3. Legs and cross rails shall be continuously welded, unless otherwise noted, and ground smooth
4. Bottom of legs at floor shall be fitted with sanitary stainless steel bullet type foot, with not less than 2' adjustment, unless otherwise specified.
5. Legs shall be fastened to equipment as follows:
 - a. To sinks by means of closed gussets, Gussets shall be stainless steel, reinforced with bushing, having set screws for securing legs.
 - b. To tables and drainboards with closed gussets which shall be welded to stainless steel hat sections or channels, 14 gauge or heavier, exposed hat sections having closed ends.
6. Bracing shall be welded to underside of tops
7. Closed gussets shall be 3" minimum diameter at top, continuously welded to frame members or to sink bottom
8. Sinks, unless otherwise specified shall be furnished with rotary type waste outlets without overflows where exposed furnish wastes chromium plated
9. Rolls shall be 1 – ½" diameter, except as detailed contrary, with corners bullnose ground and polished
10. Seams and joints shall be shop welded. Welds to be ground smooth and polished to match original finish.
11. Metal tops shall be one-piece welded construction, unless specified otherwise, reinforced on underside with stainless steel hat sections or channels welded in place. Cross bracing to be not more than 30" on centers. Sound deaden required.
12. Drawers to be 18 gauge stainless steel channel type housing and drawer cradle, both housing and cradle being reinforced and welded at corners, housing being secured to underside of table top and both housing and cradle being sized for and fitted with 19 gauge 20" x 20" x 5" deep stainless steel drawer insert having coved corners. Drawer insert shall be easily removable from cradle without tools or having to remove entire drawer. Drawers to have stainless steel fronts, provide with recessed flush type stainless steel pulls with locks keyed the same unless otherwise specified.
 - a. Support drawer on fabricated 14-gauge stainless steel interlocking channel solid Delrin ball bearing wheels. Support slides shall be load rated at 20 lb. per pair. Slides to be component Hardware S52 Series.
13. Enclosed cabinet type bases shall be made of formed steel sheets reinforced with formed steel sections to create a ridged structure. Steel shall be 18 gauge or heavier. Base shall be welded construction throughout with front rails. Mullions, etc. welded to appear as one-piece construction. All exposed sections of interior and exterior shall be stainless steel.
14. Doors shall be double cased, unless otherwise noted. Outer pans shall be 18 gauge with corners welded ground sooth and polished. Inner pans shall be 20 gauge, fitted toughly not outer pan with sound deadening material such as Celotex used as ore. Two pans shall be tack welded together with seam solid filled.

- a. Door shall finish approximately $\frac{3}{4}$ " thick and shall be fitted with flush recessed type stainless steel door pulls. Single pan type doors shall be reinforced and stiffened with closed hat sections.
 - b. Hinged doors shall be flush type mounted on heavy duty stainless steel piano or concealed hinges.
 - c. Hardware shall be solid materials and except where unexposed or specified contrary, of cast brass chrome plated. Stampings are not acceptable. Identify all hardware with manufacturer's name and number so that broken or worn parts may be ordered and replaced.
- 15. Fabricate sink compartments, with fully coved vertical and horizontal corners. Multiple compartment partition to be double thickness continuously welded sheet join at top. Front of multiple compartment sinks to be continuous on exterior. Bottoms shall be creased to drain.
- 16. Ends of all fixtures splash backs shelves, etc. shall be finished flush to walls or adjoining fixtures with enclosed splash.
- 17. Dish table drain tables, splash backs and turned up edges shall have radius bends in the all horizontal and vertical corners, coved at intersections
 - a. Rounded and coved corners or radius bends shall be $\frac{1}{2}$ " radius or longer
- 18. Shelves in fixtures with enclosed bases shall be turned up on back and sides and feathered slightly to insure tight fit to enclosure panels. Bottom shelves shall be made for easy removal unless otherwise noted.
 - a. Undershelves of tops to be coated with heavy bodied ruinous material compound for permanent, not flacking adhesion to metal. $\frac{1}{8}$ " thick, applied after reinforcing members have been installed drying without catching crevices.
- 19. Metal components, unless specified or noted otherwise to be the following gauges
 - a. Counter and table tops 14-gauge stainless steel Wall shelves, pipe leg undershelves, drawer fronts and legs, 16-gauge stainless steel, Enclosed cabinet bases, exhaust hoods, and out pan doors 18-gauge stainless steel. Sinks and drainboards, 14 guage stainless steel. Doors, inner pan 20-gauge stainless steel.
- 20. Heating equipment wherever electrical heating equipment or thermostat control for such equipment is specified. It shall be complete and of the materials size and rating specified with in equipment item or details. All such equipment shall be designed and installed to be easily cleaned or to be easily removed for cleaning.
 - a. Electrical appliances or heating element circuits for 120 volts shall not exceed 1560 watts, unless specifically shown contrary.
- 21. Switches and controls, shall be supplied by food service equipment contractor on each motor driven appliance or electrical heating unit suitable control switch of proper type in accord with underwriter's code.
 - a. All internal wiring for fabricated equipment items included, all electrical devices wiring controls switches, etc. built into or forming an integral part of these items shall be furnish and install by food service equipment contractor in his factory or building site which all items complete to

junction box for final connections to building lines by electrical contractor

- b. Provide standard 3 prong plugs to fit "U" slot grounding type receptacles, similar to NO 5262 for all equipment items powered by plugin into o110-120 volts, single phase AC. Proved suitable length 3 wire cord for equipment
- c. All equipment shall be complete with connection terminal as standardized by equipment manufacturers, expect where specified otherwise

22. Fit all doors when possible for refrigerated compartment with locking type latches, Provide master keys.

23. Laminated plastic whenever specified shall be Formica, Wilson – Art, Micarta or approved by architect. Veneer all material using urea base cement, waterproof and heatproof, Rubber base adhesives are not acceptable. Apply material directly over closed grained plywood such as mahogany or birch. Standard fir plywood is not acceptable. Face exposed surfaces and edges with 1/16" material and corresponding back faces with 1/32" reject material. Place top sheet on and over finished edge.

24. Gas equipment to be suitable for use with gas available at site and to be furnished FSEC with pressure regulators designed to work with incoming pressure.

- a. Where specified gas quick disconnects shall be furnished complete with gas valve, gas connector hose, quick disconnect fitting elbows, and restraining cable all AGA approved. Gas hose shall be flexible, braded or corrugated stainless steel with smooth plastic exterior coating or sleeve of heat shrink tubing.

25. Solid surface mater to be by Corian or Surell and approved by architect. Countertops at hot food areas shall be able to withstand 175 degree without deformation, cracking otherwise deteriorating. Color and pattern to be selected after bidding

- a. Installation shall be by a qualified install as approved by manufacturer and owner
- b. Contractor to submit bid based on 1/2" thick material, price group "E" (mid range), Colors to be selected after award of contract.

D. Sheet Steel: ASTM A446; 1.25 ounce per square foot galvanized coating.

E. Stainless Steel: ASTM A167; Type 304 commercial grade, No. 4 finish.

F. Glass: 3/16-inch float conforming to ASTM C1036 and ASTM C1048; exposed edges ground; cut or drilled to receive hardware.

G. Plastic Laminate: NEMA LD3; 0.050-inch-thick; color as selected by Architect.

H. Laminate Backing Sheets: LD3-BK20, 0.020-inch-thick, unfinished plastic laminate.

I. Finish Hardware: Manufacturer's standard.

J. Work Surfaces: As specified.

- K. Fittings: Sink drains with crumb cup and waste fittings, faucets, and electrical outlets.
- L. Service Outlet Covers and Escutcheons: Stainless steel.
- M. Service Accessories and Connections:
 - 1. Provide control switch or starter on each motor-driven appliance or heating element, under provisions of UL requirements.
 - 2. Provide internal wiring for equipment, including electrical devices, wiring controls, and switches to a common junction box.
 - 3. Provide suitable length of 4 wire cord with plugs to match building receptacles.
 - 4. Provide lamps for fixtures in equipment.
 - 5. Provide equipment with connection terminals, so that connections of plumbing, gas, steam, electrical, ventilation, and refrigeration services can be made. Where receptacles are specified for custom equipment, supply cut-outs and outlet boxes set in place accessible for connections of electrical work.

2.4 EQUIPMENT

- A. Provide rough-in hardware, supports and connections, attachment devices, closure panels, trim strips, and all accessories required for proper operation of equipment.
- B. Standard of Comparison: The specified equipment has been established to set a standard of quality and features.
- C. If substitutions require different utility/building conditions, electrical, plumbing, ventilation, etc., from those specified, a complete list of those changes for each item shall be included with the request for substitution. Any costs associated with these changes will become the responsibility of this Contractor.
- D. Verify direction of door swings.

2.5 FABRICATION

- A. General Requirements:
 - 1. Stainless Steel Fastenings and Fittings: Bolts and screws with countersunk flat heads at interior and exterior visible or accessible surfaces. Use concealed fastenings where possible
 - 2. Form edges smooth. Fabricate sheet material for work surfaces, facings, shelves, and drainboards of straight length in one continuous sheet when not over 12 feet in length.
 - 3. Fix leg-mounted units by dowelling to floor with 1/4-inch stainless steel pins, where vibration or oscillation is anticipated.
 - 4. Provide legs with stainless steel adjustable feet. Fasten legs to equipment securely and rigidly.
 - 5. Install rubber or nylon button feet or other protective device on bearing surface of any item positioned on a finished surface.

6. Isolate rotating or reciprocating machinery to prevent noise and vibration.
 7. Provide accommodation for installation of final connections by other trades and accessibility to components such as compressors, junction boxes, etc...
 8. Grind welds of stainless steel smooth and flush; polish to match adjacent surfaces.
 9. Cut and drill components for service outlets and fixtures.
 10. Provide access panels where required to access utilities.
 11. Shop assemble work where possible.
- B. Load Carrying Counter Surfaces: Reinforce frame support system and surfaces so that surfaces may safely support a load of 200 pounds concentrated on one square foot in any area or surface with no indentation showing on surface, and with permanent set not exceeding 0.005 inches.

2.6 FINISHES

- A. Metal (Except Stainless Steel): Degrease and phosphate etch followed by primer and minimum 2 coats factory baked epoxy enamel, color as selected by Architect from manufacturer's full range of standard and custom colors.
- B. Plastic Laminate: Color as selected by Architect from manufacturer's full range of standard and custom colors.
- C. Stainless Steel: Number 4 finish (unless indicated otherwise).
- D. Bituminous Paint: Sound deaden internal surfaces of metal work and underside of metal counters and sinks.

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Verify all existing conditions and existing equipment requirements.
- B. Verify ventilation outlets, service connections, and supports are correct and in required location.
- C. Verify operational condition of existing equipment.
- D. Report equipment discrepancies or non-operational equipment to the Architect.

3.2 INSTALLATION

- A. Use anchoring devices appropriate for equipment and expected usage.
- B. Verify equipment is installed in accordance with the manufacturer's recommendations and requirement.
- C. Insulate to prevent electrolysis between dissimilar metals. Provide sealant to achieve clean joint without

crevices.

- D. Weld and grind joints in stainless steel work tight, without open seams, where necessary due to limitations of sheet sizes or installation requirements.
- E. Sequence installation and erection to ensure mechanical, plumbing and electrical connections are achieved in an orderly and expeditious manner.
- F. Cut, fit, and patch where necessary. Coordinate work with other trades.
- G. Cut and drill tops, backs or other elements for service outlets, fixtures, and fittings.
- H. Provide access panel or cutting and patching of items of this Section required for the installation or services of equipment.
- I. Remove and reinstall existing equipment required under this Section. Foodservice Equipment contractor shall verify condition of existing equipment prior to removal, if being reinstalled by this contractor or reused by Owner.
- J. Protect new and existing equipment during construction phase as required to prevent damage to equipment.

3.3 EXISTING EQUIPMENT

- A. The Owner reserves the right to keep any existing equipment, coordinate with Owner on removal and transportation of equipment to a location of their choice. It shall be the responsibility of this contractor to salvage equipment the Owner chooses not to retain.
- B. MEP disconnections by related trades, move, store and re-install equipment, ready for utility connection.
- C. Coordinate scope of work and timeline with Owner and other trades prior to removal of existing equipment.
- D. Clean and re-furbish existing equipment to be re-used to "like new" condition, as noted.
- E. It is the responsibility of this contractor to provide storage as required until the piece of equipment is installed or re-installed.

3.4 ADJUSTING

- A. Upon completion of installation, adjust new and existing equipment and apparatus to ensure proper working order and conditions.
- B. If a new piece of equipment is not functioning properly and determined to be non-repairable in the field it shall be removed and replaced with a new piece of equipment.
- C. Inspect all equipment and run each piece of equipment through a complete operating cycle to verify that equipment is fully operational.

3.5 CLEANING

- A. Remove masking or protective covering from stainless steel and other finished surfaces.
- B. Remove all packing materials and debris from jobsite.

- C. Wash and clean new and existing equipment.
- D. Polish glass, plastic, hardware and accessories, fixtures and fittings.

3.6 DEMONSTRATION AND TESTING

- A. Test existing and new equipment prior to demonstration.
- B. At completion of work, provide qualified and trained personnel to demonstrate operation of each item of equipment and instruct Owner in operating procedures and maintenance.
- C. Individuals performing demonstration shall be fully knowledgeable of all operating and service aspects of equipment.
- D. Start-up, test, and adjust new equipment. Authorized factory technicians shall start-up equipment requiring testing and balancing, i.e. hoods, pulping systems, equipment with remote components, etc.

PART- 4 LISTING OF FOOD SERVICE EQUIPMENT

4.1 ITEM 001 – Hot/Cold Food Well Unit

- A. Vollrath Company, Model FC-6HC-0208-AD (or equal) Hot/Cold Food Multi-Well Unit, Drop-in, Electric, individual pan design, with drain, (3) pan size for 12" x 20" pans, (1) control box, thermostatic hot controls for each well, stainless steel, 6400 watts hot, 2800 watts cold, NSF & UL listed. Provide each with the following
 - 1. 1 ea. 1-year warranty parts and labor
 - 2. 1 ea. Electric to be verified (208v/60/1-ph, 10.2 amps)
 - 3. 1 ea. Model 4358000-2 Control Panel Mounting Frame
 - 4. 4 ea. Adapter Bars

4.2 ITEM 002 – Electric Fryer

- A. Vulcan, Model 1ER50C (or equal), electric, (1) 50 lb. oil capacity full tank, 16 gauge stainless steel tank, front & sides, Computer Control Digital Read Temperature, 1-1/4" full port ball type drain valve, twin fry baskets, under-fryer drawer filtration, NSF, CE, CSA Star, EnergyStar. Provide with the following:
 - 1. 1 ea. 1 year parts and labor warranty
 - 2. 1 ea. Electric to be verified (480v, 50/60Hz, 3 phase, 17kw, hardwired connection)
 - 3. 2 ea. Stainless steel tank covers

4. 1 set Adjustable Casters, 6" adjustable swivel non-lock rear & lock front casters
5. 1 ea. Extra Set of Twin Fry Baskets (6-1/2"w x 13-1/4"d x 6"h)
6. 1 ea. Large Single Fry Basket (13"w x 13-1/4"d x 5-1/2"h)
7. 1 ea. 10" High stainless steel removable splash guard

4.3 ITEM 003 - Hand Sink

- A. Advance Tabco Model 7-PS-62 (or equal) Dimensions: 13(h) x 17.25(w) x 15.25(d) Hand Sink, wall model, 14" wide x 10" front-to-back x 5" deep bowl, 20-gauge 304 series stainless steel, splash mounted gooseneck faucet, knee valve, basket drain, wall bracket, NSF, cCSAus Paper towel & Soap dispensers by Owner. Provide each with the following:
 1. 1 ea. Model 7-PS-10 P-trap, heavy duty, 1-1/2", 17 gauge

4.4 ITEM 004 - Toaster

- A. Waring Commercial Model CTS1000 (or equal) Dimensions: 13(h) x 15-1/2(w) x 19.5(d) Heavy duty Conveyor Toaster, Super high output (450 slices per hour), brushed stainless steel construction, cool touch side panels, conveyor speed control NSF & UL listed. Provide each with the following
 1. 1 ea. 1-year parts and labor warranty
 2. 1 ea. Electric to be verified (120v/60/1-ph, 15.0 amps)
 3. 1 ea. Model 7-PS-10 P-trap, heavy duty, 1-1/2", 17 gauge

4.5 ITEM 005 – Single Door Reach-In Freezer

- A. True Manufacturing Co., Model T-23F-HC (or equal) Dimensions: 88.5(h) x 27(w) x 29.5(d), reach-in, self-contained capillary tube refrigeration, stainless steel exterior, clear coated aluminum interior, full-height solid doors, interior safety shielded lighting, electronic controller w/digital display, 1/2 hp, cUL, UL, NSF. Provide with the following:
 1. 1 ea. Standard warranty (for the United States & Canada Only): 3-year parts and labor; 5-year compressor
 2. 1 ea. Electric to be verified, 115v/60/1-ph, 3.7 amps, cord, NEMA 5-15P
 3. 1 ea. Verify door hinge, factory installed to correct side, standard
 4. 1 set Frame rail fitted casters, swivel, with locks on front set (4" diameter rubber tires) set of 4 (4" height)
 5. 2 ea. Additional Shelves

4.6 ITEM 006 – Refrigerated Chef Base

- A. Avantco Refrigeration, Model CBE-36-HC 36" (2) drawer (or equal) Dimensions: 25.825(h) x 36.325(w) x 32.125(d), automatic electric defrost, digital temperature control, removable magnetic drawer gaskets, 132lb. drawer capacity, stainless steel exterior, cUL, UL, NSF. Provide with the following:
1. 1 ea. Standard warranty (for the United States & Canada Only): 3-year parts and labor; 5-year compressor
 2. 1 ea. Electric to be verified, 115v/60/1-ph, 4 amps, cord, NEMA 5-15P.

4.7 ITEM 007 - 36" Griddle

- A. Vulcan, Model HEG36E (or equal) Dimensions: 15.3(h) x 36(w) x 24(d) HEG Series Heavy Duty Electric Griddle, 1/2" thick polished steel plate, manual controls, 4" stainless steel back and tapered side splashes, 3-1/2" wide front grease trough empties into large capacity grease drawer, 4" adjustable legs, heavy duty chromed thermostat knob guards, CSA Star, NSF. Provide with the following:
1. 1 ea. 1-year limited parts & labor warranty, standard
 2. 1 ea. Electric to be verified, (480v, 50/60Hz, 3 phase).
 3. 1 ea. Cutting board
 4. 1 ea. Condiment rail
 5. 1 ea. Banking strip

4.8 ITEM 008 – Sandwich Unit

- A. True Manufacturing Co., Model TSSU-48-12D-2-HC (or equal) Dimensions: 36.75(h) x 48.3(w) x 30.1(d), self-contained capillary tube refrigeration, stainless steel exterior, clear coated aluminum interior, (2) adjustable shelves, 11.75" full depth composite cutting board, Heavy-duty stainless steel drawer slides and rollers, 5" diameter casters with locks on front, CSA Star, NSF. Provide with the following:
1. 1 ea. Standard warranty (for the United States & Canada Only): 3-year parts and labor; 5-year compressor
 2. 1 ea. Electric to be verified, (115v/60/1-ph, 4 amps, cord, NEMA 5-15R).
 3. 1 ea. Sneeze guard
 4. 1 ea. Single overshelf

5. 1 ea. Exterior rectangular digital temperature display (factory installed)
6. 10ea. Pan dividers

4.9 ITEM 009 – Electric Fryer Holder

- A. Vulcan, Model FrymateVX15 (or equal), electric, Free standing, 18 gauge stainless steel cabinet, Stainless steel sloped drain top with removeable grease collector (dishwash safe), grease strip brackets NSF, CE, CSA Star, EnergyStar. Provide with the following:
 1. 1 ea. 1-year parts and labor warranty
 2. 1 ea. Electric to be verified (120v/60/1-ph, 9 amps, cord, NEMA 5-15P)
 3. 1 lt. Factory to supply cord & plug
 4. 1 set Adjustable Casters, 6" adjustable swivel non-lock rear & lock front casters
 5. 1 ea. ThermoGlo Food Warmer
 6. 1 ea. Stainless steel tank cover

4.10 ITEM 010 – Refrigerated Display Case

- A. Federal Industries, Model CGR3642 Dimensions: 42(h) x 36.13 (w) x 35.31(d), curved glass styling, tempered Thermopane tilt-out front glass, steel base construction, thermometer, removable scratch-resistant & rustproof white display deck, adjustable temperature control, light switch, adjustable leg levelers, 300k LED top light and shelf lights, UL Safety, UL Sanitation, NSF, cUL, DOE 2017. Provide with the following:
 1. 1 ea. Standard warranty (for the United States & Canada Only): 3-year parts and labor; 5-year compressor
 2. 1 ea. Electric to be verified (120v/60/1-ph, 4 amps, cord, NEMA 5-15P)
 3. 2 ea. Glass Shelves
 4. 1 ea. Rear wrapping board
 5. 1 ea. Reflective ends
 6. 1 ea. White Interior
 7. 1 ea. Castor Unit

4.11 ITEM 011 – Pastry Display Case

- A. Cal-Mil Plastic Products Inc., Sierra Square Pastry Case, Model 3610, Dimensions: 21(w) x 17(d) x 23.25(h), (3) 13 x 18 clear trays, vintage frame and wood base.

4.12 ITEM 012 – Turbo Chef

- A. Turbo Chef, Model i5 Touch (or equal), stainless steel front & top & sides, 304 stainless steel interior, 7-inch capacitive touch screen with tempered glass cover, Integral recirculating catalytic convertor for UL listed ventless operation, top-launched microwave system, Smart voltage sensor technology, self-diagnostics, cUL, UL, EPA 202, NSF. Provide with the following:
1. 1 ea. 1-year limited parts & labor warranty, standard
 2. 1 ea. Electric to be verified, (208/240v, 60Hz, 3-ph, 26amps)
 3. 1 ea. MDD-1005: Additional Year (PhD SAAS)
 4. 1 ea. MDD-1001 Initial Equipment connectivity parts
 5. 1 ea. Aluminum paddle (NGC-1478)
 6. 1 ea. Bottle Oven Cleaner (105704)
 7. 1 ea. Bottle Oven Guard (105703)
 8. 2 ea. Trigger Sprayers (103182)
 9. 2 ea. PTFE Baskets (NGC-1331)

4.13 ITEM 013 – Salad Bar Unit

- A. Beverage-Air, Model SPE60HC-S (or equal) Dimensions: 36.8(h) x 60.6(w) x 30.1(d), stainless steel front & top & sides with finished back, clear coated aluminum interior, (12) 4" deep 1/3 size polycarbonate pans, Locking divider bars, Self-closing doors with 120° stay-open feature, on cartridge style hinges, 6" Casters (2) with brakes, (4) epoxy-coated steel wire shelves, cUL, UL, NSF. Provide with the following:
1. 1 ea. Standard warranty (for the United States & Canada Only): 5-year parts and labor; 7-year compressor
 2. 1 ea. Electric to be verified, (115v/60/1-ph, 5.4 amps, cord, NEMA 5-15P).
 3. 1 ea. Sneeze guard panel for single side service
 4. 1 ea. Foldable tray slides
 5. 1 ea. Low profile casters
 6. 1 set Shelf dividers

7. 2 sets Pan supports
8. 1 set Door locks
9. 1 ea. Tray slide

4.14 ITEM 014 – Sneeze Guard

- A. BSI, Model DECO-101-N (or equal), Vertical Operator-Serve Food Shield, Size as indicated on plan and schedule, NSF. Provide with the following:
 1. 1 ea. Chrome Finish
 2. 1 ea. 1" Square tube
 3. 1 ea. ¼" tempered glass panels
 4. 1 ea. Undercounter installation (square tube)
 5. 2 ea. ¼" tempered glass end panels.

4.15 ITEM 015 – Coffee Brewing System

- A. Wilber Curtis Company, Model TP15T10A1100 (or equal) Twin server, 3-gallon total (1.5gal. per side), G3 digital control module, 3/8" water source inlet, cUL, UL, NSF. Provide with the following:
 1. 1 ea. 1-year limited parts & labor warranty, standard
 2. 1 ea. Electric to be verified, (220v/60/1-ph, 24 amps, hardwired connection).

4.16 ITEM 016 – Coffee Dispensing System (2 each)

- A. Wilber Curtis Company, Model TXSG15 ThermoProServer (or equal) Twin server, 1.5gal. per side, Provide with the following:
 1. 1 ea. 1-year limited parts & labor warranty, standard

4.17 ITEM 017 – Undercounter Double Door Refrigerator

- A. True Manufacturing Co., Model TUC-36-HC (or equal) Dimensions: 29.75(h) x 36.3(w) x 30.1(d), self-contained capillary tube refrigeration, stainless steel exterior, clear coated aluminum interior, Each door fitted with 12" long recessed handle, Positive seal self-closing doors with 90° stay open feature, UL, NSF. Provide with the following:
 1. 1 ea. Standard warranty (for the United States & Canada Only): 3-year parts and labor; 5-year

compressor

2. 1 ea. Electric to be verified (115v/60/1-ph, 2.0 amps, cord, NEMA 5-15P)
3. 2 ea. Barrel locks (factory installed). Requires one per door.
4. 1 set 2-1/2" diameter casters (to allow fit under countertop)
5. 1 ea. (4) Adjustable PVC coated wire shelves
6. 1 ea. Exterior rectangular digital temperature display (factory installed)
7. 1 ea. SPEC1 package

4.18 ITEM 018 –Iced Coffee Dispensing System

- A. Bunn-O-Matic Corporation, Model TDO-N-4 (or equal) Narrow Iced Beverage Dispenser, 4.0 gallon, Integrated lid retainer, integrated drip tray NSF . Provide with the following:
 1. 1 ea. 1-year limited parts & labor warranty, standard
 2. 1 ea. Drip Tray (Model No. 39626.0000)
 3. 1 ea. Faucet Assembly (Model No. 03260.0003)
 4. 1 ea. Drip Tray Cover (Model No. 39627.0000)
 5. 1 ea. Replacement Lid (Model No. 39624.0000)
 6. 1 ea. TDO-N Locater Guide (Model No. 39696.0000)

4.19 ITEM 019– Ice Drink Dispenser

- A. This item is to be furnished by Owner
- B. Contractor to coordinate installation and provide all connections as required, inclusive but not limited to piping, wiring, drains, etc.

4.20 ITEM 020 – Exhaust Hood

- A. Manufacturer: Halton Company
 1. Model #: KVE- PSP Wall Mounted
 2. Description: Exhaust Hood
 3. Dimensions: As shown on plans with a typical hanging height of 6'-8" above finished floor. Remote

Switch panel with Fan and light switches shall be remote mounted, verify location with Architect.

4. Furnish and install a complete kitchen exhaust canopy. The hood shall be an Exhaust canopy. Halton Model KVE-PSP Wall Mounted style as manufactured by the HALTON Company of Scottsville, Kentucky. The canopy shall bear either the ETL or Underwriters Laboratories U.L. label, for listed range hood without exhaust fire damper per standard 710 and be fabricated in compliance with NFPA-96-2001 and shall bear the National Sanitation Foundation seal of approval.
5. All exposed surfaces shall be 18-gauge stainless steel with a #4 brushed finish, double shell end walls and face construction. **Single wall construction will not be permitted. Hood shall be UL Listed and labeled for “zero clearance” at the end(s) of the hood as shown on drawings when mounted against a wall.** Unexposed surfaces are 18-gauge stainless steel. The installation shall be in accordance with the manufacturer’s recommendations and conform to NFPA-96 guidelines and all applicable local codes. The hood height shall not exceed 24”H. The overall lengths of the hoods shall be as indicated on drawings and/or equipment schedule. Use of Capture Walls to create a seal between cooking equipment and wall shall not be used as they require cooking equipment to be located further from wall reducing isle space. Bottom edge of hood front panels to be square, chamfered front shall not be allowed as they reduce front overhang and jeopardize capture and containment over tall cooking equipment. **The use of S/S end panels shall not be permitted.** Hood to include s/s trim panels from top of hood to finished ceiling on all open sides. Hood shall be tapered as shown on contract drawings.
6. Seams and joints shall be welded liquid tight in accordance with National Fire Protection Association (NFPA) bulletin #96. Exposed external welds shall be ground and polished to match original material finish. The hood shall be Underwriters Laboratories (UL) Listed 710. Construction shall conform to the requirements of National Sanitation Foundation (NSF) standard 2 and the NSF seal shall be displayed on the front face of the hood. Hanger brackets shall be threaded ½-13 and located on approximately five foot centers.
7. Hood will include an active internal “Capture-Jet” System on all open sides of the hood that will allow for Capture and Containment of thermal plume at specified air volumes. The Capture Jet air shall be pulled into a 1” air plenum with the Capture-Jet fan and discharged through Capture-Jet ports that are located along the inside front, side and bottom edge of the hood at discharge velocity of 1800 FPM. Slot type, passive devices or “Short-Cycle” discharge is not acceptable.
8. Hood shall include recessed MUA ceiling plenums and diffusers extending 24” wide and entire length of the hood front as shown on drawings with a white powder coat finish to match the drop ceiling tiles in the kitchen. MUA plenums shall not exceed 150CFM/per lineal foot of plenum using 28% open perforation diffuser material to reduce possibility of air disturbance along the front edge of the hood.
9. Each canopy shall have a filter housing of the same material as the canopy liner. The filter housing shall be equipped with a concealed drip tray the full length of the canopy and with a grease cup for easy removal and daily cleaning. The hood shall be equipped with Halton KSA (High Efficiency) multi-cyclone Stainless Steel grease extractors. The KSA filters shall be NSF and UL classified. The particulate extraction efficiency is 93% on particulates of 5 microns and 98% on particles with a diameter of 10 microns or larger per ASTM F2519 method of test. The pressure loss over the extractor shall not exceed 0.50 inches W.C. at flow rates approved by UL for heavy load cooking. Sound levels shall not exceed an NC rating of 55. Baffle, adjustable or slot type extractors shall not be acceptable.

10. The airflows through the KSA extractors and the Capture Jet air chamber are to be determined through the integral T.A.B. (Testing and Balancing) ports located on the outside end of the exhaust plenum inside each hood section. It is the responsibility of the air balancer to adjust the exhaust volumes after installation with a Magnahelic Gauge or Shortridge Digital Anemometer and the hood TAB ports to match the Pressure vs Air Flow Curves card provided in each hood section.
11. The exhaust airflow will be calculated based on the convective heat generated by the appliances underneath each canopy. Submittal shall include convective heat calculations base on the input power of the appliance served and efficiency of hood system consistent with results of independent test based on ASTM Standards F-1704-05 Capture & Containment and F-2474-05 Heat Gain to Space. Final air volume calculations shall comply with the hood listing. The use of end panels or rear seals to achieve required airflows are not acceptable.
12. An illuminated hood light button and exhaust fan on/off button to be provided by hood manufacturer and installed flush mounted under the front lip of the hood as shown on contract drawings for ease of access.
13. Hood shall be provided with hood mounted temperature sensor and timer panel designed and installed to automatically activate the exhaust fan whenever cooking operation occurs. The activation of the exhaust fan shall occur through and interlock with the cooking appliances, by means of heat sensor, per IMC 2006 507.2.1.1 requirements.
14. Each hood shall be equipped with Halton Culinary LED Lights (HCL). Constructed from stainless steel frame and Aluminum hosing, the light fitting comprises flush mounted broad beam spots with a diffusion angle of at least 80°. Each light is comprised of a patented mixing chamber and a specific reflector. Both shall provide a good balance between direct and diffuse light components without dazzling the staff to mitigate eye fatigue. The shielding angle shall exceed DIN 12464-1 requirement and be at least 30°. The illuminance on the working surfaces shall be 50-foot candles with a CRI Color Rendering Index greater than 80. The wattage per fixture will be 14W, and provide code required 50-foot candles at the cooking surface. The LED's lifetime shall be 50,000 hours. The internal power supplies shall have at least the same lifetime. They shall enable switching on/off or dimming the light (0-100%) with one or several switches. The lights shall be supplied with vapor proof, grease proof, and heat proof UL-listed designed specifically for commercial kitchen hood application.
15. All light fixtures shall be wired in a concealed manner to a junction box on top of the hood for connection to the light switch. All wiring is in accordance with the National Electric Code (NFPA 70).

4.21 ITEM 52– Fire Protection System

A. Ansul R-102 (or equal) Ansul Fire Protection System

1. The hoods shall include factory installed complete Ansul R-102 fire suppression system. System shall include Ansul test and permit fees. The Ansul system cabinet shall be located as shown on contract drawings. Wiring from Ansul tanks located in cabinet to manual pull stations to be done by Contractor in field.
2. Ansul R-102 fire extinguishing system shall protect kitchen hood against grease fires by a completely automatic fire control system of the wet chemical type.

3. Fire detection system shall be capable of detecting fire in the hood, duct, or surface equipment and shall automatically discharge liquid extinguishing agent into the plenum chamber, exhaust duct collar, and cooking appliances areas to ensure against re-ignition or re-flash.
4. System components shall include a spring-loaded release mechanism, agent tank brass nozzles with blow off caps and stainless steel (chrome-plated) appliance drops, fusible link detector, wall mounted emergency pull stations, wall mounted Automan and cabinet, and a mechanical gas valve installed in the gas line serving the cooking equipment (valve provided by fire protections system manufacturer and installed in gas line by plumber.)
5. System installation shall be done by an authorized representative of the system manufacturer and conform to UL 300 requirements and local codes.
6. Automatic actuation shall be by means of fusible with no visible conduit. System shall include an electrically actuated release mechanism.
7. Microswitches shall be furnished as part of the fire protection system for tie in of building alarm and for makeup air/fire/fuel shut down.
8. All access openings, holes, sleeves, chases, etc., in building structure necessary to permit piping and control tubing to be run between system unit, ventilator and duct work are to be provided by the Contractor.
9. The Contractor is to furnish a control relay to detect operation of the system by connection to the microswitches supplied. The Contractor is to furnish and install all wiring required for the system specified.
10. All exposed piping and nozzles of fire protection system shall be chrome or Stainless steel sleeved.
11. All horizontal piping is to be done on the top of the ventilator unless otherwise specified.
12. Verify location of remote manual pull station.
13. Contractor to provide shunt trip breaker.

4.22 ITEM 022 – Cup Dispenser / Lid Organizer

- A. Serve-Sense, KleanTake, Countertop cup and lid dispenser, 8-slot, Dimensions: 12.25(w) x 23.8(d) x 25.5(h), color: black, Cup-capacity 8 - 44oz., Gasket dispenser mechanism, adjustable.

4.23 ITEM 023– Point-of-Sale Unit

- A. This item is to be furnished by Owner
- B. Contractor to coordinate installation and provide all connections as required, inclusive but not limited to power, data, etc.

4.24 ITEM 024 – Equipment / Work Table

- A. Custom Model by MARLO: (or equal) Size and shape as shown on drawings (approximately 50"(l) x 30"(d) x 36" high). Table shall be constructed of 14-gauge 304 stainless steel top with fully enclosed 6" high backsplash. Provide channel underbracing, cross bracing and sound deaden top. Provide with a tier of three (3) S/S drawers. 24" wide 16-gauge two tier over shelf remaining length of table, mounted on S/S tubular uprights with concealed fasteners. NSF & UL Listed.

4.25 ITEM 025– Shelving Units – (2Lot) Required

- A. Four tier Metro Model A----NK3 (or equal) Super Adjustable Super Erecta® Shelf, wire, Metroseal 3 (corrosion-resistant) finish, corner release system, with Microban® antimicrobial protection, NSF.
- B. Each shelving unit shall have four (4) Model 74PK3 (or equal) Super Erecta® SiteSelect™ Post, 74-5/8"H, adjustable leveling bolt, posts are grooved at 1" increments & numbered at 2" increments, double grooved every 8", Metroseal 3™ epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection. Shelving shall be provided as shown on drawing (No "S" clips allowed), it shall be the responsibility of this contractor to verify and adjust shelving sizes to insure proper fit.

PART- 5 CONDITIONS

5.1 EXISTING CONDITIONS:

- A. It is the responsibility of this contractor to fully review the existing conditions of the building and the new kitchen location. This contractor shall be familiar with access to the kitchen location, including equipment access by elevators, stairwells, corridors, openings, including access around the exterior of the building for a crane or hoisting equipment (if required). It will be the responsibility of this contractor to coordinate equipment installation with the owner, CM, GC, etc.

PART- 6 DETAILS OF CONSTRUCTION

6.1 DETAIL DRAWINGS

- A. The following details are a part of these specifications and shall be referred to for additional design requirements:

END OF SECTION 11 4000

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. Work Included
 - 1. Plastic laminate wood cabinets.

1.3 QUALITY ASSURANCE

- A. Kitchen Cabinet Standard: ANSI A161.1.
- B. Field Measurements: Verify cabinet dimensions to field measurements, finish wall to finish wall.

1.4 SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturer's technical product data and installation instructions indicating materials, hardware and finishes used in fabrication of kitchen cabinets as required to show compliance with specifications.
- B. Shop Drawings:
 - 1. Submit shop drawings indicating location and size of each type of cabinet, accessories, materials, finishes, hardware types and locations, fillers, etc. Including fully dimensioned plans and elevations and indicate details of anchorage to countertop and to walls.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Protect cabinets during transit, delivery, storage and handling to prevent damage, soiling and deterioration.
- B. Do not deliver cabinets until painting, wet work, grinding and similar operations, which could be performed before installation of cabinets, have been completed in installations areas.

1.6 JOB CONDITIONS

- A. Conditioning:
 - 1. Comply with cabinet manufacturer's recommendations for temperature and humidity requirements in cabinet installation areas. Do not install cabinets until required temperature and relative humidity have been stabilized and will be maintained in installation areas.
 - 2. Maintain temperature and humidity in installation areas as required to maintain moisture content of installed cabinet work within a tolerance range of the optimum moisture content acceptable to cabinet manufacturer, from date of installation through remainder of construction period.

PART- 2 PRODUCTS

2.1 MANUFACTURERS

- A. Custom Millwork:
 - 1. Style: Similar to existing cabinetry which is to be removed, plastic laminate as per details on drawings.
 - 2. Plastic Laminate
 - a. Manufacturer: Wilson Art
 - b. Color: Silver Oak Ply #8203
 - c. Grain Orientation: Vertical

2.2 MATERIALS

- A. Accessories:
 - 1. Heat Shield Strips use where doors are near heat producing appliances.
 - 2. Door Pulls
 - a. Liberty 3in Stainless Steel, model #P13456L-SS-U1

3. Frame Hinge – Soft close.
 4. Shelf Pin – PINSHLF
- B. All other accessories as may be required.

PART- 3 EXECUTION

3.1 INSPECTION

- A. Inspect substrate and conditions under which cabinets are to be installed. Do not proceed until all unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Install cabinets plumb, level, true and straight with no distortions. Shim as required using concealed shims. Where kitchen cabinets abut other finished work, scribe and cut for accurate fit. Provide filler strips, scribe strips and molding as indicated or required and in finish to match cabinet face.
- B. Anchor cabinet securely in place with concealed (when door and drawer are closed) fasteners, anchored into structural support members of wall construction. Comply with manufacturer's instructions for support of units.
- C. Complete hardware installation and adjust doors and drawers for proper operation.

3.3 CLEANING AND PROTECTION

- A. Repair or remove and replace defective work as directed upon completion of installation.
- B. Clean exposed and semi-exposed surfaces, touch-up finish as required. Remove and refinish damaged or soiled areas.

END OF SECTION 12 3530

COUNTY OF ALBANY

REQUEST FOR BIDS SHAKER PLACE NURSING AND REHABILITATION CENTER



RFB #2024-150

SHAKER PLACE CAFÉ PROJECT

VOLUME 3

**ALBANY COUNTY DEPARTMENT OF GENERAL SERVICES
PURCHASING DIVISION
PAMELA O NEILL, PURCHASING AGENT
112 STATE STREET, ROOM 1000
ALBANY, NY 12207**

**ALBANY COUNTY SHAKER PLACE REHABILITATION
& NURSING CENTER CAFÉ RENOVATION
ALBANY, NEW YORK**

October 6, 2023

OWNER

County of Albany
Shaker Place Nursing Home
Albany, New York

ARCHITECT

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**MECHANICAL/PLUMBING/
ELECTRICAL ENGINEER**

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646 Plank Road, #104
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VOLUME 3

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E-201	FIRST FLOOR CAFE REMOVAL PLAN
E-301	FIRST FLOOR CAFE LIGHTING PLAN
E-401	FIRST FLOOR CAFE POWER & SYSTEMS PLAN
E-402	ROOF ELECTRICAL PLAN

END OF LIST

END TABLE OF CONTENTS: VOLUME 3

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including all General Conditions, Supplementary Conditions, Division 1 specification sections as well as Information to Bidders requirements that are included in the project documents, apply to the work of this Contract.

1.02 ALLOWANCES, ALTERNATES AND UNIT PRICES

- A. Refer to Division 1 specifications for allowances, alternates and unit prices required as part of this Contract.

1.03 INTENT

- A. The intent of the drawings and these specifications is to provide all systems complete and operative. Whether indicated on the drawings and/or included in the specification or not, provide all materials, equipment and labor usually furnished with such systems.

1.04 DEFINITIONS

- A. Provide: Furnish, install and connect.
- B. Furnish: Supply material only.
- C. EXR: Existing to remain.

1.05 SCOPE OF WORK

- A. Drawings and specifications are complementary and must be so interpreted to determine the full scope of work under this section. Wherever any material, article, operation or method is either specified or shown on the drawings, this Contractor is required to provide each item and perform each prescribed operation according to the designated quality, qualification or condition, furnishing all necessary labor equipment and incidentals.
- B. Specifically included, without limiting the generality of drawings and specifications are:
 - 1. Plumbing fixtures and trim indicated.
 - 2. Valves where indicated.
 - 3. Connection to equipment "by others" as indicated.
 - 4. Hot and cold water lines, recirculating lines.
 - 5. Sanitary drainage and vent lines.
 - 6. Connection to existing water and sewer mains.
 - 7. Thermal insulation on hot and cold water systems.
 - 8. Remove existing plumbing fixtures where indicated.
 - 9. Remove existing plumbing piping systems and equipment where indicated.
 - 10. Sprinkler system.
 - 11. Tests: This contractor shall furnish materials, equipment and labor and shall perform all work of testing of the plumbing systems as outlined hereinafter. Testing procedure shall include installation tests and operating tests.

1.06 TEMPORARY SERVICES

- A. Temporary Heat: In accordance with Architect's specifications and/or conditions, contractor shall have the permanent heating system capable of providing heat to the new work areas when required. The term heating system shall include all work or components necessary to operate heating system. For temporary usage, it is not required that this work be in a finished condition, i.e., covers in place, etc. Cost of fuel consumed for temporary heat from permanent systems only shall be paid by owner.
- B. The use of permanent system will be allowed only if the building is fully enclosed with no construction dust to clog heating/cooling coils, heat recovery components, fans, etc.
- C. At the completion of work, Contractor shall turn over to the Owner all equipment used for temporary heat in a new, as purchased condition. Contractor shall replace filters with new ones, clean all components which shall include: unit casings, ductwork, grilles, diffusers, etc., re-lubricate all moving parts, replace belts if required and perform any other work necessary (as determined by Architect and Engineer) to put equipment in a "new" condition.
- D. Contractor shall take all measures necessary to insure that dust, dirt, or debris does not enter air systems while in operation for temporary heat and shall change filters as often as necessary. Under no circumstances shall air handlers be allowed to operate with no filter in place.

1.07 CONTINUITY OF UTILITY SERVICES

- A. It is of paramount importance that each utility service operate continuously and without interruption. Whenever this contractor plans to make changes or alterations to any existing utility service, such plans shall result in no or minimum service interruption or inconvenience to Owner. This contractor shall plan and schedule any change or alteration to an existing utility service with Architect and Owner. Such planning, timing, and/or scheduling shall be approved by both these parties.

1.08 CODES AND STANDARDS

- A. All materials, equipment, and installations by this contract shall be in accordance with the latest editions of the following applicable requirements:
 - 1. 2020 International Building Code, including all applicable amendments supplements to the following:
 - a) 2020 International Building Code
 - b) 2020 International Existing Building Code
 - c) 2020 International Fire Code
 - d) 2020 International Plumbing Code
 - e) 2020 International Mechanical Code
 - f) 2020 International Fuel Gas Code
 - 2. 2020 Supplement to the New York State Energy Conservation Construction Code including all applicable amendments to the following:
 - a) 2020 International Energy Conservation Code
 - b) 2020 ASHRAE 90.1
 - 3. 2020 Uniform Code Supplement (May 12, 2020)
 - 4. Lead testing in school drinking water (10 CRRNY 67-4)
 - 5. Conform to requirements of NEMA.
 - 6. Liquefied Petroleum Gas Code - NFPA 58.
 - 7. Bear label of Underwriters Laboratories, Inc.
 - 8. National Electrical Code NFPA Article 70, latest edition.
 - 9. New York State Health Code.

10. Local Utility Standards.
11. Local Municipal and/or City Standards.
12. Industrial Code Rule #4 and #14 (12NYCRR 4 and 14) (Standards for Boiler Installation).
13. Conform with applicable requirements of ASTM - Regulations and Standards for Pipe and Pipe Fittings.
14. Be in accordance with USAS - Code for Pressure Piping, latest edition.
15. For external and internal pipe insulations, have flame spread rating of 25 or less and smoke developed rating of 50 or less when tested in accordance with ASTM Standard E84.
16. Sheetmetal and Air Conditioning Contractor's National Association, Inc. (SMACNA), latest editions.
17. Conform with applicable requirements of Standard for the Installation of Air Conditioning and Ventilating Systems, NFPA 90A, and Code for Safety to Life from Fire in Buildings and Structures, NFPA 101.
18. Be in accordance with design standards outlined in ASHRAE Handbooks, latest edition.
19. Conform to requirements of Owner's insurance carriers.

1.09 SUBMITTALS AND SUBMISSION REQUIREMENTS

- A. All submittals shall be in accordance with Division 1 requirements, the following requirements listed below, and also as indicated in each specification section. All submittals not complying with the listing above will be returned to the contractor without being reviewed. Rejection by Architect or Engineer of any items submitted shall require resubmittal of acceptable items.
1. Within (30) days after receiving signed contract or notice to proceed, submit to Architect for review complete descriptive dimensional data and ratings for equipment and materials proposed to be furnished and installed. Submit (8) copies of data unless otherwise specified by the architect.
 2. All materials submitted shall clearly state the job name and specification section(s) that it applies to.
 3. Any package containing more than one piece of equipment or material shall also contain a schedule clearly listing all items in submittal. Schedule page(s) shall also indicate project name and building name.
 4. All submittals must be clearly marked using nomenclature used in this specification for proper item identification, schedule of usage's, model numbers, construction materials, performance, data, etc.
 5. Projects involving multiple buildings must have the submittals separated by building. Submittals in which buildings are combined will not be accepted. (Exception: When specifically approved by engineer, basic materials may be submitted once.)
 6. The contractor shall verify and insure that dimensions and elevations of equipment and structures to be used conform to the space allocated for the equipment on the drawings, and complies with existing conditions.
 7. Submittals traced or copied from contract drawings are not acceptable and will be returned without review.
 8. In the event material and/or equipment is installed prior to obtaining approval of shop drawings, and in the sole opinion of the Owner's Agent, this material and/or equipment does not meet the specifications, the Contractor shall be liable for the removal and the replacement at no additional cost to the contract.

- B. Samples: When requested by Engineer, provide samples of both specified equipment and proposed substitutions for review by the Owner's Agent. Such equipment shall be delivered to a location designated, or erected at the job site as directed. When neither is physically possible, arrange for the Owner's Agent to visit an acceptable site where the proposed equipment can be inspected.
- C. Substitutions:
 - 1. Submittals for equipment or materials other than as specified shall be accepted for review by the Owner's agent.
 - 2. Approval of substitute equipment shall be based on functional, physical and aesthetic compatibility to the equipment specified as determined by the Owner's agent and approved by the engineer.
 - 3. Where substitute equipment is approved, the contractor shall be responsible for, and bear the cost of any necessary changes by his trade or other trades to make the system complete and operable.
 - 4. Contractor is fully responsible for providing coordination between all trades affected by equipment substitution.
 - 5. When requested, contractor shall submit layout drawings indicating new dimensions and arrangements of substituted equipment. Layout drawings shall indicate all revisions necessary for all services affected by substitution.

1.10 SUBSTANTIAL COMPLETION REQUEST FOR PUNCH LIST

- A. Contractor shall submit a letter in email form stating that the work is substantially complete and ready for Punch List review by Engineer.
- B. Contractor shall note which areas are substantially complete by Building (if multiple buildings) and by Area according to the Key Plan.
- C. Contractor shall list all items that are known to be incomplete at time of submission.
- D. If the request is for a partial Punch List, Contractor shall also include a list of room numbers/room tags.
- E. When letter is received by the Engineer, site review(s) will be coordinated with the Construction Manager, Clerk, Architect.

1.11 CUTTING AND PATCHING

- A. This contractor shall bear the cost of all cutting and patching required by and for the installation of this work. This contractor shall perform all cutting and patching unless otherwise indicated on drawings or if directed by the Architect.
- B. Patching of fire rated floors, walls, partitions, etc. shall be made using new materials equal to the fire rating of the existing.
- C. Should changes, omissions or errors in this contract's work require cutting, patching or making alterations in any portion of new construction, such work will be performed by GC at this Contractor's expense.

- D. Cutting and patching of roof surfaces and structures shall only be performed by a qualified contractor, as approved by the Architect. The work of this contract shall bear the cost of above mentioned cutting and patching. This contractor shall insure that existing roof warranties remain in force.
- E. This contractor shall furnish lintels, sized to accommodate structure above opening, where cutting and patching is to be performed on load bearing walls. Contractor shall obtain written approval for all lintels prior to installation.
- F. Cutting shall be done in a manner which will not adversely affect the strength of the building. Holes and openings shall be neatly cut so as to provide a finished appearance and shall be patched around the edge where required for a finished appearance. Provide temporary bracing, shoring, etc. as required.
- G. Patching shall be structurally sound and match the existing materials and finish of adjacent materials. Patching is required in finished areas, wherever existing work is removed, at the sides of openings, etc.
- H. At the completion of the work, all evidence of alteration will be as inconspicuous as possible.

1.12 FIELD INSPECTION

- A. As there are various conditions at the site which do not show on the accompanying drawings, or which are at variance with the conditions indicated on the drawings, it is important that each bidder visit the site and acquaint himself with existing conditions, and take these conditions into consideration when preparing his proposal. Each bidder shall obtain information or make any measurement desired. Lack of knowledge relative to existing conditions will not be allowed as a basis for extra compensation.
- B. This contractor and his subcontractors shall inspect existing equipment to remain prior to any of his new work in order to determine that all equipment is in good operating condition. If equipment is found to be lacking components, is inoperable, damaged, etc., contractor shall provide immediate written notice to the Owner. The Owner or his representative shall determine if any additional work is necessary and the method by which any work shall be performed.

1.13 INSTRUCTION SERVICES AND MANUALS

- A. Instructions:
 - 1. Provide competent personnel to remain at the jobsite for necessary time to instruct the Owner's personnel in proper operation and maintenance of installation made by this contractor.
 - 2. This contractor shall be responsible for notifying and instructing Owner's personnel on all equipment operations, maintenance requirements, etc. Furnish operating training session(s) for equipment listed.
 - 3. The Owner shall be responsible for establishing an operating and maintenance program for all equipment listed.
- B. The instruction shall include the following types of information:
 - 1. System overview
 - 2. Major component designation
 - 3. System operation procedures
 - 4. Maintenance scheduling and procedures
 - 5. Provide a list of spare components each system would normally require

- C. Services: Provide services required, for all equipment specified under this contract, for a period of (1) year after written acceptance by the Owner.
- D. Manuals: Submit (3) sets of Operation and Maintenance manuals. Each set shall contain the manufacturers' data, operating instruction parts catalog and maintenance procedures for each piece of equipment. Include normal maintenance servicing schedule to be performed by the Owner.
 - 1. For projects containing multiple buildings, manuals shall be submitted separately for each building.

1.14 PERMITS, CERTIFICATES AND FEES

- A. This Contractor shall obtain and pay for permits, certificates, fees etc. listed below. Costs for permits, fees etc. shall be included in the Base Bid amount.
 - 1. All required applications and permits to begin work
 - 2. Certificate of inspection including Third Party Agent
 - 3. All municipal connection charges
 - 4. All local utility charges (gas etc.)
 - 5. Fees and charges shall be obtained directly from the respective authority having jurisdiction.

1.15 REMOVAL, DISPOSAL AND HAZARDOUS MATERIALS

- A. All removed equipment shall be removed from the site and properly disposed of.
- B. All hazardous materials must be disposed of in compliance with ENCON and all other regulatory agencies.
- C. The Owner may wish to keep certain equipment, therefore, check with Owner before removals to determine what may be salvageable.

1.16 GAURANTEE

- A. Contractor shall guarantee all work furnished through this contract including work performed by sub-contractors, for a period of (1) year (unless otherwise noted), from the date of final acceptance. Contractor agrees to repair or replace any defective work or materials at no additional cost to the Owner. Contractor shall also pay for any damage to other work resulting from repairs to defects. Contractor shall furnish written guarantees to the Owner's agent in accordance with the general conditions.

1.17 INSTALLATION

- A. This contractor shall coordinate scheduling and installation of work with other contractors, sub-contractors and other trades. The contractor is also required to coordinate all work with owner supplied materials, direct contracts, and normal building operations, if any.
- B. All finished work shall be neat and workmanlike. All work of a special nature shall be performed by skilled and qualified workmen who can present credentials showing experience in said trade. New systems shall be delivered to Owner complete in perfect working order, tested and balanced in full accordance with plans and specifications. Existing systems shall function in same manner as before this work was performed. Any malfunctions which arise in existing systems as a result of demolition or alteration of parts of such systems shall be corrected.

- C. Layout of equipment, accessories and piping systems in plan is generally diagrammatic unless specifically dimensioned or detailed. Check project drawings and existing site conditions before installing work for interference's as governed by structural or other conditions. Owner reserves the right to make reasonable changes in location of equipment, accessories or piping systems prior to "roughing-in" without involving additional expense. Exact dimensions shown upon plans will be subject to verification and confirmation of exact conditions at site at time of construction. "Plus or minus" dimensions are shown upon drawing as a guide only. Exact surrounding conditions are governed by final equipment selection and/or other like details.
- D. Furnish all new equipment and materials as described herein. Any material, operation, method or device mentioned, listed or noted within this specification, if not specifically mentioned as furnished or installed by others, shall be furnished and installed by this contractor.

1.18 TESTING AND INSPECTION

- A. Inspections required for any ordinances, regulations, instructions, laws, rules, standards and practices that require any work to be inspected or tested shall be performed. Contractor shall give Owner, Architect and Engineer timely notice of readiness of work for inspection or testing and the date fixed for said inspection or testing.
- B. Third-Party Agency must inspect completed installation and present Owner with Certificate of Inspection showing approval.
- C. Required local or municipal inspection processed and present Owner with certificate indicating approval of such governing bodies.
- D. Contractor shall submit a written report to Architect, copy to Engineer, on results of each inspection or test on system or equipment supplied. Report shall contain all pertinent information, recommendations, approvals, additional work required, etc.
- E. Tests:
 - 1. After installations are completed and before insulation is applied, walls are closed, or trenches backfilled, all portions of the installation shall be tested in accordance with the procedures described herein.
 - 2. Provide hydrostatic pressure test for storm water sanitary and vent pipe with 10' or more developed length. Test pressure shall be a minimum of 10' water column at all points except the upper most portion of the roof vent or drain terminal. Piping shall be tested in sections with approved test plugs, duration of the test shall be one hour. In addition to the pressure test described above, Contractor shall provide a flow test for each section of the plumbing drainage systems to verify that there are no blockages. All pipes must be exposed during testing unless otherwise approved by Engineer.
 - 3. Interior domestic water piping shall be tested at 125 psi pressure. Contractor shall fill piping at the beginning of working day and maintain pressure for two hours with no pressure loss. If no leaks are found, the piping shall be allowed to remain under pressure overnight and then be inspected the next morning. No insulation shall be applied to the piping until the test is complete.

1.19 RECORD DOCUMENTS

- A. When required by general conditions or other Division 1 Section this Contractor shall prepare and turn over to Owner's agent record As-built documents. As-built drawings will include actual equipment location layout, service connections, ductwork and piping layouts, valve locations, etc.
- B. In all projects, contractor shall provide record drawings of all underground equipment and service runs. As-built drawings for underground work will include dimensions to actual locations finish grade elevations, and actual invert to underground structures equipment and service runs.

1.20 IDENTIFICATION AND NAMEPLATES

- A. Provide engraved plastic labels screwed to equipment furnished under this contract including control panels, starters, switches, panels, etc. Labels shall have black background, white letters; minimum letter height 3/8" high, self adhesive labels or punch tape type labels are not acceptable.

1.21 PENETRATIONS THRU FIRE RATED CONSTRUCTION

- A. All penetrations by this contract through rated construction shall be sealed fire safe by a UL listed approved method.
- B. All piping penetrations through walls, floors, etc. shall be sleeved.
- C. All piping penetrations through fire rated partitions, walls, floors, etc. shall be installed as follows; penetration shall be oversized 1/2" to 3/4" maximum. This contractor shall pack with fireproofing insulation, type FS cerablanket. Outside of penetrations (exposed surfaces around pipes and ductwork) shall be caulked and sealed with flame stop V, as manufactured by Flame Stop, Inc.; or an approved equal. Flame stop sealant shall be troweled smooth for finishing as required.

1.22 CONFINED SPACES

- A. All work in pipe tunnels, mechanical pits, well manholes, etc. shall be performed by skilled tradesman and laborers with current certification for working in confined space. Contractor shall bear all costs to provide all safety equipment, ventilation, etc. as required by State and Federal Regulations and shall obtain all necessary permits for such work.
- B. Contractor shall submit copy of current certifications and photo I.D. of all tradesman and laborers who will be working in confined spaces on this project.

1.23 COORDINATION DRAWINGS

- A. Before construction work commences, Contractors for all trades shall submit Coordination Drawings at not less than 1/4" = 1'-0" scale. Coordination Drawings are required throughout all areas for all trades. These drawings shall identify and show resolutions of trade conflicts. Mechanical Equipment Rooms shall be drawn early in the Coordination Drawing process, simultaneous with all other congested areas. Prepare Coordination Drawings as follows:
 - 1. HVAC Contractor will prepare the base plan Coordination Drawings showing all ductwork and all pertinent piping and equipment. The drawings shall be coordinated with cable tray, lighting fixtures, sprinklers, air diffusers, other ceiling mounted items, ceiling heights, structural work, maintenance clearances, electric code clearance, reflected ceiling plans, and other contract requirements. Reposition proposed locations of work after coordination drawing review by

the Owner and the Architect. Provide adjustments to exact size, location and offsets of ducts, pipes, conduit, etc., to achieve reasonable appearance objectives. Provide these adjustments as part of Base Bid Contracts. Minor revisions need not be redrawn.

2. HVAC Contractor will provide prints and CAD drawings and submit the base plan to all major trades' Contractors.
3. Electrical, Plumbing and Fire Protection Contractors will draft location of piping and equipment on the base plan, indicating areas of conflict and suggested resolutions.

END OF SECTION 22 0010

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including the General and Supplementary Conditions and Division 1 Specifications Sections, apply to the work of this section.
- B. Entire sprinkler system shall be designed to be in compliance with NFPA 13 and shall be approved by the Owners Insurance Underwriter prior to installation.

1.02 SUBMITTALS

- A. All items specified in this section.
- B. Prior to purchasing any equipment or materials, a list of their manufacturers shall be submitted.
- C. Scale drawings indicating invert and sleeve locations, stamped by a Professional Engineer.
- D. Scale drawings showing all piping with sizes, elevations and appropriate indication of coordination with other trades, dimensioned location of each sprinkler head, approval stamp of governing authority.
- E. Catalog information, factory assembly drawings and field installation drawings as required for a complete explanation and description of all items of equipment.
- F. Documents Will Not Be Accepted for Review Unless:
 - 1. They include complete information pertaining to appurtenances and accessories.
 - 2. They are submitted as a package where they pertain to related items.
 - 3. They are properly marked with service or function identification as related to the project, where they consist of catalog sheets displaying other items which are not acceptable.

1.03 NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS

- A. Applicable Publications: The following publications form a part of this specification.
 - 1. No. 13 Sprinkler System
- B. The drawings and information included in this specification are given as a guide only, and they, therefore, do not relieve this Contractor from providing all work and equipment necessary to complete the installation according to the requirements. The number and spacing of sprinkler heads, spacing and size of pipe, location and number of valves, methods of draining lines, alarm valves and all other details and work shall be as required by the ISO, Owner's Underwriters', NFPA, local authorities and all other governing authorities.
- C. In general, sprinklers are to be arranged for coverage in accordance with NFPA #13 for The hazard classification, shown on the plans and hydraulically designed with a uniform density. Variation in discharge from individual sprinklers shall not exceed 15%.

1.04 LAYOUT

- A. Sprinkler heads shall be installed symmetrically, centered in ceiling tiles and coordinated with ceiling light fixtures, diffusers, ductwork, etc.

1.05 FIELD INSPECTION

- A. As there are various conditions at the site which do not show on the accompanying drawings, or which are at variance with the conditions indicated on the drawings, it is important that each bidder visit the site and acquaint himself with existing conditions, and take these conditions into consideration when preparing his proposal. Each bidder shall obtain information or make any measurement desired. Lack of knowledge relative to existing conditions will not be allowed as a basis for extra compensation.
- B. This contractor and his subcontractors shall inspect existing equipment to remain prior to any of his new work in order to determine that all equipment is in good operating condition. If equipment is found to be lacking components, is inoperable, damaged, etc., contractor shall provide immediate written notice to the Owner. The Owner or his representative shall determine if any additional work is necessary and the method by which any work shall be performed.

1.06 CODES, PERMITS AND INSPECTIONS

- A. All work shall meet or exceed the latest requirements of all national, state, county, municipal and other authorities exercising jurisdiction over construction work at the project.
- B. All required permits and inspection certificates shall be obtained, paid for, and made available by the contractor at the completion of the work.
- C. Any portion of the work which is not subject to the approval of an authority having jurisdiction, shall be governed by the applicable sections of the overall National Fire Code, as published by the NFPA.
- D. Installation procedures, methods, and conditions shall comply with the latest requirements of the Federal Occupational Safety and Health Act (OSHA).

1.07 GUARANTEES AND CERTIFICATES

- A. All work shall be guaranteed to be free from leaks or defects. Any defective materials or workmanship as well as damage to the work of all trades resulting from the same shall be replaced or repaired as directed for the duration of stipulated guarantee periods.
- B. The duration of guarantee period following the date of acceptance of the work, shall be (1) one year.
- C. The date of acceptance shall be the date of the final payment for the work or the date of a formal notice of acceptance, whichever is earlier.
- D. Non-durable replaceable items do not require replacement after the date of acceptance. If received in writing, requests to have earlier acceptance dates established for these items will be honored.
- E. Certification shall be submitted attesting to the fact that specified performance criteria are met by all items of equipment.

1.08 RECORD DOCUMENTS

- A. When required by general conditions or other Division 1 Section this Contractor shall prepare and turn over to Owner's agent record As-built documents. As-built drawings will include actual equipment location layout, service connections, ductwork and piping layouts, valve locations, etc.

- B. In all projects, contractor shall provide record drawings of all underground equipment and service runs. As-built drawings for underground work will include dimensions to actual locations finish grade elevations, and actual invert to underground structures equipment and service runs.

PART 2 - PRODUCTS

2.01 PIPING & EQUIPMENT/SPRINKLER & ALARM EQUIPMENT

- A. Products of The Viking Corp., Reliable Sprinkler Corp, Grinnell Co., Inc. or other "equal" manufacturer selected from "List of Approved Equipment and Materials" published by Factory Mutual and shall bear UL approval stamp or label, where applicable. Piping and equipment shall also be listed by a testing agency.

2.02 PIPE, FITTINGS, HANGERS & ESCUTCHEONS

- A. Pipe: All piping material shall be Black Iron according to ASTM A-120 with 1", 1-1/4", 1-1/2", 2", 6" and above being Schedule 40 and 2-1/2" thru 5" being Schedule 10 ASTM A135. As manufactured by Wheatland Tube and US Steel.
- B. Fittings: Pipe 1" thru 2" threaded malleable iron Class 150, ANSI B1603. Pipe 2-1/2" thru 6" threaded malleable iron or Victaulic Quick Vic Rigid Coupling Style 107 for grooved end pipe with ductile iron housing enamel coated and grade EHP-EDPM.
- C. Hangers: All hangers shall and installation shall be in accordance with the requirements of Section NFPA 13 section 3-15. Provide longitudinal and lateral sway bracing. Provide welded flanges on riser at each floor AWS D10.9; Level AR-3.
- D. Escutcheon Plates: At pipe penetrations through wall (Where piping is exposed) provide heavy gauge chrome escutcheons with springs, snap/split retro fit.

2.03 VALVE SEALS, SIGNS, TAGS & CHARTS

- A. Seals: Provide brass cross-link chain, all brass padlock, with keys, copper wire and approved seal, for each manually operated shut-off valve required to be sealed in open position.
- B. Signs: Provide identification signs of standard design, fasten securely at designated locations as per requirements of insuring agency. This shall include "When bell rings...", hydraulic calculation signs, and Inspectors test.
- C. Tags: Provide brass tags about 2" in diameter; stamp with designating numbers, secure 12 gauge copper wire to spindle of all control valves.
- D. Charts: The Contractor shall provide two (2) copies of approved sprinkler system diagram and valve charts giving designating number, function, location of each valve, mounted in painted, glazed frames, hung where directed.

2.04 SPRINKLER HEADS

- A. Provide approved automatic spray sprinkler heads, Reliable Sprinkler Corporation; or equal.
- B. Provide heads and type as scheduled on the plans.

- C. Provide stock of six (6) extra sprinkler heads of each type with cabinet, two (2) sprinkler wrenches in accordance with NFPA Pamphlet No. 13.
- D. Style and finish of sprinkler heads must be selected and approved by the Architect. Submit one (1) sample of each head.

2.05 TEMPORARY PLUGGING

- A. At times when pipe laying is not actually in progress, the open ends of the pipes shall close temporarily with pipe plugs or by other means. If water is in the trench when work is resumed, the trench shall be dewatered and the plugs shall not be removed until all danger of water entering the pipe is past.

2.06 CLEANING LINES

- A. At the conclusion of the work, the Contractor shall thoroughly clean all new pipes by flushing with water or other means to remove dirt, stones, pieces of wood, etc. which may have entered during the construction period. If, after this cleaning, any obstructions remain, they shall be removed to the satisfaction of the Engineer and/or Water District. Pipes shall be flushed at a rate of 2.5' per second for a duration suitable to the Engineer and/or the Water District. The rates of flow required to produce 2.5' per second flushing velocity in different sizes of pipe are as shown in the following table:

Pipe Size (Inches)	Flow Required to Produce 2.5 FPS Velocity (Gallons per Minute)	Hydrant Opening Required At 40 PSI Residual
4	100	One - 2-1/2"
6	220	One - 2-1/2"
8	390	One - 2-1/2"

2.07 HYDROSTATIC TESTING

- A. Testing shall be done within 72 hours of conclusion of installation.
- B. Hydrostatic acceptance tests, consisting of a pressure test and a leakage test, shall be performed on all sections of all water systems installed after the trench has been backfilled. Hydrostatic presumptive tests may be performed when the system is partially backfilled to simply check the work, but acceptance of the system shall be based on hydrostatic test runs on the finished system after it is completely backfilled. All hydrostatic tests shall be performed in accordance with Section 4 of ANSI/AWWA C600-82.
- C. For the pressure test, the system shall be pressure tested by pressurizing to a minimum of 150 pounds per square inch, based on the elevation of the lowest point in the section under test and corrected to the elevation of the gauge. Provisions shall be made to relieve air trapped at high points in the system adjacent hydrants or through taps and corporations stops installed for this purpose by the contractor. After this pressure has been maintained successfully, with further pumping as required, for a period of at least (1) hour, the section under test shall be considered to have passed the pressure test and leakage tests shall then be performed.
- D. Leakage tests shall be performed under a minimum test pressure of 150 pounds per square inch, based on the elevation of the lowest point of the section under test and corrected to the elevation of the gauge. The test section should be limited to a maximum length of about 2000'. The leakage test duration shall be a minimum of two hours after the leakage rate has been stabilized.

- E. The maximum allowable leakage for a (2) hour test per 1000' length of different sizes and nominal laying lengths of pipe shall be as shown in the following table:

Pipe Size (Inches)	Allowable Leakage at 150 PSI (Gallons per 2 Hours per 1000' of Pipe)
3	0.56
4	0.74
6	1.10
8	1.48

- F. All water for tests shall be furnished and disposed of by the Contractor at his own expense. Source and/or quality of the water which the Contractor proposed to use in testing the lines shall be acceptable to the Water District.

2.08 STERILIZATION

- A. All pipes and fittings connected to and forming a portion of a potable water supply shall be sterilized and flushed in a manner acceptable to the Engineer and/or Water District. Sterilization shall be accomplished after the pipe has passed the pressure and leakage tests.
- B. Sterilization shall be performed in accordance with ANSI/AWWA C601-81 (excluding section 5.1 covering the tablet method).
- C. Sterilization shall be accomplished by applying a chlorine solution that will give a 50 ppm chlorine residual throughout the main being disinfected. The chlorine solution shall remain in the water mains for a minimum period of (24) hours. At the termination of this period, the chlorine residual shall be a minimum of 25 ppm. If the residual is less than 25 ppm, the entire procedure shall be repeated. The chlorine solution shall be thoroughly flushed out prior to placing the new section of the main in service. The chlorine solution shall be disposed of in a manner that will in no detrimental way affect fish, plant or animal life.
- D. After the water mains have been flushed with potable water to the satisfaction of the Engineer and/or Water District, samples of water from the mains shall be taken for bacteriological analysis.
- E. The number of samples and their collection point shall be reviewed with and be acceptable to the Superintendent of Water District. The testing laboratory that will do the bacteriological analysis shall be the responsibility of this contractor. The water samples shall test bacteriologically safe before the water mains are placed in service. Certification of testing is required.

2.09 SPRINKLER DRAINS AND TEST CONNECTION

- A. Provide all necessary drain valves, drain risers, capped nozzles, auxiliary piping, etc., as required to drain the system risers and mains and all trapped portions of the system. Drain valves which are not connected to drain pipes leading to floor drains shall be hose type. Provide inspectors test connections at end of system in accordance with NFPA #13.
- B. Note: Sprinkler contractor shall furnish and install all switches. Electrical contractor shall split system zone wire and tie to existing fire alarm system.

2.10 TESTS

- A. Subject sprinkler system to tests required by and in presence of representatives of agencies having jurisdiction.
- B. Provide instruments, equipment; pay expense incurred in making tests; obtain approvals, certificate.
- C. Where evidence of stoppage appears in piping or equipment, disconnect, clean, repair, reconnect obstructed parts; also bear cost of cutting, patching adjoining work necessitated by such cleaning, repairing.

PART 3 - EXECUTION

3.01 INTERIOR PIPING

- A. Run slightly off level to low points, provide drain valve.
- B. All water piping shall maintain electrical continuity with wedges and or straps.

END OF SECTION 22 0300

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.02 SUBMITTALS

- A. All valves other than design equipment.
- B. Operating and Maintenance Instruction Manual and Parts List.

PART 2 - PRODUCTS

2.01 VALVES

- A. General: Valves shall have following requirements:
 - 1. Working pressure stamped or cast on bodies.
 - 2. Ball valves, stem packing, serviceable without removing valve from line.
 - 3. All valves must comply with ANSI 372 for lead free plumbing products.
- B. Make
 - 1. Gate, globe and check valves: Walworth, Stockham, Milwaukee, Nibco.
 - 2. Butterfly Valves: Nibco, Milwaukee, Stockham, Watts.
 - 3. Ball valves: Nibco, Apollo, Milwaukee, Jomar.
 - 4. Balancing valves: Calibrated manual balance valves with memory stop.
 - 5. For convenience in designating type, design, etc., certain numbers are given hereinafter as "Design Equipment."
- C. Valve Types:
 - 1. Ball Valves:
 - a) 2" and Smaller: Bronze body 2-piece full port with chrome plated bronze ball. TFE seats and seals, 600 psi WP, W.O.G. screwed ends; Nibco Model #T-685-80-LF, conforms to MSS SP-110, ANSI 372.

PART 3 - EXECUTION

3.01 GENERAL

- A. Provide valves of type called for and where shown and/or specified, and where required to service equipment whether or not shown.
- B. Provide at all major building or systems sections whether or not shown.
- C. Install all valves with stems at or above horizontal positions and all swing check valves in horizontal position only.

- D. Ball valves may be used in place of gate valves for water service through 2" size at contractor's option, unless otherwise noted.
- E. Provide new valves (size to match existing) for any existing non-operational valves which are required to allow for new installations to be made.

3.02 PLUMBING SYSTEM

- A. Install valves on all branch lines leaving mains and serving two fixtures or more; to isolate each piece of equipment or fixture, for future connections and where indicated.
- B. Use balancing valves on domestic water re-circulation lines.

END OF SECTION 220523

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.02 IDENTIFICATION

- A. Pipe Identification Markers: Furnish and install pipe identification markers on all piping installed under this contract, to consist of self-adhesive labels of black letters imprinted on color coded background indicating pipe fill and direction of flow. Lettering shall be 2" high on pipes 3" in diameter and over and 3/4" high on pipes under 3". Markers shall be applied to pipe, or to insulation in case of insulated pipes, on 15' centers, at branch take-offs and at each valve, whichever is closer.

- B. Refer to schedule below for piping system, background color and lettering color.

- C. Pipe Identification Schedule

	<u>System I.D.</u>	<u>Background</u>	<u>Lettering</u>
1.	Domestic Cold Water	Green	White
2.	Domestic Hot Water	Yellow	Black
3.	Domestic Hot Water Recirculation	Yellow	Black
4.	Sanitary Sewer	Green	White
5.	Sanitary Sewer Vent	Green	White
6.	Condensate Drainage	Yellow	Black
7.	Fire Protection Water	Red	White
8.	Fire Sprinkler Water	Red	White

- D. Equipment Nameplates and Valve Tags: Identify each valve, control entity or piece of equipment with stamped brass or engraved plastic nameplate permanently attached by riveting, wiring, etc. Set up complete identification system in accordance with Owner's Physical Plant Department. Each drain plug or valve shall be tagged "DRAIN". Embossed and/or pressure sensitive plastic tape labels shall not be acceptable. Furnish engraved 2" x 1" black rigid laminated plastic nameplate for each motor starter to EC for mounting. Furnish framed valve chart indicating valve number, location and usage for all valves installed under this contractor.

END OF SECTION 220553

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.02 SUBMITTALS

- A. Manufacturer data for all materials used in Contract.
- B. Submit schedule of insulation applications.
- C. Samples, only when requested.

1.03 QUALIFICATIONS

- A. Installation of thermal insulation shall be made by competent mechanics regularly employed by and under the direct supervision of a qualified, approved insulation subcontractor.
- B. All materials shall be installed per manufacturer's written recommendations and specifications.
- C. All insulation, jackets, adhesives, and coatings, unless specifically modified, shall comply with the following:
- D. Any treatment of jackets or facings for flame and smoke safety must be permanent. Water soluble treatments prohibited.
- E. Insulation, including finishes and adhesives on the exterior surfaces of ducts, pipes, and equipment, shall have a flame spread rating of 25 or less and a smoke developed rating of 50 or less as determined by an independent testing laboratory in accordance with American Society for Testing and Materials Standard E 84, NFPA 255 and UL 723. Also, same shall comply with NFPA 90A, when installed in air plenums.
- F. Work shall not commence until building is enclosed and roofs are watertight. Obtain approval from Architects before commencing work.

PART 2 - PRODUCTS

2.01 PIPE INSULATION (RIGID TYPE)

- A. Pre-formed rigid sectional pipe covering, with factory applied jacket. Material, jacket type and thickness as specified hereinafter.
- B. Insulation Material: Fiberglass.
- C. Conductivity: Maximum thermal conductivity (k), on a flat surface, shall be 0.25 Btu/sq. ft. hr. °F/inch mean temperature.
- D. Jackets: White Kraft outer surface bonded to aluminum foil and reinforced with fiberglass yarn permanently treated for fire and smoke safety and to prevent corrosion of the foil.

2.02 ACCEPTABLE MANUFACTURERS

- A. Fiberglass: Johns-Manville, CGS, (Certainteed), Owens-Corning, Knauf.
- B. Adhesives: Benjamin Foster or equivalent. Benjamin Foster (BF) numbers are used, unless otherwise noted, for convenience in designating quality of adhesive.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

- A. "Concealed" is generally intended to mean Work within or behind various construction elements, either fixed or removable, or in crawl spaces or trenches, which are not exposed to view when project is complete.
- B. "Exposed" is generally intended to mean anything exposed to view when project is complete; as opposed to "concealed."
- C. Provide Thermal Insulation:
 - 1. Insulation is required on all piping unless otherwise indicated on Contract Documents.
 - 2. Only on clean, dry surfaces and after piping ductwork and equipment have been tested and found to be tight.
 - 3. On cold surfaces with continuous unbroken vapor seal.
 - 4. All exposed surfaces shall be white.
 - 5. Pipes individually insulated.
 - 6. Domestic cold water, hot water and hot water return piping-hanger installed around piping insulation. Provide insulation shields.
 - 7. On Sanitary drains for fixtures accessible to the disabled.
 - 8. On all roof drain bodies and storm water piping.
- D. Miscellaneous:
 - 1. Install insulation on exposed hot and cold plumbing piping to within 18" of fixture or equipment connection.
 - 2. Insulate hot and cold piping longer than 18" located inside sink cabinets, under counters, under tables, etc.

3.02 PIPE INSULATION (RIGID TYPE)

- A. Apply insulation on all systems piping including fittings, flanges, unions, strainers, and other miscellaneous attachments installed in piping system, whether exposed or concealed, except where omitted or specified to contrary.
- B. Any piping in exterior walls, spaces, overhangs, attics, or where subject to freezing: Insulate pipe with double the thickness specified. Where in wall chases: In addition to the above, pack chase with loose glass fiber insulation.
- C. Hanger Shields: Required on all piping.

D. Joints in Section Pipe Covering Made as follows:

1. Standard: Longitudinal laps and butt joint sealing strips cemented with BF 85-20 or Armstrong 520. May be stapled with outward clinching staples where concealed or recovered. Factory applied pressure sensitive adhesive lap seal may be used at contractor's option. Adhesive shall be in two strips -- one, applied to the longitudinal jacket and the other on the opposing jacket surface.
2. Vapor barrier: Provide for all cold services. Longitudinal laps and 4" vapor barrier strip at butt joints shall be sealed with white BF 85-20 or Armstrong 520. Seal ends of pipe insulation at valves, flanges, and fittings and at butt joint approximately every 21' with white BF 85-20.

E. Fittings, Valves and Flanges:

1. Concealed & Exposed: Premolded fitting covers of the same material and thickness as the adjacent pipe insulation and finished with glass cloth applied and coated with BF 30-36 "Seal-Fas".
2. Optional: In lieu of the standard method above, the Contractor has the option of using "Zeston" methods, or Ceel-Tite System provided:
 - a) Appearance and workmanship are acceptable to the Architects.
 - b) Insulation values at least as great as specified must be maintained.
 - c) Application details and manufacturer specifications shall be followed and are hereby made a part of the Contract Documents.

3.03 PIPE INSULATION MATERIALS

A. Schedule of Piping Insulation:

Schedule of Piping Insulation

Service	Material	Insulation Thickness
Domestic Cold-Water	Glass Fiber	All Sizes – 1"
Domestic Hot Water	Glass Fiber	105-140 deg. F = 1" 141-180 deg. F = 1.5"
Domestic Hot Water Recirculation	Glass Fiber	105-140 deg. F = 1" 141-180 deg. F = 1.5"
Roof Drains, Storm and Drainage Piping	Glass Fiber	All Sizes – 1/2"
Condensate Drainage Piping	Glass Fiber	All Sizes – 1/2"

- B. Note: Jacket material, finish, fitting covers, etc. (for all piping) shall be as specified for "exposed" and/or "concealed" application. Color shall always be white unless specifically approved otherwise.
- C. Insulation Covers for Piping and Pipe Fittings: Provide PVC (Zeston) type insulation covers for all exposed insulated pipe and pipe fittings, other than Mechanical Rooms. Cover shall be fastened with a vandal resistant system and as specified.
- D. Cover system shall be installed from floor to ceilings, complete. In areas where a ceiling is not present cover system shall be provided from the floor to 10' 0" above finished floor.

END OF SECTION 22 0715

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.02 SUBMITTALS

- A. All items specified in this section under Part 2 - Products.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All pipe and fittings new and marked with manufacturer's name; comply with applicable ASTM and ANSI Standards.
- B. All water piping fittings must comply with ANSI 372 for lead free plumbing products.

2.02 COPPER PIPE AND FITTINGS

- A. Pipe: Hard temper, ASTM B-88; Type K, L, M, or DWV, as called for. Soft temper only in specific cases. Plans show copper tube sizes.
- B. Tees, Elbows, Reducers: Wrought copper or cast bronze; solder end connections; ASTM B-62, ANSI B16.22. mechanical fittings ASTM B-88
- C. Unions and Flanges: 2" and smaller use unions, solder type, cast bronze, ground joint, 150# swp; 2-1/2" and over use flanges, cast bronze, companion type, ASME drilled, solder connection, 150 swp. Bolts shall be same as for steel pipe.
- D. Press Fittings: Bronze or copper shall conform to the material requirements of ASME B16.18 or ASME B16.22, and the performance requirements of IAPMO PS117, and ICC LC1002. Press fittings 1/2-inch thru 4-inch for use with ASTM B88 copper tube type K, L, or M and 1/2-inch up to include 1-1/4-inch annealed copper tube. Press fittings shall have either an EPDM, FKM, or HNBR sealing element and integral detection feature intended to identify un-pressed fittings. 2-1/2-inch thru 4-inch shall have a 420 stainless steel grip ring, PBT separator ring, EPDM or FKM sealing element and integral detection feature. Sealing elements shall be factory installed and shall be verified for the intended use.
 - 1. Note: Only Press fittings with EPDM sealing element that conform to NSF 61-pw shall be installed in a potable water system.
 - 2. Acceptable Manufacturers: Veiga ProPress, ApolloPRESS or Nibco.

2.03 SOIL PIPE AND FITTINGS

- A. All cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and be listed by NSF International.
- B. Pipe: ASTM A-74 service weight cast iron, coated.

- C. Fittings: Service weight type with neoprene gasket of same manufacturer as piping, acceptable for piping buried only in earth.
- D. No-Hub (Above Grade Only):
 - 1. Pipe: ASTM C-564 no-hub cast iron, coated.
 - 2. Fittings: Cast iron no-hub pattern with heavy-duty rubber gasket and stainless steel clamp assembly. Mission Rubber or equal. ASTM # 1540, ASTM C564.

2.04 DIELECTRIC PIPE FITTINGS

- A. Tensile strength, Federal Specification WW-U-531A, union or flange design, 250 psi pressure rating, threaded or solder joint, constructed to prevent gasket from squeezing into internal opening.
- B. Make: Epco or equivalent.

2.05 HANGERS, INSERTS AND SUPPORTS

- A. Hangers, Inserts, Clamps, Etc.: Carpenter & Patterson, Central Iron, Elcen, Fee & Mason, Grabler and Grinnell.
- B. Hangers: Adjustable, steel clevis type, cadmium plated or galvanized except where in contact with copper piping. Copper plated or PVC coated where in contact with copper piping.
- C. Hanger Shields: Required on all piping.

- D. Spacing Schedule:

Pipe Size	Steel (ft)	Copper (ft)	No-Hub Cast Iron *	Rod Size
3/4" to 1"	12	6	Each	3/8"
1-1/4" to 1-1/2"	12	6	Horizontal	3/8"
2" to 4"	12	10	Joint	1/2"

*Cast iron "No-Hub" to be supported on all sides of fittings & Joints

- E. Piping systems with material not listed in above schedule shall be supported and protected in accordance with manufacturer's recommendations and as approved.
- F. Inserts: Equal to Grinnell Fig. #281, maximum loading 1000 lbs., galvanized finish, and Fig. #285, maximum loading 400 lbs. Use approved beam clamps if possible.
- G. Supports:
 - 1. For Weights Under 1000 lbs.: Support all Contract Work with approved type "Drill-In" inserts equal to "red Head," "unistrut," beam clamps or other structurally approved support. The factor of safety shall be at least four (4). Follow manufacturer's recommendations.
 - 2. For Metal Decks: Drill hole through for hanger rods and imbed a bolted plate in concrete or use Phillips "Red Head" devices designed for this application. All cases must have safety factor of four (4).

2.06 PIPING ACCESSORIES

- A. Escutcheon Plates: Steel or cast iron polished chrome, split hinge type with setscrew, when used at ceiling and floor locations. Special high plates where required for extended sleeves. Chrome plated in vicinity of all fixtures. Provide escutcheons at all pipe penetrations thru ceilings, floors and walls exposed to view.

2.07 SLEEVES

- A. Standard Type: Schedule 40 black steel pipe sleeves, two pipe sizes larger than the pipe, required for all structural surfaces.
- B. Sheet metal sleeves permitted only for nonstructural surfaces and existing construction. Sheet metal sleeves shall be 18 gauge minimum and shall be properly braced to prevent collapsing.

2.08 SEALING ELEMENTS

- A. Waterproof Type: Synthetic rubber material with zinc plated bolts equal to "Link-Seal" Series 200, 300 or 400.

2.09 PIPING MATERIALS (PLUMBING)

- A. Water Distribution Piping:
 - 1. Copper tubing Type "L" ASTM B75, ASTM B88, ASTM B251, ASTM B 447. Lead-free soldered joints or mechanical joints.
- B. Above Grade Drainage & Vent Piping:
 - 1. Cast-iron soil piping with no-hub connections ASTM A74, ASTM A888.

PART 3 - EXECUTION

3.01 EQUIPMENT AND SYSTEMS

- A. All equipment and systems as shown on the drawings or specified herein shall be installed in accordance with the provisions of each applicable section of these Specifications and all local and state codes and regulations having jurisdiction.
- B. All work shall be installed in a workmanlike manner as determined by Architects.
- C. Accurately establish grade and elevation of all piping before setting sleeves. Install piping without springing or forcing (except where specifically called for), making proper allowance for expansion and anchoring. Arrange piping at equipment with necessary offsets, unions, flanges, valves, to allow for easy part removal and maintenance, as approved.
- D. Offset piping and change elevation as required to coordinate with all other trades.
- E. Avoid contact with any part of other mechanical or electrical systems.
- F. Provide adequate means of draining and venting all units, risers, circuits and systems.
- G. Conceal all piping unless otherwise specified.

- H. Install piping and connections approximately as indicated or directed, straight, plumb, direct, parallel and close to building walls, partitions, ceiling, in general, with groups of pipes parallel to each other and close to structural members allowing for insulation and access for servicing valves, etc. Horizontal piping to be installed as high as possible without sags.
- I. Coordination with other trades: Check Contract Drawings with all others, anticipate and avoid interference with other installations. Obtain decision or approval from Architect for proposed group installation and before proceeding, and for clearances in structure and finish.
- J. Fixture branches exposed only as required for final connections.
- K. Over Electrical Equipment: Prohibited. Special cases may be permitted with approval of Architect, protecting copper drip pan.
- L. Ream pipes after cutting and clean before installing. Cap or plug equipment and pipe openings during construction. Install piping parallel with lines of building, properly spaced to provide clearance for insulation. Make all changes in direction and branch connections with approved fittings. All cleanout plugs, bushings and nipples, required for gauge and instrument installation shall be brass. Do not install valves, unions and flanges in inaccessible locations.
- M. Materials used within a system and between systems shall be consistent. If this is not possible, install approved dielectric fittings.

3.02 HANGERS, INSERTS AND SUPPORTS

- A. No piping shall be supported by wires, band iron, chains, or from other piping, nor by vertical expansion bolts. Support piping with individual hangers from concrete inserts, approved welded supports, or beam clamps of proper configuration and loading design requirements for each location; replace if not suitable. Follow manufacturer's safe loading recommendations. Always obtain approval.
- B. Suspend with rods of sufficient length for swing and of size as previously scheduled, using four (4) nuts per rod. Use rods and nuts having electroplated zinc or cadmium (0.005" minimum) finish.
- C. Provide additional approved structural steel members, having one coat rustproof paint, where required for proper support.
- D. Provide oversized hangers where insulation/supports must pass between pipe and hanger.
- E. Hangers, when attached to joists, shall only be placed at the top or bottom chord panel point. Only concentric type hangers are permissible; "C" type not permitted.
- F. Riser Clamps: Provide riser clamps for each riser at each floor. Allow for escutcheon plates.

3.03 PIPE CONNECTIONS

- A. Solder Connections: Use only 95/5 nonacid flux and clean off excess flux. Also remove excess solder from piping.
- B. Threaded Connections: For steel pipe and brass pipe. Clean out tapering threads, made up with pipe dope; screwed until tight connection. Pipe dope must be approved for application.
- C. Dielectric Pipe Fittings: Protect fittings from excessive heat.

3.04 SLEEVES

- A. All underground pipes and conduits, regardless of their contents, shall be provided with sleeves at the foundation wall and shall be sealed at the section of entry into the building with a material that will form a gas-proof barrier.
- B. Provide for all pipes passing through floors, walls or ceilings.
- C. Extend 1/8" above floor in all finished areas except those with floor drains or in Penthouse; use steel pipe sleeves 2" above floor in excepted areas. Use steel pipe sleeves in all bearing walls, structural slabs, beams and all other structural surfaces, and where specifically called for.
- D. Sleeves, where installed in walls of shafts, shall be as small as practical, consistent with insulation, etc., so as to preserve fire rating of shaft walls.
- E. Fill abandoned sleeves with concrete.
- F. Where floors are membrane waterproofed, use flashing clamp device on sleeves equivalent to Josam Series 1880 "Riser Sleeve".

3.05 ESCUTCHEON PLATES

- A. Provide polished chrome escutcheon plates for all exposed piping passing through floors, walls or ceilings, in all rooms except Mechanical Rooms.
- B. Cut plates if necessary to fit conditions.

3.06 SLEEVE PACKING

- A. Tightly seal void space at all sleeves throughout building as follows:
 - 1. Interior locations: Firmly pack with fiberglass, the space between sleeve and pipe, then neatly caulk with caulking gun and approved material.
 - 2. Exterior walls above grade: Use sealing element.
 - 3. Exterior walls below grade: Use sealing element.
 - 4. Cored holes: Method shall be approved or use sealing element.
 - 5. Fire rated, partitions and floor slabs: Use fire rated sealing elements, materials and methods.
 - 6. Waterproofed floors without membrane: Use Architects' approved sealing element, device or compound.
 - 7. Waterproofed floors with membrane: Use Architects' approved sealing element, device or compound.

3.07 TESTS

- A. Refer to Section 220010 for testing of plumbing systems.

3.08 PIPE LINE SIZING

- A. Pipe sizes indicated on Contract Documents are to be maintained. Pipe size changes made only as approved by Engineer, or required by State or local codes.
- B. Where discrepancy in size occurs, the larger size shall prevail, unless otherwise directed by the Architects.

END OF SECTION 221116

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.02 SUBMITTALS

- A. All items specified under Part 2 - Products of this Section, including pipe and fittings.

PART 2 - PRODUCTS

2.01 WATER PIPING

- A. Refer to Section 221116 - Piping Systems and Accessories; for acceptable materials.

2.02 DISINFECTION

- A. The Contractor shall disinfect the entire hot and cold water system. This shall include all hot water circulation piping and connecting supply mains. Renovations to existing piping systems shall be isolated with new valves by Contractor for testing of new system only.
- B. Use the purging and disinfecting procedure proscribed by the authority having jurisdiction or, in case a method is not prescribed by that authority, the procedure described in either AWWA C651, or AWWA C652, or as described below.
- C. A chlorine solution shall be injected into and circulated through the entire hot and cold water system. Operate all hot and cold water faucets, flush valves, mixing valves and metering valves. Duct tape all metering valves to hold in on position. Continue flow of water from system until a determined uniform chlorine count of 50 ppm is reached. Then shut off all flow and let systems stand full.
- D. Tube test samples of hot and cold water in each fixture area every 8 hours to determine chlorine residual content.
- E. If the chlorine residual content drop is more than 10% in any 24 hour period, system must be injected with additional chlorine and Step A repeated. This shall continue until a 95% chlorine residual level remains over 24 hours.
- F. After the system test has been accepted by the Architect or Engineer, the entire system shall be drained and refilled. It is important that if the building has a septic system all water must be drained on to paved areas of parking lots. The Contractor shall install all necessary valves at low points and furnish any pumps and drain piping to accomplish this.
- G. Prior to final test, the system should be flushed through plumbing fixtures until any concentrated chlorine odor is undetectable.
- H. A final test of both hot and cold water shall be taken at the furthest point of the system by a certified testing agency. Full bacteria and metals test shall be performed to verify the water meets all potable drinking water standards.

PART 3 - EXECUTION

3.01 PIPING

- A. Run slightly off level to low points; provide drain valves.
- B. Provide shock arrestors where shown, or specified.
- C. Branch headers serving flush valves; full size as shown.
- D. Provide dielectric pipe fittings when connecting to piping system of dissimilar metals.
- E. Supply piping to all fixtures, faucets and flush valves shall be anchored to prevent movement.
- F. Provide and install necessary wood or metal backing material to secure piping, flush valves, faucets, etc.
- G. Piping shall be run to avoid all electrical panels and equipment.

END OF SECTION 22 1127

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.02 SUBMITTALS

- A. All items specified in this Section under Part 2 - Products.

PART 2 - PRODUCTS

2.01 FLOOR DRAINS AND FLOOR SINKS

- A. Acceptable Manufacturers: Jay R. Smith, Josam, Zurn or Wade.
- B. FD-1: Zurn #ZN-415 floor drain, dura coated cast iron body with bottom outlet. Combination membrane clamp and adjustable collar. 5" polished brass nickel bronze round top. Provide with Rector-Seal Sure-Seal Trap Guard
- C. FS-1: Zurn #Z-1910-P-25 Sani-Flor receptor 8"x8"x6" deep cast iron body and square slotted medium duty grate, with white acid resisting porcelain enamel interior and top complete with white acid resisting enamel bucket.

2.02 CLEANOUTS

- A. Acceptable Manufacturers: Jay R. Smith, Josam, Zurn or Wade.
- B. FCO-1: Zurn #ZN-1400 level-trol adjustable floor cleanout D.C.C.I. body with polished nickel bronze scoriated top, gas and water tight. ABS tapered thread plug and scoriated round top adjustable to finished floor
- C. WCO: Zurn #Z-1446 cleanout with round stainless-steel wall access cover.
- D. BCO: Zurn #1445 cleanout tee.

PART 3 - EXECUTION

3.01 CLEANOUTS

- A. Install cleanouts out of traffic patterns; provide offset from unnecessary stress on basin at these points.
- B. Do not locate under doors or under equipment, or behind cabinets.

END OF SECTION 22 1130

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including all General Conditions, Supplementary Conditions, Division 1 specification sections as well as Information to Bidders requirements that are included in the project documents, apply to the work of this Contract.

1.02 ALLOWANCES, ALTERNATES AND UNIT PRICES

- A. Refer to Division 1 specifications for allowances, alternates and unit prices required as part of this Contract.

1.03 INTENT

- A. The intent of the drawings and these specifications is to provide all systems complete and operative. Whether indicated on the drawings and/or included in the specification or not, provide all materials, equipment and labor usually furnished with such systems.

1.04 DEFINITIONS

- A. Provide: Furnish, install and connect.
- B. Furnish: Supply material only.
- C. EXR: Existing to remain.
- D. MC: Mechanical Contractor-note MC and HC (Heating Contractor) shall be interchangeable for all drawings and specifications.

1.05 SCOPE OF WORK

- A. This Contractor shall do all work, furnish all labor, tools and equipment necessary for all the MECHANICAL work all as indicated on the drawings and specified herein.
 - 1. Removal of existing equipment as indicated on drawings.
 - 2. All cutting and patching.
 - 3. Heating boiler, complete with accessories and controls.
 - 4. Replacement burner packages, associated controls, fuel piping as required for each boiler and new hot water heater.
 - 5. Roof top units, complete with curbs, etc. Flashing by G.C.
 - 6. Variable refrigerant system, complete with all accessories.
 - 7. Boiler breeching, supports and accessories
 - 8. Underground heating fuel storage tank, fuel piping, vent piping, valves, and all accessories.
 - 9. Converter and steam specialties.
 - 10. Central station air handling units.
 - 11. Air cooled condenser units;
 - 12. Unit ventilators.
 - 13. Chillers, complete with piping and accessories.
 - 14. Cooling towers, complete with piping and accessories.
 - 15. Fan coil units.
 - 16. Ductless split air conditioning units, complete with piping, controls, supports and accessories.
 - 17. Cabinet unit heaters, complete with piping, controls, supports and accessories.
 - 18. Convectors, complete with piping and accessories.

19. Fin tube radiation, complete with piping and accessories.
20. Electric fin radiation, complete with accessories.
21. Unit heaters, complete with piping, supports and accessories.
22. Duct coils, complete with piping and installation accessories.
23. Circulating pumps complete with motors, controls, supports and accessories.
24. Exhaust fans, complete with accessories, curbs, etc., flashing by GC.
25. Humidifiers, complete with piping and accessories and supports.
26. Drain water condensate pump, complete with piping, tank, accessories and support.
27. Pipe fittings, hangers, supports, valves, and piping specialties as required to make complete heating system.
28. Refrigeration piping, fittings, valves, etc.
29. All diffusers, registers and grilles complete with accessories.
30. All louvers provided by Contractor.
31. Sound traps.
32. Galvanized ductwork (or specialty ductwork where noted) to serve supply, relief and exhaust systems complete with control devices and accessories, unless otherwise noted.
33. Welding hood, including exhaust fan, complete with motors and accessories.
34. Insulation both thermal and acoustical to serve piping, breeching, ductwork systems, equipment, housings and accessories.
35. Temperature control system complete to serve all MECHANICAL equipment and systems complete with accessories.
36. Testing and balancing of all heating, ventilating and air conditioning installations to include sheetmetal ductwork, air conditioning supply and exhaust systems, heating and cooling systems and temperature control system. Balancing shall include NC ratings as described herein.
37. Special testing and balancing requirements for existing MECHANICAL equipment to include repair of existing equipment as required to obtain air flow as indicated on drawings.
38. Servicing of heating, ventilating and air conditioning facilities are required for guarantee period. Provide competent factory trained men at site for purpose of instructing Owner's personnel in proper operation and maintenance of all new MECHANICAL facilities.
39. Concrete pads, 4" high unless otherwise noted on drawings, to provide housekeeping elevation for boilers, pumps and such other equipment as shown on drawings that require a pad. Coordinate installation of pads with GC to insure secure bonding of pads to floor structure. This contractor shall be responsible for installation of pads.
40. Temporary heat as required by Architect's Special Conditions.

1.06 TEMPORARY SERVICES

- A. Temporary Heat: In accordance with Architect's specifications and/or conditions, contractor shall have the permanent heating system capable of providing heat to the new work areas when required. The term heating system shall include all work or components necessary to operate heating system. For temporary usage, it is not required that this work be in a finished condition, i.e., covers in place, etc. Cost of fuel consumed for temporary heat from permanent systems only shall be paid by owner.
- B. The use of permanent system will be allowed only if the building is fully enclosed with no construction dust to clog heating/cooling coils, heat recovery components, fans, etc.
- C. At the completion of work, Contractor shall turn over to the Owner all equipment used for temporary heat in a new, as purchased condition. Contractor shall replace filters with new ones, clean all components which shall include: unit casings, ductwork, grilles, diffusers, etc., re-lubricate all moving parts, replace belts if required and perform any other work necessary (as determined by Architect and Engineer) to put equipment in a "new" condition.

- D. Contractor shall take all measures necessary to insure that dust, dirt, or debris does not enter air systems while in operation for temporary heat and shall change filters as often as necessary. Under no circumstances shall air handlers be allowed to operate with no filter in place. All duct in the work area shall be sealed so no dust or debris will enter duct.

1.07 CONTINUITY OF UTILITY SERVICES

- A. It is of paramount importance that each utility service operate continuously and without interruption. Whenever this contractor plans to make changes or alterations to any existing utility service, such plans shall result in no or minimum service interruption or inconvenience to Owner. This contractor shall plan and schedule any change or alteration to an existing utility service with Architect and Owner. Such planning, timing, and/or scheduling shall be approved by both these parties.

1.08 CODES AND STANDARDS

- A. All materials, equipment, and installations by this contract shall be in accordance with the latest editions of the following applicable requirements:
1. 2020 New York State Building Code, including all applicable amendments supplements to the following:
 - a) 2020 International Building Code
 - b) 2020 International Existing Building Code
 - c) 2020 International Fire Code
 - d) 2020 International Plumbing Code
 - e) 2020 International Mechanical Code
 - f) 2020 International Fuel Gas Code
 2. 2020 Supplement to the New York State Energy Conservation Construction Code, including all applicable amendments to the following:
 - a) 2020 International Energy Conservation Code
 - b) 2013 ASHRAE 90.1
 3. 2020 Uniform Code Supplement (May 12, 2020)
 4. New York State Department of Environmental Conservation.
 5. Conform to requirements of NEMA.
 6. Bear label of Underwriters Laboratories, Inc.
 7. National Electrical Code NFPA Article 70, latest edition.
 8. New York State Health Code.
 9. Local Utility Standards.
 10. Local Municipal and/or city standards.
 11. Industrial Code Rule #4 and #14 (12NYCRR 4 and 14) (Standards for boiler installation).
 12. AMBA Boiler Rating.

13. ASME Boiler Pressure Vessel Code.
14. ASHRAE Standard 15.
15. Conform with applicable requirements of ASTM - Regulations and Standards for Pipe and Pipe Fittings.
16. Be in accordance with USAS - Code for Pressure Piping, latest edition.
17. For external and internal duct insulations, have flame spread rating of 25 or less and smoke developed rating of 50 or less when tested in accordance with ASTM Standard E84.
18. Sheetmetal and Air Conditioning Contractor's National Association, Inc. (SMACNA), latest editions.
19. Conform with applicable requirements of Standard for the Installation of Air Conditioning and Ventilating Systems, NFPA 90A, and Code for Safety to Life from Fire in Buildings and Structures, NFPA 101.
20. Conform to requirements of ASHRAE 90.1, latest edition.
21. Be in accordance with design standards outlined in ASHRAE Handbooks, latest edition.
22. Conform to requirements of Owner's insurance carriers.

1.09 SUBMITTALS & SUBMISSION REQUIREMENTS

- A. All submittals shall be in accordance with Division 1 requirements, the following requirements listed below, and also as indicated in each specification section. All submittals not complying with the listing above will be returned to the contractor without being reviewed. Rejection by Architect or Engineer of any items submitted shall require resubmittal of acceptable items.
 1. Within (20) days after receiving notice to proceed, submit to Architect for review complete descriptive dimensional data and ratings for equipment and materials proposed to be furnished and installed.
 2. All materials submitted shall clearly state the job name and specification section(s) that it applies to.
 3. Any package containing more than one piece of equipment or material shall also contain a schedule clearly listing all items in submittal. Schedule page (s) shall also indicate project name and building name.
 4. All submittals must be clearly marked using nomenclature used in this specification for proper item identification, schedule of usages, model numbers, construction materials, performance, data, etc.
 5. Projects involving multiple buildings must have the submittals separated by building. Submittals in which buildings are combined will not be accepted. (Exception: When specifically approved by engineer, basic materials may be submitted once.)

6. The contractor shall insure that dimensions of equipment to be used conform to the space allocated for the equipment on the drawings.
 7. Submittals traced or copied from contract drawings are not acceptable and will be returned without review.
 8. In the event material and/or equipment is installed prior to obtaining approval of shop drawings, and in the sole opinion of the Owner's Agent, this material and/or equipment does not meet the specifications, the Contractor shall be liable for the removal and the replacement at no additional cost to the contract.
- B. Samples: When requested by Engineer, provide samples of both specified equipment and proposed substitutions for review by the Owner's Agent. Such equipment shall be delivered to a location designated, or erected at the job site as directed. When neither is physically possible, arrange for the Owner's Agent to visit an acceptable site where the proposed equipment can be inspected.
- C. Substitutions (where allowed within the project):
1. After bid award if there are any units/piping/equipment the contractor would seek to substitute on, they must indicate in writing the specific equipment.
 2. All substitutions shall be clearly highlighted, and in bold print, on the front cover of any submittal that it is a substitution.
 3. Substitutions received after 45 days will not be considered.
 4. Supporting documentation shall be provided describing why the item is an equal and listing the major difference.
 5. Submittals for equipment or materials other than as specified shall be accepted for review by the Owner's agent.
 6. Any substitution should be sent in as an RFI and reviewed prior to bid for acceptance. If the unit is submitted after the bid date, the submittal may be rejected without review.
 7. Approval of substitute equipment shall be based on performance, dimensional, functional, physical and aesthetic compatibility to the equipment specified as determined by the Owner's agent and approved by the engineer. Any substitution shall meet any scheduled performance and characteristics noted within its particular specification section.
 8. Where substitute equipment is approved, the contractor shall be responsible for, and bear the cost of any necessary changes by his trade or other trades to make the system complete and operable, including but not limited to any design fees and structural or steel changes required to implement a substituted unit.
 9. Contractor is fully responsible for providing coordination between all trades affected by equipment substitution.
 10. When requested, contractor shall submit layout drawings indicating new dimensions and arrangements of substituted equipment. Layout drawings shall indicate all revisions necessary for all services affected by substitution.

1.10 SUBSTANTIAL COMPLETION REQUEST FOR PUNCH LIST

- A. Contractor shall submit a letter in email form stating that the work is substantially complete and ready for Punch List review by Engineer.
- B. Contractor shall note which areas are substantially complete by Building (if multiple buildings) and by Area according to the Key Plan.
- C. Contractor shall list all items that are known to be incomplete at time of submission.
- D. If the request is for a partial Punch List, Contractor shall also include a list of room numbers/room tags.
- E. When letter is received by the Engineer, site review(s) will be coordinated with the Construction Manager, Clerk, Architect.

1.11 CUTTING AND PATCHING

- A. This contractor shall bear the cost of all cutting and patching required by and for the installation of this work. This contractor shall perform all cutting and patching unless otherwise indicated on drawings or if directed by the Architect.
- B. Patching of fire rated floors, walls, partitions, etc. shall be made using new materials equal to the fire rating of the existing.
- C. Should changes, omissions or errors in this contractor's work require cutting, patching or making alterations in any portion of new construction, such work will be performed by GC at contractor's expense.
- D. Cutting and patching of roof surfaces and structures shall only be performed by a qualified contractor, as approved by the Architect. The work of this contract shall bear the cost of above mentioned cutting and patching. This contractor shall insure that existing roof warranties remain in force.
- E. This contractor shall furnish lintels, sized to accommodate structure above opening, where cutting and patching is to be performed on load bearing walls. Contractor shall obtain written approval for all lintels prior to installation.
- F. Cutting shall be done in a manner which will not adversely affect the strength of the building. Holes and openings shall be neatly cut so as to provide a finished appearance and shall be patched around the edge where required for a finished appearance. Provide temporary bracing, shoring, etc. as required.
- G. Patching shall be structurally sound and match the existing materials and finish of adjacent materials. Patching is required in finished areas, wherever existing work is removed, at the sides of openings, etc.
- H. At the completion of the work, all evidence of alteration will be as inconspicuous as possible.
- I. If the MC has a duct or pipe going through a wall where the GC made an opening for the MC, the MC shall be responsible to infill the space between the duct/pipe and wall. Also refer to section 1.22 Penetrations through fire rated construction.

1.12 FIELD INSPECTION

- A. As there are various conditions at the site which do not show on the accompanying drawings, or which are at variance with the conditions indicated on the drawings, it is important that each bidder visit the site and acquaint himself with existing conditions, and take these conditions into consideration when preparing his proposal. Each bidder shall obtain information or make any measurement desired. Lack of knowledge relative to existing conditions will not be allowed as a basis for extra compensation.
- B. This contractor and his subcontractors shall inspect existing equipment to remain prior to any of his new work in order to determine that all equipment is in good operating condition. If equipment is found to be lacking components, is inoperable, damaged, etc., contractor shall provide immediate written notice to the Owner. The Owner or his representative shall determine if any additional work is necessary and the method by which any work shall be performed.

1.13 INSTRUCTION SERVICES AND MANUALS

- A. Instructions:
 - 1. Provide competent personnel to remain at the jobsite for necessary time to instruct the Owner's personnel in proper operation and maintenance of installation made by this contractor.
 - 2. This contractor shall be responsible for notifying and instructing Owner's personnel on all equipment operations, maintenance requirements, etc. Furnish operating training session(s) for equipment listed.
 - 3. The Owner shall be responsible for establishing an operating and maintenance program for all equipment listed.
- B. Training Session: A training session shall be held for each system and/or item listed below: (Note: For Temperature Controls refer to Temperature Control Sections for training requirements.)

Item	Description	Training Hours For Each Bldg
1.		
2.		
3.		

- C. The instruction shall include the following types of information:
 - 1. System overview
 - 2. Major component designation
 - 3. System operation procedures
 - 4. Maintenance scheduling and procedures
 - 5. Provide a list of spare components each system would normally require
- D. Services: Provide services required, for all equipment specified under this contract, for a period of (1) year after written acceptance by the Owner.
- E. Manuals: Submit (3) sets of Operation and Maintenance manuals. Each set shall contain the manufacturers' data, operating instruction parts catalog and maintenance procedures for each piece of equipment. Include normal maintenance servicing schedule to be performed by the Owner.
 - 1. For projects containing multiple buildings, manuals shall be submitted separately for each building.

1.14 DELEGATED DESIGN

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit three paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.
- C. At completion of work, contractor to submit written report of acceptance by service representative and/or qualified third party testing agency that systems are installed in accordance with manufacturer's details and requirements.
- D. Delegated Design Systems:
 - 1. Seismic Restraint of Mechanical Systems
 - 2. xxx

1.15 PERMITS, CERTIFICATES AND FEES

- A. This Contractor shall obtain and pay for permits, certificates, fees etc. listed below and as required. Costs for permits, fees etc. shall be included in the base bid amount.
 - 1. All required applications and permits to begin work
 - 2. Certificate of inspection including Third-Party Agency.
 - 3. All municipal connection charges
 - 4. All local utility charges (power, telephone, cable, etc.)
 - 5. Fees and charges shall be obtained directly from the respective authority having jurisdiction
 - 6. Fees and charges for hazardous waste hauling as required by DOT, DEC, etc.

1.16 REMOVAL, DISPOSAL AND HAZARDOUS MATERIALS

- A. All removed equipment shall be removed from the site and properly disposed of.
- B. All hazardous materials must be disposed of in compliance with ENCON and all other regulatory agencies. The contractor shall provide the owner with written chain of custody reports and final destination of disposal.
- C. The Owner may wish to keep certain equipment, therefore, check with Owner before removals to determine what may be salvageable.
- D. Unless otherwise noted, all equipment to be removed shall have all accessories and supports

removed with it, whether indicated or not. In addition, any refrigeration containing equipment that is shown for removal shall have all refrigerant evacuated from the system and properly disposed of and all refrigerant piping removed from the site. Refrigerant recovery shall be performed by a technician certified in the maintenance, service, repair, and disposal of refrigerant containing equipment per EPA.

- E. Any equipment, piping or ductwork that has been removed in the project and has left an opening and/or anchor points in a floor, wall or roof shall have the openings and voids infilled to match existing conditions.

1.17 GUARANTEE

- A. Contractor shall guarantee all work furnished through this contract including work performed by sub-contractors, for a period of (1) year (unless otherwise noted), from the date of final acceptance. Contractor agrees to repair or replace any defective work or materials at no additional cost to the Owner. Contractor shall also pay for any damage to other work resulting from repairs to defects. Contractor shall furnish written guarantees to the Owner's agent in accordance with the general conditions.

1.18 INSTALLATION

- A. This contractor shall coordinate scheduling and installation of work with other contractors, sub-contractors and other trades. The contractor is also required to coordinate all work with owner supplied materials, direct contracts, and normal building operations, if any.
- B. All finished work shall be neat and workmanlike. All work of a special nature shall be performed by skilled and qualified workmen who can present credentials showing experience in said trade. New systems shall be delivered to Owner complete in perfect working order, tested and balanced in full accordance with plans and specifications. Existing systems shall function in same manner as before this work was performed. Any malfunctions which arise in existing systems as a result of demolition or alteration of parts of such systems shall be corrected.
- C. Layout of equipment, accessories and piping systems in plan is generally diagrammatic unless specifically dimensioned or detailed. Check project drawings and existing site conditions before installing work for interference's as governed by structural or other conditions. Owner reserves the right to make reasonable changes in location of equipment, accessories or piping systems prior to "roughing-in" without involving additional expense. Exact dimensions shown upon plans will be subject to verification and confirmation of exact conditions at site at time of construction. "Plus or minus" dimensions are shown upon drawing as a guide only. Exact surrounding conditions are governed by final equipment selection and/or other like details.
- D. Furnish all new equipment and materials as described herein. Any material, operation, method or device mentioned, listed or noted within this specification, if not specifically mentioned as furnished or installed by others, shall be furnished and installed by this contractor.

1.19 STORAGE OF MATERIALS

- A. For all ductwork, piping and insulation brought to the jobsite, it shall be protected from all environmental elements. This shall include, but not limited to, water, dust, chemicals and other hazardous materials. It shall be stored within a protected area in the building.
- B. All ductwork onsite shall have a wrap on it to prevent the duct from having any dust, debris or other

hazardous materials from becoming adhered to the interior of the duct. No duct may be stored where it could be rained on. Also refer to section 233330, low velocity ductwork, for additional information.

- C. All insulation on the jobsite will be stored in an area that will protect it from weather damage.

1.20 START UP

- A. A start up shall be performed for all new MECHANICAL equipment (MECHANICAL equipment shall be defined here as any MECHANICAL unit that requires power or a temperature controls connection). The manufacturers representative will be onsite and unit operation will be verified, including but not limited to air flow, heating and cooling setpoints are attained and unit functions within manufacturers parameters. A written report shall be furnished to the architect.

1.21 TESTING AND INSPECTION

- A. Inspections required for any ordinances, regulations, instructions, laws, rules, standards and practices that require any work to be inspected or tested shall be performed. Contractor shall give Owner, Architect and Engineer timely notice of readiness of work for inspection or testing and the date fixed for said inspection or testing.
- B. Third-Party Agency must inspect completed installation and present Owner with Certificate of Inspection showing approval.
- C. Required local or municipal inspection processed and present Owner with certificate indicating approval of such governing bodies.
- D. Contractor shall submit a written report to Architect, copy to Engineer, on results of each inspection or test on system or equipment supplied. Report shall contain all pertinent information, recommendations, approvals, additional work required, etc.

1.22 RECORD DOCUMENTS

- A. When required by general conditions or other Division 1 Section, this Contractor shall prepare and turn over to Owner's agent record As-built documents. As-built drawings will include actual equipment location layout, service connections, ductwork and piping layouts, valve locations, etc.
- B. In all projects, contractor shall provide record drawings of all underground equipment and service runs. As-built drawings for underground work will include dimensions to actual locations finish grade elevations, and actual invert to underground structures equipment and service runs.

1.23 IDENTIFICATION AND NAMEPLATES

- A. Provide engraved plastic labels screwed to all MECHANICAL equipment furnished under this contract including but not limited to: pumps, air handling units, rooftop units, exhaust fans, condensing units, control panels, starters, switches, panels, etc. Labels shall have black background, white letters; minimum letter height 3/8" high, self adhesive labels or punch tape type labels are not acceptable.

1.24 PENETRATIONS THRU FIRE RATED CONSTRUCTION

- A. All penetrations by this contract through rated construction shall be sealed fire safe by a UL listed approved method.

- B. All piping penetrations through walls, floors, etc. shall be sleeved.
- C. All ductwork penetrations shall be furnished with trim frames.
- D. All piping and ductwork penetrations through fire rated partitions, walls, floors, etc. shall be installed as follows; penetration shall be oversized 1/2" to 3/4" maximum. This contractor shall pack with fireproofing insulation, type FS cerablanket. Outside of penetrations (exposed surfaces around pipes and ductwork) shall be caulked and sealed with flame stop V, as manufactured by Flame Stop, Inc.; or an approved equal. Flame stop sealant shall be troweled smooth for finishing as required.

1.25 CONFINED SPACES

- A. All work in pipe tunnels, mechanical pits, well manholes, etc. shall be performed by skilled tradesman and laborers with current certification for working in confined space. Contractor shall bear all costs to provide all safety equipment, ventilation, etc. as required by State and Federal Regulations and shall obtain all necessary permits for such work.
- B. Contractor shall submit copy of current certifications and photo I.D. of all tradesman and laborers who will be working in confined spaces on this project.

1.26 COORDINATION

- A. Layouts of duct and piping systems shown on contract drawings are diagrammatic. Actual duct and piping layouts shall be coordinated in the field by the contractor. Ductwork shop drawings shall be submitted for approval (see next section for coordination drawings if applicable). Coordinate with other trades and with existing conditions, as required for proper installation of all systems. Contractor shall verify that ductwork and piping layouts are coordinated with all other construction trades which might cause a conflict. Any changes due to systems not being properly coordinated shall be the contractor's responsibility.
- B. All offsets, elbows, duct/pipe transitions, air vents, drains and accessories required to accommodate field changes found during coordination drawings are the responsibility of the contractor at NO additional cost.
- C. NOTE: Ductwork and piping drawings will NOT be given to the contractor since it is expected of the contractor to field verify and draw the ductwork and piping.
- D. Refer to section 013100 Project management and coordination for obtaining cad files from the architect.
- E. All offsets, elbows, duct/pipe transitions, air vents, drains and accessories required to accommodate field changes found during shop drawings are the responsibility of the contractor at NO additional cost.

1.27 COORDINATION DRAWINGS

- A. Before construction work commences, Contractors for all trades shall submit Coordination Drawings at not less than 1/4" = 1'-0" scale. These drawings shall identify and show elevations of all trades and resolutions of trade conflicts. Mechanical Equipment Rooms shall be drawn early in the Coordination Drawing process, simultaneous with all other congested areas.
- B. Prepare three-dimensional component conflict analysis (building information modeling - BIM) as part of coordination drawings. Refer to section 013100 Project management and coordination for obtaining

revit models from the architect (if available). Resolve component conflicts prior to submittal. Indicate where conflict resolution requires modification of design requirements by Architect.

- C. Contractor shall perform the final coordination review. As each coordination drawing is completed, Contractor will meet with Architect to review and resolve conflicts on the coordination drawings.
- D. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
- E. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
- F. Indicate dimensions shown on drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- G. Additional design, drafting and/or engineering time to fully complete the coordination drawings shall not be considered an additional cost to the project and shall be part of the contract.
- H. Show the sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
- I. Architect will review coordination drawings to confirm that, in general, the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make suitable modifications and resubmit.
- J. Coordination drawings shall be required for all boiler rooms and mechanical rooms.
- K. Prepare Coordination Drawings as follows:
 - 1. Coordination drawings shall be required in the following areas:
 - a)
- L. Mechanical Contractor will prepare the base plan Coordination Drawings showing the building, all ductwork and all pertinent piping and equipment. The drawings shall be coordinated with cable tray, lighting fixtures, sprinklers, air diffusers, other ceiling mounted items, ceiling heights, structural work, maintenance clearances, electric code clearance, reflected ceiling plans, and other contract requirements. Reposition proposed locations of work after coordination drawing review by the owner and the architect. Provide adjustments to exact size, location and offsets of ducts, pipes, conduit, etc., to achieve reasonable appearance objectives. Provide these adjustments as part of Base Bid Contracts. Minor revisions need not be redrawn.
- M. Mechanical Contractor will provide prints and CAD drawings and submit the base plan to all major trades' Contractors.
- N. Electrical, Plumbing and Fire Protection Contractors will draft location of piping and equipment on the base plan, indicating areas of conflict and suggested resolutions.
- O. All offsets, elbows, duct/pipe transitions, air vents, drains and accessories required to accommodate field changes found during coordination drawings are the responsibility of the contractor at NO additional cost.

P. Coordination meetings will be held as necessary as determined by the architect.

END OF SECTION 23 0005

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections apply to work in this section.

1.02 SUBMITTALS

- A. Schedule of valves and service.
- B. Product data for all valves.

1.03 REFERENCE STANDARDS AND CODES

- A. All installations and materials shall conform to applicable 2020 New York State Building Code, and local building and plumbing codes.
- B. All installations shall conform to requirements of Owner's Insurance carriers.
- C. Refer to the latest edition and applicable sections of the following:
 - 1. Underwriters Laboratories (UL)
 - 2. American Society of Testing and Materials (ASTM)
 - 3. American National Standards Institute (ANSI)
 - 4. American Society of Mechanical Engineering (ASME)
 - 5. Code for Pressure Piping B31.9 - Building Services Piping
 - 6. American Welding Society (AWS)
 - 7. National Fire Protection Association (NFPA)
 - 8. Manufacturer's Standardization Society of the Valve and Fitting Industry (MSS)

1.04 GENERAL REQUIREMENTS

- A. Ensure valves are dry and internally protected against rust and corrosion. Store valves indoors. Maintain valve temperature higher than the ambient dew point temperature. If outdoor storage is necessary, support valves off the ground or pavement in watertight enclosures.
- B. Protect valve ends against damage to threads, flange faces and weld-end preps.
- C. Do not use hand-wheels and stems as lifting or rigging points.
- D. All valves and terminal water specialties shall be same size as upstream piping, unless otherwise indicated.
- E. Furnish valves with pressure and temperature ratings as specified and required to suit system pressures and temperatures.
- F. Furnish valves with either threaded, flanged or solder-joint end connections as specified.
- G. Furnish chain wheel operators for valves 6" and larger when valve is to be mounted 8' or higher above finished floor elevations.

PART 2 - PRODUCTS

2.01 VALVE SCHEDULE

A. Note: Specialty valves specified in other sections.

	Pipe Fill	Pipe Size	Valve Type
1.	Heating Hot Water	Up to 2"	BV-1
2.	Heating Hot Water	2-1/2" & Over	WV-1
3.	Heating Hot Water	Up to 2"	CBV-1
4.	Heating Hot Water	2-1/2" & Over	CBV-2
5.	Heating Hot Water	Up to 2"	CKV-1
6.	Heating Hot Water	2-1/2" & Over	CKV-2
7.	Chilled Water	Up to 2"	BV-1
8.	Chilled Water	2-1/2" & Over	WV-1
9.	Chilled Water	Up to 2"	CBV-1
10.	Chilled Water	2-1/2" & Over	CBV-2
11.	Chilled Water	Up to 2"	CKV-1
12.	Chilled Water	2-1/2" & Over	CKV-2
13.	Steam (30 psig & above)	Up to 2"	GV-3
14.	Steam (30 psig & above)	2-1/2" & Over	GV-4
15.	Steam (below 30 psig)	Up to 2"	GV-1
16.	Steam (below 30 psig)	2-1/2" & Over	GV-2
17.	Steam Throttling (30 psig & above)	Up to 2"	GLV-3
18.	Steam Throttling (30 psig & above)	2-1/2" & Over	GLV-4
19.	Steam Throttling (below 30 psig)	Up to 2"	GLV-1
20.	Steam Throttling (below 30 psig)	2-1/2" & Over	GLV-2
21.	Steam Condensate	Up to 2"	BV-1
22.	Steam Condensate	2-1/2" & Over	WV-2
23.	High Temp. Hot Water	Up to 2"	GV-3
24.	High Temp. Hot Water	2-1/2" & Over	GV-4
25.	Condensate Drain	Up to 2"	BV-1
26.	Condensate Drain	2-1/2" & Over	WV-1
27.	Cold Water Makeup	Up to 2"	BV-1
28.	Cold Water Makeup	Up to 2"	CKV-1
29.	Cold Water Makeup	2-1/2" & Over	CKV-2
30.	Cold Water Makeup	2-1/2" & Over	WV-1
31.	Cooling Tower Water	Up to 2"	BV-1
32.	Cooling Tower Water	2-1/2" & Over	WV-1

B. Valve Types

1. BV-1: Ball valve, size as required, sweat or threaded ends, forged bronze body, hard chrome plated ball, glass reinforced durafill seats, PTFE stem packing, 600 psi WOG non-shock, 150psi WSP for 1/4"-2", 450°F (@50psi) maximum temperature. Brass body is not acceptable and will be rejected. Series #B6000, B6001, Watts Regulator Co.; or equal.

2. CBV-1: Circuit balancing valve, size as required for nominal 3ft WG pressure drop. Note: the submitted pressure drop shall not exceed 2ft. The TAB contractor shall balance to 3ft. Y-pattern Style design and all metal parts of nonferrous, pressure die cast, nonporous Ametal copper alloy and high strength resin hand-wheel and sleeve. Provides a positive shut-off. Provision for connecting a portable differential pressure meter. Each meter connection shall have pressure/ temperature readout ports. Rubber O-ring disc to ensure positive shut-off. Valve shall provide multi-turn, 360° adjustment, digital handwheel with hidden memory feature to set the valve with precision tamper-proof setting. Model STAD, rated at 300 psig, 250°F, TA Hydronics; or equal.
3. CBV-2: Circuit balancing valve, size as required for nominal 2 ft WG pressure drop. Flanged, Y-pattern Style design with ductile iron body and other metal parts of nonferrous copper alloy and high strength resin hand-wheel and sleeve. Provides a positive shut-off. Provision for connecting a portable differential pressure meter. Each meter connection shall have pressure/ temperature readout ports. Rubber O-ring disc to ensure positive shut-off. Valve shall provide multi-turn, 360° adjustment, digital handwheel with hidden memory feature to set the valve with precision tamper-proof setting. Model STAF, rated at 250 psig, 250°F, TA Hydronics; or equal.
4. CKV-1: Check valve, bronze body, bronze disc. rated at 200 psi, non-shock for 2" and smaller. Nibco Model #T-413; or equal.
5. CKV-2: Check valve, iron body, bronze disc. rated at 200 psi, non-shock, flanged connections for 2-1/2" and larger. Nibco Model #F-918; or equal.
6. FCV-1: **ADJUSTABLE** Automatic flow control valves. Valve gpm shall be factory set and shall automatically limit flow to within 5% of specified rate. For 3/4" to 2" valves flow cartridge shall be removable from valve housing without the use of special tools to provide access without breaking main piping. Cartridge flow rates shall be externally adjustable while system is in operation with 41 flow rate settings range per cartridge. A true design operating pressure (psid) range of 4.4 – 58 psi is required. Each valve should have 2 P/T ports. All automatic flow control valves shall be provided by single source with certified flow tests. Internal wear surfaces of the valve cartridge shall be stainless steel. The cartridge body shall have machined threads to compensate for the spring free height. Fixed shims are not acceptable. Cartridges shall be color coded to determine model type and GPM Range and a flow rate chart for external adjustment of flow rate settings shall be provided. For 3/4" to 2" valves, valve assembly shall consist of Y type body and O-ring union. 2-1/2" to 6" valves shall be flanged wafer style valves and shall be externally adjustable while system is in operation with 51 flow rate settings per valve insert. Static pressure rating of 580 psi with a temperature rating of 248 F. Valve shall be E-just, by FlowCon International.; B&G; or approved equal. **NOTE: It is the intent that an externally adjustable valve is used to simplify installation, so the balancer can set the flow and ensure that the correct flow is achieved.**

7. FCV-2: **NON-Adjustable**, Automatic flow control valves. Valve gpm shall be factory set and shall automatically limit flow to within 5% of specified rate. For 3/4" to 2" valves flow cartridge shall be removable from valve housing without the use of special tools to provide access without breaking main piping. A true design operating pressure (psid) range of 4.4 – 58 psi is required. Each valve should have 2 P/T ports. All automatic flow control valves shall be provided by single source with certified flow tests. Internal wear surfaces of the valve cartridge shall be stainless steel. The cartridge body shall have machined threads to compensate for the spring free height. Fixed shims are not acceptable. Cartridges shall be color coded to determine model type and GPM Range and a flow rate chart for external adjustment of flow rate settings shall be provided. For 3/4" to 2" valves, valve assembly shall consist of Y type body and O-ring union. 2-1/2" to 6" valves shall be flanged wafer style valves. Static pressure rating of 580 psi with a temperature rating of 248 F. Valve shall be Griswald K-valve; or approved equal.
8. GLV-1: Globe valve, size as required, Class 150, bronze body, renewable composition disc, threaded ends, Figure #B29, Stockham Valve Co.; or equal. Provide Babbitt adjustable Sprocket Rim, complete with guide arm, guard ring, rust proof chain. Furnish with chain length as shown on drawing. Figure #659, #656, Jenkins Co.; or equal.
9. GLV-2: Globe valve, size as required, Class 125, iron body, renewable seat and disc, flanged ends, rated for steam, Figure #613, Jenkins Co.; or equal.
10. GLV-3: Globe valve, size as required, Class 250, bronze body, renewable composition disc and bronze seat ring, threaded ends, Figure #801, Jenkins Co.; or equal.
11. GLV-4: Globe valve, size as required, Class 250, iron body, renewable seat and disc, bronze disc and seat ring, rated for steam, flanged ends, Figure #923, Jenkins Co.; or equal.
12. GV-1: Gate valve, size as required, Class 125, bronze body, solid wedge, traveling stem threaded ends, rated for steam, rated at 200 psig and 353 F, T-113, Nibco; or equal.
13. GV-2: Gate valve, size as required, Class 125, iron body, OS & Y, flanged ends, bronze trim, rising stem, rated for steam service, Figure #F-617, Nibco; or equal.
14. GV-3: Gate valve, size as required, Class 200, bronze body, monel seats, bronze wedge, rising stem, threaded ends, Figure #B-144, Stockham Valve Co.; or equal.
15. GV-4: Gate valve, size as required, Class 300, steel body, OS & Y, flanged ends, bolted bonnet, Figure #30-GPFU-S, Stockham Valve Co.; or equal.
16. ROM-1: Provide a portable computerized balancing instrument capable of indicating pressure differential and temperature measurement across a system component. Instrument to contain a micro computer and a sensor unit with pressure sensor, measurement valve and connections. TA Hydronics Model TA CBI: or approved equal. Contractor shall provide (1) unit per project and turn over to Owner at project completion.
17. WV-1: Butterfly valve (HW, CHW as indicated) 2" – 12" size as required,. One piece cast iron **LUG** style body ANSI class 125/150, extended neck, Stainless Steel disc with polished edges, one piece stainless steel stem, triple function molded-in EPDM seat, upper and lower stem bearings, NBR (Buna) upper stem seal, bubble-tight shutoff, temperature range of -20o F to 250o F, pressure rating of 250 psi bi-directional. Keystone Figure 222; or equal.
 - a) Grooved end valve: 300 psi CWP suitable for bidirectional and dead-end service at full rated pressure. Body shall be grooved end black enamel coated ductile iron conforming to ASTM A536. Disc shall be electroless nickel plated ductile iron with

blowout proof 416 stainless steel stem. Disc shall be offset from the stem centerline to allow full 360 degree seating. Seat shall be pressure responsive EPDM. Valve shall be complete with ISO flange for actuation mounting. Valve operators shall be lever handle or gear operator, available with memory stop feature, locking device, chainwheel, or supplied bare. Basis of Deign: Victaulic S/761

18. WV-2: Butterfly valve (HTHW, LPS as indicated), size as required. High performance valve, double off-set design, carbon steel body, lug type, 316SS disc and 17-4SS stem, RTFE seat, TFE packing, Temperature range up to 500o F, and pressure rating of 285 PSI bi-directional. Keystone Figure 36 or equal.

PART 3 - EXECUTION

3.01 GENERAL

- A. Install all valves per manufacturers recommendations.

END OF SECTION 23 0523

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary conditions and Division 1 Specification Sections, apply to work of this section.

1.02 SUBMITTALS:

- A. Description of intended testing procedures.
- B. Blank data forms indicating all intended test data points.
- C. Written statement of coordination with sheetmetal contractor.
- D. Written statement of coordination with piping contractor.
- E. Written statement of acceptance of location and quantity of air and water balancing devices.
- F. Pre-balance information from existing systems, where required.

1.03 QUALIFICATIONS

- A. Acceptable Subcontractors are:
 - 1. Member contractors of "Associated Air Balance Council".
 - 2. Member contractors of "National Environmental Balancing Bureau".
- B. Procedures and Methods: Follow written procedures published, one or more of following:
 - 1. Associated Air Balance Council (AABC).
 - 2. National Environmental Balancing Bureau (NEBB).

1.04 SCOPE OF WORK

- A. Contractor shall perform testing, balancing and adjusting work on all new and existing equipment shown on plans, listed in this section and as required by applicable sections of the specification.
Note: All existing equipment used in new or renovated systems is required to be tested adjusted and balanced.
- B. Note: Air side systems shall be balanced prior to water balance.
- C. Testing, adjusting and balancing is required for all of the following:
 - 1. Air Side Equipment:
 - a) Air Handling Units
 - b) Supply, Return, Exhaust and Relief Duct Systems
 - c) Terminal Equipment
 - d) Diffusers, Registers and Grilles
 - 2. Hydronic Equipment:
 - a) Pumps
 - b) Air Handling Unit Coils
 - c) Terminal Equipment Coils
 - d) Piping Distribution Systems
 - e) Terminal Radiation Units

1.05 GENERAL REQUIREMENTS

- A. It shall be responsibility of the Contractor to place all systems in satisfactory operating condition, including providing services of approved adjusting and balancing subcontractor regularly engaged in this type of work.
- B. Furnish set of Bid Documents to subcontractor within ten (10) days after award of contract.
- C. Adjusting and balancing shall be accomplished as soon as possible after systems are complete and before Owner takes possession.
- D. All systems must conform with the following noise criteria:
 - 1. Areas shall have NC30 to 35.
- E. Initial adjustment and balancing to quantities indicated on design drawings and thereafter as required to satisfy job conditions to satisfaction of the Architects.
- F. Adjusting and balancing shall be accomplished under appropriate outdoor temperature conditions.
- G. Immediately prior to subcontractor's arrival on project:
 - 1. Adjust all balancing cocks and dampers open.
 - 2. Place all equipment in operating condition.
 - 3. Clean all strainers.
 - 4. Remove all temporary air filters and install design filters.
- H. During course of the adjusting and balancing work:
- I. Maintain qualified personnel at project at all times for system operation, trouble shooting, assistance, etc.
- J. Change pulleys and belts as required to meet system performance requirements. Adjustable sheaves shall not be operated at extreme end of adjustment. Replace adjustable sheaves with proper size to operate approximately in mid-range.
- K. Perform necessary mechanical adjustments in conjunction with balancing procedure.
- L. Replace all flow balancers in new and existing systems that cannot be manipulated to satisfy balancing requirements.

1.06 JOB VISIT

- A. Balancing subcontractor shall visit job prior to concealment of work and advise location of dampers, test connections, etc.; advise Architects by letter.
- B. Make any changes or additions of types, locations, etc. of balancing facilities.

1.07 FINAL REPORT

- A. Upon completion, all information shall be inserted in report form listing all items required by specifications. Entire report shall be typewritten and shall be submitted to Architect and Engineer for approval. Results shall be guaranteed. Provide (3) hard copies and electronically submit to architect.

- B. Complete balancing analysis on all individual equipment and systems as specified shall be included in report.
- C. Contractor shall be subject to recall to site to verify report information before approval of report by Architects.
- D. Record action taken to adjust all systems to meet design specifications.
- E. Report on condition of installations (i.e. - complete/inoperative etc.)
- F. Final reports which do not contain all data required by this section will be rejected. Contractor will be required to retest and resubmit for all applicable systems with missing information.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Provide all tools, ladders, recording meters, gauges, thermometers, velometers, anemometers, Pitot tubes, inclined gauge manometers, magnehelic gauges, amprobes, voltmeters, psychrometers, tachometers, etc. required to execute the work. Instruments used shall be accurately calibrated.
1. **NOTE: IF VFD IS PROVIDED, CONTRACTOR SHALL USE VFD FOR BALANCING OF AIR OR HYDRONIC EQUIPMENT. SYSTEM TO BE BALANCED WITH TDV COMPLETELY OPEN.**

PART 3 - EXECUTION

3.01 AIR AND HYDRONIC SYSTEMS

- A. Preparation:
 1. Examine bid documents and notify Architects of any questions regarding balancing, within 30 days after receipt of bid.
 2. The balancing subcontractor shall review sheetmetal shop drawings and mark the location of all required balancing dampers before duct fabrication.
 3. Written notice of coordination between Contractor and balancing contractor to be submitted to Architect and Engineer.
- B. Requirements for Air-Side Testing, Adjusting & Balancing:
 1. Air Handling Equipment:
 - a) Record all drive information (i.e. - sheave type, belt size, motor data).
 - b) Test and adjust fan rpm to design requirements.
 - c) Record RPM and final sheave position.
 - d) Test and record motor no load, and full load amperes, and determine operating brake horsepower.
 - e) Test and record inlet and discharge static pressures.

- f) Test, adjust and record SA, RA, OA and relief air flows for design recirculated air cfm.
 - g) Test, adjust and record SA, RA, OA and relief air flows for full design outside air cfm. Make special effort to test and record total relief cfm air.
 - h) Test and record entering and leaving air temperatures. (D.B. heating and cooling)
 - i) Test and record equipment sound levels in closest occupied space.
2. Ductwork & Air Distribution Systems:
- a) Adjust all main supply, exhaust and return air ducts to proper design cfm, supply, exhaust, return and relief.
 - b) Test and adjust each diffuser, grille, and register to within 10% of design requirements.
 - c) After grilles, diffusers and registers are set at final CFM, check and record sound levels at occupant level at all locations.
 - d) Each grille, diffuser, and register shall be identified as to location and area.
 - e) Size, type and manufacturer of diffusers, grilles and registers, and all tested equipment shall be identified and listed; manufacturer's ratings on all equipment shall be used to make required calculations.
 - f) Readings and tests of diffusers, grilles and registers shall include required fpm velocity and test resultant velocity, required cfm and test resultant cfm after adjustments.
3. Terminal Units:
- a) Adjust terminal units to cfm.
4. Fans (Supply & Exhaust):
- a) Record all drive information (i.e. - sheave type, belts, size, motor data).
 - b) Test and adjust fan rpm to design requirements.
 - c) Record cfm, rpm and final sheave position.
 - d) Test and record motor no load and full load amperes and determine operating brake horsepower.
 - e) Test and record inlet and discharge static pressures.
 - f) In cooperation with control manufacturer's representative, make mechanical adjustments of automatically operated dampers to operate as specified, indicated, and/or noted; subcontractor shall check these damper control operations for proper calibrations and list those requiring adjustment by control installers.
 - g) All diffusers, grilles and registers shall have air patterns adjusted to minimize drafts in all areas.

- h) A record of all final settings shall be made, preferably at each piece of equipment by an appropriate approved mark or if necessary by description on the report schedule.
- i) Record all space temperatures. If space temperatures vary more than 2°F from thermostat setting readjust air flows to obtain proper temperature.

C. Requirements for Water Systems Testing, Adjusting & Balancing:

1. Initial Procedure:
 - a) Examine bid documents and notify Architects of any questions regarding balancing, within 30 days after receipt of bids.
 - b) Air systems shall be examined first.
 - c) Open all manual valves to full open position; close coil bypass stop valves; set automatic control valves to full coil flow.
 - d) Examine water in system and determine if water has been treated and cleaned.
 - e) Check expansion tank and/or compression tanks to determine if they are not air bound or water logged and system is full of water and a proper minimum fill pressure.
 - f) Check all air vents at high points of water systems and determine if they are installed and operating freely.
 - g) Balance terminal units furthest from pumps, work towards pumps. Final balance pump flow control valve(s) last.
2. Pumps:
 - a) Prior to balancing ensure all strainers and dirt pockets have been cleaned.
 - b) Check pump rotation.
 - c) Set hot water pumps to proper gallons per minute delivery.
 - d) Record and check the following items at each heating element:
 - (1) Pressure drop across bypass valve.
 - (2) Pump operating suction and discharge pressures & final TDH.
 - (3) List all mechanical specifications of pumps.
 - (4) Rated and actual running amperage of pump motor.
3. Piping Distribution System:
 - a) Test and adjust all flow control devices.
 - b) Record final settings and distribution gpm.
 - c) Test and record pressure on non adjustable flow control valves. Verify pressure is within control range on valve.
4. Hydronic Coils (HW, CHW):
 - a) Set all temperature controls so all coils are calling for full flow.

- b) After adjustments to coils are made, recheck settings at pumps and readjust as required.
 - c) Read pressure and differential across coils and set flow rate on coil for full heating; set pressure drop across bypass valve to match coil full flow pressure drop.
 - d) Record and check the following items at each heating element:
 - (1) Inlet water temperature.
 - (2) Leaving water temperatures.
 - (3) Pressure drop.
 - e) Check water temperatures at outlet side of heating coils; Note: drop of temperature from source.
 - f) Upon completion of flow reading and adjustment of coils, mark all settings and record data. Show on schematic sketch form wherever practical.
5. Heat Exchangers:
- a) Check operation of any automatic bypass or diverting valves.
 - b) Check and set operating temperatures of heat exchanger to design requirements.
 - c) Record all flows, pressure drops and temperature across heat exchanger.
6. Fin Tube Radiation:
- a) Test, adjust and record gpm for fin tube unit.
 - b) For units not equipped with balancing valve, adjust flow across fin tube using temperature drop method.
 - c) Record flows or temperature drop readings and flow calculations.

3.02 STEAM SYSTEMS

A. Preparation:

- 1. Examine bid documents and notify Architects of any questions regarding balancing, within 30 days after receipt of bids.
- 2. Air systems shall be balanced first.

B. Initial Procedure:

- 1. Open all manual valves to full open position; close coil bypass stop valves; set automatic control valves to full coil flow. Examine steam in system and determine if desired flow is attainable.
- 2. Set all temperature controls so all coils are calling for full flow.
- 3. Check operation of any automatic bypass or diverting valves.
- 4. Check all steam traps and determine they are installed and operating freely.

C. Flow Adjustments:

1. Check steam temperatures at outlet side of heating coils; Note: drop of temperature from source.
2. Upon completion of readings and adjustment at coils, mark all settings and record data. Show on schematic sketch form wherever practical.
3. Fin radiation balancing valves shall be set by temperature drop across the fin. Drop shall be consistent with drop and heat output as specified herein.

D. Final Check:

1. After procedure is complete, thoroughly clean all strainers, dirt pockets, traps, etc.

END OF SECTION 23 0593

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 WORK INCLUDED

- A. Insulate all ducts and as required by contract documents.

1.03 REFERENCES

- A. Test standards and reports for evaluating and rating performance of fire rated shaft enclosures and zero inch clearance ratings for duct wrap systems for compliance to Code.
 - 1. ISO 6944-1985, 'Fire Resistive Tests - Ventilation Ducts'.
 - 2. ASTM E 2336, 'Standard Test Methods for Fire Resistive Grease Duct Enclosure Systems'.
 - 3. ASTM E 814 (UL1479), 'Fire Tests of Through-Penetration Fire Stops Standard'.
 - 4. ASTM E 84, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
 - 5. ASTM C 1338, 'Fungi Resistance of Insulation Materials and Facings Standard'.
 - 6. NFPA 96 'Standard for Ventilation Control & Fire Protection of Commercial Cooking Operations'.

1.04 SUBMITTALS

- A. Manufacturer data for all materials used in contract. Submit schedule of insulation applications.

PART 2 - PRODUCTS

2.01 DUCTWORK INSULATION

- A. **NOTE: IF A CONDITION IS NOT LISTED BELOW, IT SHALL BE INSULATED WITH 2" RB.**
- B. All exhaust fan and relief hoods shall have the void between the duct and the curb completely insulated with FB insulation.
- C. All relief/intake hoods, goosenecks, louvered penthouses and any other ductwork that has exterior termination that have exposed surfaces inside the building shall be insulated as outside air ductwork.

D. The following is a schedule for ductwork insulation:

	Duct System & Location	Type	Thickness	Notes
1.	Outside Air, Relief Air, and Exhaust Air Ducts & Plenum Exposed to Air at Outside Ambient Temperatures (For All Air Handling and Energy Recovery Units), Energy Recovery Exhaust:			
	a) Concealed Spaces	FB	3"	(2)
	b) Exposed Spaces	RB	2"	(1)
2.	Supply & Return Duct:			
	a) Concealed Spaces	FB	2.2"	(2)(4)
	b) Exposed Spaces	RB	2"	(1)(4)
3.	Return Duct within a plenum ceiling	NONE		(6)
4.	Exhaust Fan Ductwork	FB	3"	(2)(5)
	a) Between the backdraft or mechanical damper and the space (ductwork having room conditioned ductwork), no insulation is required. All other exhaust ductwork (or if there is no damper present) shall be insulated as outside air ductwork.			
	b) This does not apply to energy recovery units, refer to above for all energy recovery units.			
5.	Crawlspace	FB	2.2"	(2)(3)
6.	Kitchen Exhaust & Grease Duct	FRI	3"	(1)
7.	Duct Coils (coil & duct 3'-0" min. upstream & downstream, including the coil)	FB	2.2"	(2)
8.	VAV coils (boxes are lined, coils need to be insulated)	FB	2.2"	(2)
9.	All Exterior Ductwork	ERB	3"	(3)(7)(8)(9)

Schedule Notes [some notes might not be used]:

- (1) Weld pins with tapered joints.
- (2) Stapled edge with mechanical fasteners on ducts over 24" wide.
- (3) Provide insulation whether duct is lined or not
- (4) Ducts with internal liner do not require additional insulation unless otherwise noted. This does not apply to special 14 gauge supply duct.
- (5) Exhaust duct exposed to air at ambient temperature must meet the requirements listed above.
- (6) Provide continuous, water tight jacketing over all exterior ductwork.
- (7) For ductwork over 24" wide, pitch insulation towards sides of duct.
- (8) Pitch insulation at equipment connections away from equipment to prevent pooling and intake of water.
- (9) Exterior insulation is not required on return ductwork contained within areas with a ceiling acting as a plenum return – provide exterior insulation per schedule on return ductwork when outside of areas of plenum return.

- E. Duct insulating materials shall be as follows:
1. FB: Flexible fiberglass blanket type duct wrap with factory applied foil faced jacketing reinforced with fiberglass scrim laminated to UL rated kraft. Minimum thickness = 2.2in. Insulation shall be 1-lb/ft³ with a thermal conductivity (k-value) of 0.27 Btu x in/(hr x ft² x °F) at 75°F mean temperature when compressed. Provide with 2" stapling tab. Provide Type #75, Johns Manville; or equal.
 2. FRI: Fireproof insulating material, non-asbestos, biosoluble, patented inorganic fire resistant blanket duct wrap insulation encapsulated with a scrim-reinforced foil, blanket thickness of 1.5" for kitchen exhaust grease duct applications marked with manufacturer's logo and UL and Intertek markings. Design use limit of 2192°F. Flame spread <25; smoke developed <50. Maximum flame spread 0 and smoke developed 0. R value of 4.15 and density of 6 pcf. Insulation shall be UL listed for 2 hour barrier. Duct wrap by 3M Fire Protection Products Duct Wrap 615+; or equal. Use with tape: High performance filament tape, 1" wide. Aluminum foil tape: 4" wide (for sealing cut blanket edges and seams). 3M No. 898; or equal.
 - a) UL 2221 – Standard for tests of fire resistive grease duct enclosure assemblies.
 - b) UL 1978 – Standard for grease ducts.
 - c) NFPA 96 – Standard for ventilation control and fire protection of commercial cooking operations.
 - d) NFPA-90A – Standard for the installation of air conditioning and ventilating systems.
 3. RB: Factory fabricated rigid fiberglass board with factory applied white kraft facing bonded to aluminum foil, reinforced with fiberglass yarn. Minimum thickness = 2in. Temperature limit 450°F unfaced side, 3.0 lb./cu. ft. density. Thermal conductivity (k-value) of 0.23 Btu x in/(hr x ft² x °F) at 75°F mean temperature. Insulation to have a R value of 4.3 per inch. Type #814, Johns Manville; or equal.
 4. ERB: Furnish and install 3" thick, closed-cell polyisocyanurate foam core board with foil facing on all ductwork segments and fittings installed outside of the building. Board shall have a R-value of 19 (for a 3" thick sheet). Board shall act as a vapor barrier with a vapor permeance of 0.05 perms. Provide Johns Manville AP Foil Faced; or equal.
- F. Jacketing Material shall be Venture Clad 1579GCW-E as manufactured by Venture Tape; or approved equal. To be applied over all exterior ductwork insulation or exterior lined ductwork, and as noted elsewhere.
1. Jacketing material shall have a 24.0 mils thickness, 13-ply embossed aluminum made with (2) layers of aluminum foil, a layer of polyester film, an outer layer of tedlan film and an acrylic pressure sensitive adhesive layer.
 2. Jacketing material to provide a 10 year membrane warranty, to be UV resistant and have zero permeability.

PART 3 - EXECUTION

3.01 INSTALLATION OF DUCTWORK INSULATION

- A. All insulation, jacketing and accessories are to be installed in strict accordance with manufacturer's instructions.

- B. Flexible Blanket Insulation (FB): Insulation shall be tightly wrapped around ductwork with all circumferential joints butted and longitudinal joints overlapped minimum of 2".
1. Adhere insulation to metal with 4" wide strips of insulation bonding adhesive at 8" on center and, on ductwork over 24" wide, additionally secure insulation to bottom with pins welded to duct 18" on center. On circumferential joints, secure 2" flange of facing using 9/16" flare door staples applied 6" on center and tape with 3" wide foil reinforced kraft tape. On longitudinal joints, secure overlap in the same manner. All pin penetrations or punctures in facing shall be similarly taped. If single blanket or sufficient thickness is not available, install two layers of equal thickness with vapor barrier facing on outer layer only.
- C. Fireproof Insulating Material (FRI): Install two layers of 1.5" thick wrap with 4" overlap applied directly to the duct. Overlap perimeter and longitudinal joints 3" or 4" on both layers. Fiberglass filament tape may be used as a temporary hold until metal banding is in place on exterior layer. Install fire resistive duct wrap insulation in direct contact with ductwork to manufacturer's instructions and referenced standards. For duct widths greater than 24", weld insulation pins to bottom of horizontal ducts on a 12"x10.5" maximum grid spacing. Welded insulation pins to one of the wider sides of all vertical ducts on a 12"x10.5" maximum grid spacing. Impale duct wrap insulation over pins and secure with speed clips to prevent blanket sag. At duct access doors: Install duct wrap to manufacturer's instructions and procedures. Firestopping at fire separations:
1. Firestop all wrapped ductwork penetrating fire rated concrete floors, gypsum board, block and concrete wall assemblies and gypsum board shaftwall assemblies using UL and/or Intertek firestop system listings appropriate for the applicable duct wrap system.
 2. Kitchen exhaust grease ducts: Fire resistive duct wrap insulation to be continuous through wall or floor penetrations. Maximum 3" clearance permitted between outer layer of duct wrap insulation and edge of opening. Fill annular space between edge of opening and wrapped duct with pieces of 3M duct wrap insulation or mineral wool insulation firmly packed into opening. Compress to percentage stated in firestop listing to minimum depth of 4". Recess packing material below surface on both sides of walls or top side only for floors to depth stated in firestop listing. Seal over packing material using 3M firestop sealant to depth stated in firestop listing, flush with top side of floor and both sides of wall surfaces.
- D. Rigid Board Insulation (RB): Impale insulation over pins welded to duct on 21" centers, cut to extend 1/8" beyond face of board and cover with vapor seal mastic and self-locking cap. Seal all edges and butt joints with 5" wide strips of self-sealing pressure sensitive tape matching surface and finish of duct insulation.
- E. Exterior Ductwork Insulation. Polyisocyanurate Board (ERB): Apply adhesive according to manufacturer's recommended coverage rates per area. Insulation to be adhered to ductwork with weld pins with tapered joints and adhesive, see below. Impale insulation over pins welded to duct on 21" centers, cut to extend 1/8" beyond face of board and cover with vapor seal mastic and self-locking cap. Seal all edges and butt joints with 5" wide strips of self-sealing pressure sensitive tape matching surface and finish of duct insulation. Insulation is to be applied to ductwork with joints tightly butted. All joints shall be fitted to eliminate voids. Any voids are to be eliminated by refitting or replacing sections of insulation.
1. Provide polyisocyanurate board on top, sides and bottom of duct with adhesive.
 2. For ducts over 24", apply sloped polyisocyanurate insulation (Hunter board H-shield; or equal) over Polyisocyanurate insulation to provide a 12/1 pitch in the center of the duct to prevent snow buildup. Attach Polyisocyanurate insulation together with adhesive.

3. Insulate bottom of duct first, full width of duct.
 4. Insulate sides next, same height as duct plus thickness of bottom sheet insulation.
 5. Insulate top full width of duct plus thickness of side sheets both sides.
 6. This contractor shall have a manufacturer's insulation representative instruct his personnel on the installation of this insulation and must be on the site the first day to review the installation.
- F. Jacketing: Jacket to be applied to all surfaces of insulation and duct. Jacket to overlap previous section by minimum of 2".

END OF SECTION 23 0713

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 SUBMITTALS

- A. Schedule of all materials used.
- B. Product data for all materials.

1.03 WORK INCLUDED

- A. Insulate all pipes as required by contract documents.

PART 2 - PRODUCTS

2.01 PIPING INSULATION

- A. **NOTE: IF A CONDITION IS NOT LISTED BELOW, IT SHALL BE INSULATED WITH 1-1/2" TYPE A OR TYPE B, DEPENDING ON THE PIPE.**

- B. The following is a schedule for pipe insulation:

		Pipe Diameter		Type	Notes
System Type		Up To 1-1/4"	1-1/2" & Larger Insulation		
		Min. Insulation Thickness			
1.	Steam (Low Pressure)	2"	3"	A	(1)(2)(3)(6)
2.	Steam (High Pressure)	2"	3"	C	(1)(2)(3)(6)
3.	Condensate	2"	3"	A	(1)(2)(3)(6)
4.	Heating Hot Water	1-1/2"	2"	A	(1)(2)(3)(5)(6)
5.	High Temp Hot Water	2"	3"	C	(1)(2)(3)(6)
6.	Chilled Water	1-1/2"	1-1/2"	A	(1)(2)(3)(5)(6)
7.	Dual Temp	1-1/2"	2"	A	(1)(2)(3)(5)(6)
8.	Condensate Drain	1/2"	1/2"	B	(4)
9.	Condenser Water	1/2"	1"	A	(1)(2)(3)
10.	Cold Water Make-up	1/2"	1/2"	A	(1)(2)
11.	Refrigerant Suction, Liquid Piping and Hot Gas Bypass				
	a) INTERIOR	1/2"	1/2"	B	(4)(7)
	b) EXTERIOR	1"	1"	B	(4)(5)

Schedule Notes:

- (1) Pre-Molded PVC Fitting Covers: Zeston, Inc.; or equal.
- (2) Self-seal lap.
- (3) Staples-outward clinching.
- (4) Foamed plastic pipe insulation adhesive; Armstrong Co.; 520 adhesive; or equal as required to ensure there are no gaps in insulation.

- (5) Exterior insulation shall be covered with exterior jacketing (venture clad) as specified hereinafter. All piping shall be supported to prevent sagging of the pipe, provide supports as required.
- (6) Furnish high impact strength PVC piping jacketing, as specified hereinafter, for all exposed piping in all finished spaces.
- (7) Provide manufacturers pre-insulated line sets with flare connections where possible. Provide rubber insert cushy clamps for all unistrut piping risers and hydra-zorb insulation unistrut cradles for horizontal piping. Ensure all piping is insulated with no gaps.

C. Equipment Insulation:

1. All hot water and chilled water fittings, valves, water specialties, flanges, air separators and pumps shall be insulated per this section, NO EXCEPTIONS!
2. Note: Do not run any insulation through pitch pockets.
3. Note: All insulation requirements of this section shall apply to flexible expansion joints (EXP-1).

2.02 MATERIALS FOR PIPING INSULATION

A. Pipe insulating materials shall be as follows:

1. Type A: Fiberglass pipe insulation jacketed with a reinforced vapor retarder jacket and factory applied longitudinal acrylic adhesive closure system. Insulation shall have a maximum service temperature of 850°F with a thermal conductivity (k-value) of 0.23 Btu x in/(hr x ft² x °F) at 75°F mean temperature per ASTM C518 and UL rated for maximum flamespread of 25 and smoke developed of 50. Johns Manville. Micro-Lok; or equal.
2. Type B: Closed Cell Foam Pipe Insulation. Insulation shall have a maximum service temperature of 300°F with a thermal conductivity (k-value) of 0.28 Btu x in/(hr x ft² x °F) at 75°F mean temperature per ASTM C518 and UL rated for a maximum flamespread of 25 and smoke developed of 50.
 - a) Pre-slit foamed plastic pipe insulation with slit positioned at side and vapor sealed with adhesive on all joints. AP Armaflex Tube Insulation; or equal.
3. Type C: High Temp. Pipe Insulation. Johns Manville, Thermo-12/Gold calcium silicate; or equal. Insulation shall have a maximum service temperature of 1,200°F with a thermal conductivity (k-value) of 0.37 Btu x in/(hr x ft² x °F) at 100°F mean temperature per ASTM C518 and UL rated for a maximum flamespread of 0 and smoke developed of 0.

B. High Impact Strength Jacketing: Furnish PVC jacketing and fitting covers, conforming to ASTM E-84; flame spread 25, smoke developed 50, white high gloss finish, 0.02" minimum thickness.

C. Furnish pre-molded PVC jacketing and fitting covers, lo-smoke type, as manufactured by Proto Corp.; or an approved equal.

D. Exterior Jacketing: Material shall be Venture Clad 1579GCW-E as manufactured by Venture Tape; or approved equal. To be applied over all exterior piping, and as noted elsewhere.

1. Jacketing material shall have a 24.0 mils thickness, 13-ply embossed aluminum made with (2) layers of aluminum foil, a layer of polyester film, an outer layer of tedlan film and an acrylic pressure sensitive adhesive layer.

2. Jacketing material to provide a 10 year membrane warranty, to be UV resistant and have zero permeability.

PART 3 - EXECUTION

3.01 PIPING INSULATION INSTALLATION

A. Type of Insulation Listed and Methods of Installation:

1. Fiberglass Pipe Insulation (A): Butt joints sealed with 3" wide strips of jacket material with factory applied pressure sensitive adhesive, laps and strips applied over clean dry surfaces and all longitudinal and circumferential seams rubbed hard with blunt steel edge. Cover valves, fittings, flanges, etc. with pre-formed fiberglass fittings and premolded PVC plastic jackets.
2. Closed Cell Foam Pipe Insulation (B): Insulate fittings, valves and flanges with mitered and fitted sections of foamed plastic pipe insulation positioned and fastened by adhesive on all joints.
3. Calcium Silicate Pipe Insulation (C): Secure insulation with stainless steel bands at 12-inch (300-mm) intervals, and tighten bands without deforming insulation materials. Apply a skim coat of mineral-fiber, hydraulic-setting cement to insulation surface. When cement is dry, apply flood coat of lagging adhesive and press on one layer of glass cloth or tape. Overlap edges at least 1 inch (25 mm). Apply finish coat of lagging adhesive over glass cloth or tape. Thin finish coat to achieve smooth, uniform finish.

B. Special Requirements:

1. Heating piping hangers shall be applied directly to piping. Cut-out insulation for hanger and cover with jacketing. Insulation shall be "butt-up" to hanger as tightly as possible.
2. Cooling/refrigeration piping insulation shall be continuous and have no breaks, insulation shield shall be applied between insulation and hanger.

END OF SECTION 23 0719

PART 1 – GENERAL

1.01 RELATED SECTIONS

- A. The General Conditions of the Contract, Supplementary Conditions, and General Requirements are part of this specification and shall be used in conjunction with this section as part of the contract documents. Consult the above for further instructions pertaining to this work. The Contractor is bound by the provisions of Division 0 and Division 1.

1.02 STATE CONTRACT

- A. All controls will be by _____ under state contract.
- B. This section applies to the portion of _____ equipment and controls that will be supplied for this project via _____'s NYS OGS contract.
- C. Equipment will be shipped FOB factory and will be unloaded, inspected, stored, and installed by the Mechanical Contractor.
- D. The pre-purchased _____ equipment and _____ controls shall include start-up services, temperature controls, control engineering, controls installation and wiring, operating manuals, training and warranty for parts on equipment and controls. See other specification sections for additional requirements. All other warranty services are by the installing contractor.

1.03 CONNECTION TO EXISTING CONTROL SYSTEM (*If Necessary*)

- A. All new control equipment must integrate seamlessly with existing _____ DDC system. All new digital controllers are required to communicate fully with the existing temperature control network.
- B. All new controllers provided under this project must be connected to the existing BAS System. Extend network (including software) as required to provide a fully integrated control system.
- C. BAS System Contractor shall modify programming in host computer to accept all new equipment and I/O points.
- D. Contractor must visit site to inspect existing equipment required for operation of new systems. If existing miscellaneous equipment is not of sufficient size or is not functioning properly, contractor must include replacement or refurbishment in his bid.

1.04 ACCEPTABLE MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. XXX
 - 2. XXX
- B. If the Contractor is proposing to provide a product by a Manufacturer other than those listed above, the Contractor must, at least 10 days prior to bid opening, to obtain the approval of the Owner for the equal manufacturer, along with provided 5 references of sites where the company has performed projects to similar type.

1.05 SOFTWARE UPGRADES / SERVER UPGRADES

- A. At the completion of the project, the contractor shall ensure that all software is at its latest available revision and that all hardware (servers, workstations, laptops, etc.) shall be capable of meeting all requirements to ensure that the (OWNER) has been furnished with a completely updated system.
- B. If replacement of existing hardware is required due to compatibility with the latest revision of software, it shall be the responsibility of this contractor to provide new hardware.

1.06 CONTROL SYSTEM DESCRIPTION

- A. Provide labor, controls materials, controls equipment and services as required for a complete BACnet Building Automation System (BAS), to perform the functions described in this Section. Controls System shall be Web-based and accessible either directly connected and/or through the owners IP LAN network.
- B. It is the BAS manufacturer's responsibility to provide all the design, engineering, and field coordination required to ensure all equipment sequence of operations are met as specified and the designated BAS operators have the capability of managing the building mechanical system.
- C. The BAS shall meet BACnet communication standards to ensure the system maintains "interoperability" to avoid proprietary arrangements that will make it difficult for the Owner to consider other BAS manufacturers in future projects. These open protocol communication standards are discussed in more detail later in this specification.
- D. BAS controllers shall be listed by BACnet Testing Laboratories (BTL) with appropriate classification.
- E. Direct Digital Control (DDC) technology shall be used to provide the functions necessary for control of mechanical systems and equipment on this project.
- F. The BAS shall accommodate simultaneous multiple user operation. Access to the control system data should be limited only by the security permissions of the operator role. Multiple users shall have access to all valid system data. An operator shall be able to log onto any workstation on the control system and have access to all appropriate data.
- G. The BAS manufacturer shall provide all hardware and software necessary to implement the functions and sequence of operations specified.

1.07 SUBMITTAL REQUIREMENTS

- A. BAS manufacturer shall provide shop drawings and manufacturers' standard specification data sheets on all hardware and software being provided for this project. No work may begin on any segment of this project until the Engineer has reviewed submittals for conformity with the plan and specifications. Five (5) copies are required. All shop drawings shall be provided to the Owner electronically once they have been approved and as-built drawings have been completed.
- B. Quantities of items submitted shall be reviewed by the Engineer. Such review shall not relieve the BAS manufacturer of furnishing quantities required based upon contract documents.
- C. Provide the Engineer with any additional information or data which is deemed necessary to determine compliance with the specifications or which is deemed valuable in documenting and understanding the system to be installed.

- D. Submit the following within 45 days of contract award:
1. A complete bill of materials of equipment to be used indicating quantities, manufacturers and model numbers.
 2. A schedule of all control valves including the valve size, pressure drop, model number (including pattern and connections), flow, CV, body pressure rating, and location.
 3. A schedule of all control dampers including damper size, pressure drop, manufacturer, and model number.
 4. Note: schedule of valves and dampers shall be submitted independently of other submittals; do not combine with other submittals.
 5. Provide all manufacturers' technical cut sheets for major system components. When technical cut sheets apply to a product series rather than a specific product, the data specifically applicable to the project shall be highlighted or clearly indicated by other means. Include:
 - a) Building Controllers
 - b) Custom Application Controllers
 - c) Application Specific Controllers
 - d) Operator Workstations
 - e) Portable Operator Terminals
 - f) Auxiliary Control Devices
 6. Room schedule including a separate line for each VAV box and/or terminal unit indicating location and address.
 7. Samples of graphic display screen types and associated menus.
 8. Provide proposed Building Automation System architectural diagram depicting various controller types, workstations, device locations, addresses, and communication cable requirements.
 9. Provide detailed termination drawings showing all required field and factory terminations, as well as terminal tie-ins to DDC controls provided by mechanical equipment manufacturers. Terminal numbers shall be clearly labeled.
 10. Provide points list showing all system objects and the proposed object names.
 11. Provide a sequence of operation for each controlled mechanical system and terminal end devices.
 12. Provide a BACnet Protocol Implementation Conformance Statement (PICS) for each BACnet system level device (i.e. Building Controller & Operator Workstations) type. This defines the points list for proper coordination of interoperability with other building systems if applicable for this project.
- E. Project Record Documents: Upon completion of installation, submit PDF of record (as-built) documents. The documents shall be submitted for approval prior to final completion and include:
1. Project Record Drawings - These shall be as-built versions of the submittal shop drawings. One set of electronic drawing files shall be provided.

2. Testing and Commissioning Reports and Checklists signed off by trained factory (equipment manufacturers) and field (BAS) commissioning personnel.
3. Operating and Maintenance (O & M) Manuals - These shall be as-built versions of the submittal product data. In addition to the information required for the submittals, Operating & Maintenance manual shall include:
 - a) Names, address and 24-hour/7-day per week telephone numbers of Contractor personnel managing and installing equipment, along with service personnel responsible for supporting the ongoing warranty and services of the control system.
 - b) Procedures for operating the BAS including logging on/off, alarm management, generation of reports, trends, overrides of computer control, modification of setpoints, and other interactive system requirements.
 - c) Description of the programming language including syntax, statement descriptions, algorithms, calculations, point database creation and modification, program creation and modification, and operator use of the editor.
 - d) Explanation of how to design and install new points, new DDC controllers, and other BAS hardware.
 - e) Preventative Maintenance and calibration procedures; hardware troubleshooting; and hardware repair and/or replacement procedures.
 - f) Documentation of all software program logic created for Custom Programmable Controllers including the overall point database. Provide one set of magnetic media containing files of the software and point database.
 - g) One set of electronic media containing files of all operator color graphic screens for the project.
 - h) A list of recommended spare parts including pricing, manufacturer, supplier, and part numbers.
 - i) Documentation, installation, and maintenance information for all third party hardware/software products provided including personal computers, printers, hubs, sensors, valves, etc.
 - j) Original issue media for all software provided, including operating systems, programming language, operator workstation software, and graphics software.
 - k) Licenses, Guarantee, and Warranty documents for all equipment and systems.

1.08 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

A. Section 232113 – Hydronic Piping

1. Control Valves
2. Temperature Sensor Wells and Sockets
3. Hydronic Pressure Taps
4. Hydronic Flow Meters

B. Section 233300 – Ductwork Accessories

1. Automatic Dampers
2. Airflow Stations

1.09 DEFINITIONS

Term	Definition
UCP	Unitary Controller
ACP	Air Handler Controller
BACnet/BACnet Standard	BACnet communication requirements as defined by the latest version of ASHRAE/ANSI 135 and approved addenda.
Control Systems Server	A computer(s) that maintain(s) the systems configuration and programming database.
Controller	Intelligent stand-alone control device. Controller is a generic reference to building controllers, custom application controllers, and application specific controllers.
Direct Digital Control	Microprocessor-based control including Analog/Digital conversion and program logic.
Gateway	Bi-directional protocol translator connecting control systems that use different communication protocols.
Local Area Network	Computer or control system communications network limited to local building or campus.
Master-Slave/Token Passing (MS/TP)	Data link protocol as defined by the BACnet standard.
Point-to-Point	Serial communication as defined in the BACnet standard.
Primary Controlling LAN	High speed, peer-to-peer controller LAN connecting BCs and optionally AACs and ASCs. Refer to System Architecture below.
Protocol Implementation Conformance Statement (PICS)	A written document that identifies the particular options specified by BACnet that are implemented in a device.
Router	A device that connects two or more networks at the network layer.
Wiring	Raceway, fittings, wire, boxes and related items.

1.10 CODES AND STANDARDS

- A. Codes and Standards: Meet requirements of all applicable standards and codes, except when more detailed or stringent requirements are indicated by the Contract Documents, including requirements of this Section.
1. Underwriters Laboratories: Products shall be UL-916-Energy Management Systems for BAS components & ancillary equipment
 2. Underwriters Laboratories: Products shall be UL-873 Temperature Indication & Regulating Equipment.
 3. Federal Communications Commission –Part 15- Subpart J.
 4. All products shall be labeled with the appropriate approval markings. System installation shall comply with NFPA, NEMA, Local and National Standards.
 5. ASHRAE/ANSI 135-2012 (BACnet) - (System Level Devices) - Building Controllers shall conform to the listed version of the BACnet specification in order to improve interoperability with various building system manufacturers' control systems and devices.

6. ASHRAE/ANSI 135-2012 (BACnet) - (Unit Level Devices) - Unit Controllers shall conform to the listed version of the BACnet specification in order to improve interoperability with various building system manufacturers' control systems and devices.

1.11 QUALITY ASSURANCE

A. BAS Manufacturer Qualifications

1. The BAS manufacturer shall have an established business office within 100 miles of the project site and must provide 24 hours/day, 7 days/week response in the event of a customer warranty or service call.
2. The BAS Manufacturer shall have factory trained and certified personnel providing all engineering, service, startup, and commissioning field labor for the project from their local office location. BAS manufacturer shall be able to provide training certifications for all local office personnel upon request.
3. The BAS shall be provided by a single manufacturer and this manufacturer's equipment must consist of operator workstation software, Web-based hardware/software, Open Standard Protocol hardware/software, Custom application Programming Language, Graphical Programming Language, Building Controllers, Custom Application Controllers, and Application Specific Controllers. All other products specified herein (i.e., sensors, valves, dampers, actuators, etc.) need not be manufactured by the BAS manufacturer listed in this specification.

1.12 SYSTEM PERFORMANCE

A. Performance Standards. The BAS system shall conform to the following:

1. Graphic Display. The system shall display a graphic with a minimum of 20 dynamic points. All current data shall be displayed within 10 seconds of the operator's request.
2. Graphic Refresh. The system shall update all dynamic points with current data within 10 seconds.
3. Object Command. The maximum time between the command of a binary object by the operator and the reaction by the device shall be 5 seconds. Analog objects shall start to adjust within 5 seconds.
4. Object Scan. All changes of state and change of analog values shall be transmitted over the high-speed network such that any data used or displayed at a controller or workstation will be current within the prior 10 seconds.
5. Alarm Response Time. The maximum time from when an object goes into alarm to when it is annunciated at the workstation shall not exceed 10 seconds.
6. Program Execution Frequency. Custom and standard applications shall be capable of running as often as once every 5 seconds. The Contractor shall be responsible for selecting execution times consistent with the mechanical process under control.
7. Programmable Controllers shall be able to execute DDC PID control loops at a selectable frequency from at least once every 5 seconds. The controller shall scan and update the process value and output generated by this calculation at this same frequency.

8. Multiple Alarm Annunciations. All workstations on the network shall receive alarms within 5 seconds of each other.
9. Reporting Accuracy. Table 1 lists minimum acceptable reporting accuracies for all values reported by the specified system.
 - a) Table 1: Reporting Accuracy (*applicable to the project*)

Measured Variable	Reported Accuracy
Space Temperature	±1°F
Ducted Air	±2°F
Outside Air	±2°F
Water Temperature	±1°F
Delta –T	±0.25°F
Relative Humidity	±5% RH
Water Flow	±5% of full scale
Air Flow (terminal)	±10% of reading
Air Flow (measuring stations)	±5% of reading
Air Pressure (ducts)	±0.1 "W.G.
Air Pressure (space)	±0.01 "W.G.
Water Pressure	±2% of full scale *Note 1
Electrical Power	5% of reading *Note 2
Carbon Monoxide (CO)	± 50 PPM
Carbon Dioxide (CO2)	± 50 PPM

Note 1: for both absolute and differential pressure

Note 2: * not including utility supplied meters

1.13 WARRANTY REQUIREMENTS

A. Warranty all work as follows:

1. BAS system labor and materials shall be warranted free from defects for a period of twelve (12) months after final completion acceptance by the Owner. BAS failures during the warranty period shall be adjusted, repaired, or replaced at no charge to the Owner. The BAS manufacturer shall respond to the Owner's request for warranty service within 24 hours of the initiated call and will occur during normal business hours.
2. At the end of the final start-up/testing, if equipment and systems are operating satisfactorily to the Owner and Engineer, the Owner shall sign certificates certifying that the BAS is operational, and has been tested and accepted in accordance with the terms of this specification. The date of Owner's acceptance shall be the start of the warranty period.
3. Operator workstation software, project specific software, graphics, database, and firmware updates shall be provided to the Owner at no charge during the warranty period. Written authorization by the Owner must be granted prior to the installation of these updates.
4. The BAS manufacturer shall provide a web-accessible Users Network for the proposed System and give the Owner free access to question/answer forum, user tips, upgrades, and training schedules for a one year period of time correlating with the warranty period.

1.14 SYSTEM MAINTENANCE

- A. Perform Building Automation System preventative maintenance and support for a period of 1 year (beginning the date of substantial completion).
 - 1. Make a minimum of 2 complete Building Automation System inspections, in addition to normal warranty requirements. Inspections to include:
 - a) System Review – Review the BAS to correct programming errors, failed points, points in alarm, and points that have been overridden manually.
 - b) Seasonal Control Loop Tuning – Control loops are reviewed to reflect changing seasonal conditions and/or facility heating and cooling loads.
 - c) Sequence of operation verification – Systems all verified to be operating as designed and in automatic operation. Scheduling and setpoints are reviewed and modified.
 - d) Database back-up
 - e) Operator coaching
 - 2. Technician shall review critical alarm log and advise owner of additional services that may be required.
 - 3. Technician shall provide a written report to owner after each inspection.
- B. Do not assign or transfer maintenance service to agent or subcontractor without prior written consent of owner.

1.15 OWNERSHIP OF PROPRIETARY MATERIAL

- A. Project specific software and documentation shall become the owner's property upon project completion.

1.16 SEQUENCE OF OPERATION

- A. Unit Shut Down
 - 1. All units connected to FACP shall be shut down in the event of fire. (By EC via fire alarm system).
 - 2. All units with low limit controllers (freezestats) shall be shut down if supply air temperature drops below 35°F. Shut down includes closing OA dampers, shut down fan, open control valve (or face damper).
 - 3. All low limit controls shall be hard wired to break fan controls. Wiring low limit through DDC is not permitted to break fan controls. Wiring from LC-1 to DDC system is for alarm purposes only.
 - 4. When low limit control is activated, send auxiliary alarm signal to DDC unit controller. DDC system shall annunciate alarm condition.
 - 5. **All temperature control valves and dampers will be spring return and shall fail to the "Safe" position for that system.**

6. **Bypass valve application will be size for 50% of the pump capacity of that system.**
- B. Remote Monitoring:
1. Provide all software necessary to monitor all sensors, equipment status and alarm conditions at operate workstation and local second tier controllers.
 2. Provide all software necessary to recognize, process and record alarm conditions as required by Owner.
- C. Occupied/Unoccupied Cycle:
1. Each system with DDC controls shall function as an individual D/N zone with individual event times for start/stop.
 2. Stagger initial start times to prevent simultaneous occupied cycle activation for all equipment.
 3. In unoccupied cycle, when room sensor override button is pushed, start software timer (setpoint 2 hours) to provide Day (occupied) cycle for a software selectable period of time after which system reverts to Night (unoccupied) cycle.
 4. While software timer is operating ignore additional override switch signals. System shall ignore switch signals initiated when area is in occupied cycle.
- D. Morning Warm-Up: Provide software routine to initiate morning warm-up when outdoor conditions dictate, warm-up schedule shall be adaptive (i.e. optimize energy usage). During morning warm-up for classrooms and shop areas with motion detector, the detector is overridden until room occupied temperature setpoint is reached, duration (2) hours (adjustable).
- E. Refer to drawings for unit specific sequences.

PART 2 – PRODUCTS

2.01 GENERAL DESCRIPTION

- A. The Building Automation System (BAS) shall use us an open BACnet architecture and DDC controllers that are certified by BACnet Testing Laboratories (BTL) with the appropriate classifications. The BAS shall be capable to integrae to third-party devices and applications. The system shall be for use on the the Internet, or intranets using off the shelf, industry standard technology compatible with the owner provided network.
- B. The Building Automation System (BAS) shall consist of the following:
1. BACnet Testing Laboratories Certified Controllers
 2. Portable Operator Terminal(s)
 3. Networking processing, data storage, and communications equipment
 4. Other controls components required for a complete and working BAS
- C. The Building Automation System (BAS) shall be modular in nature, and shall permit expansion of both capacity and functionality through addition of sensors, controllers, actuators, and operator devices, whilre reusing existing controls equipment.

2.02 BAS ARCHITECTURE

A. Communication Network

1. This project shall be comprised of a high speed Ethernet network utilizing BACnet/IP communications between System Controllers and Workstations. Each System Controller shall function as a BACnet Router to each unit controller providing a unique BACnet Device ID for all controllers within the system. Communications between System Controllers and sub-networks of Custom Application Controllers and/or Application Specific Controllers shall be as defined below.
2. Each System Controller shall perform communications to a network of Custom Application and Application Specific Controllers using BACnet/Zigbee (802.15.4) as defined by the Zigbee Standard.
 - a) Each communication interface shall be Zigbee Building Automation Certified product as defined by the BACnet Standard and the Zigbee Alliance.
 - b) Each System Controller shall function as a BACnet Router to each unit controller providing a unique BACnet Device ID for all controllers within the system.
 - c) Wireless equipment controllers and auxiliary control devices shall conform to:
 - (1) IEEE 802.15.4 radios to minimize risk of interference and maximize battery life, reliability, and range.
 - (2) Communication between equipment controllers shall conform to ZigBee Building Automation (ZBA) standard as BACnet tunneling devices to ensure future integration of other ZBA certified devices.
 - (3) Operating range shall be a minimum of 200 feet (60 m); open range shall be 2,500 ft. (762 m) with less than 2% packet error rate.
 - (4) To maintain robust communication, mesh networking and two-way communications shall be used to optimize the wireless network health.
 - (5) Wireless communication shall be capable of many-to-one sensors per controller to support averaging, monitoring, and multiple zone applications.
 - (6) Certifications shall include FCC CFR47 - RADIO FREQUENCY DEVICES - Section 15.247 & Subpart E.
3. Each System Controller shall perform communications to a network of Custom Application and Application Specific Controllers using BACnet/MSTP (RS485) as defined by the BACnet standard.

B. Integrator Panel:

1. The BAS System shall include appropriate hardware equipment and software to allow bi-directional data communications between the BAS and the 3rd Party manufacturers' control panels. The BAS shall receive, react to, and return information from multiple building systems, including equipment manufacturers' integral packaged controls that do not have the BACnet protocol.
2. All data required by the application shall be mapped into the BAS database, and shall be transparent to the operator.
3. Point inputs and outputs from the third-party controllers shall have real-time interoperability with the BAS such as: Control Software, Energy Management, Custom Process Programming, Alarm Management, Historical Data and Trend Analysis, and Local Area Network Communications.

BACNET Protocol Integration:

4. The neutral protocol used between systems will be BACnet and must comply with the ASHRAE BACnet standard 135.
 5. A complete Protocol Implementation Conformance Statement (PICS) shall be provided for all BACnet system devices.
 6. The ability to command, share point object data, change of state data, and schedules between the host and BACnet systems shall be provided.
- C. The Controls Contractor shall provide all communication media, connectors, repeaters and network switches routers necessary for the high speed Ethernet communications network.

2.03 OPERATOR USER INTERFACE

- A. Furnish 1 PC based operator interface as shown on the system drawings. Each operator web interface shall be able to access all information in the system. Operator interfaces shall reside on the same dedicated high-speed IP network as the System Controller(s).
1. Each operator interface PC shall include the following:
 - a) Hardware type
 - (1) PC or Laptop
 - b. Minimum Hardware
 - (1) Pentium Core 2 DUO or better
 - (2) 4 GB RAM
 - (3) 100 GB hard drive space
 - c. Internet Browser compatibility outlined in the following sections.
- B. Operator web interface
1. The operator web interface shall be accessible via a web browser without requiring any “plug-ins” (i.e. JAVA Runtime Environment (JRE), Adobe Flash).
 2. The operator web interface shall support the following Internet web browsers:
 - a) Internet Explorer 11.0+
 - b) Firefox 47.0+
 - c) Chrome 51.0+
 3. System Security
 - a) Each operator shall be required to login to the system with a user name and password in order to view, edit, add, or delete data.
 - b) User Profiles shall restrict the user to only the objects, applications, and system functions as assigned by the system administrator.
 - c) Each operator shall be allowed to change their user password.
 - d) The System Administrator shall be able to manage the security for all other users.
 - e) The system shall include pre-defined “roles” that allow a system administrator to quickly assign permissions to a user.

- f) User logon/logoff attempts shall be recorded.
 - g) The system shall protect itself from unauthorized use by automatically logging off following the last keystroke. The delay time shall be user definable.
 - h) All system security data shall be stored in an encrypted format.
 - i) The system shall support Active Directory for user set-up and management.
 - j) The system shall track and record all user log-in activity and all changes done at the enterprise level including who made the change, when, what was changed, previous value and new value.
4. Database
- a) Database Save: A system operator with the proper password clearance shall be able to archive controller back-ups on the designated Enterprise operator web interface PC.
 - b) Database Restore: The system operator shall also be able to clear a panel database and manually initiate a download of a specified database to any panel in the system.
 - c) Database Limits. The system operator shall have the ability to set limits on Alarm Log, Global Point Control Log, System Log, and User Change Log to manage database size.
5. On-line Help and Training
- a) Provide a context sensitive, on line help system to assist the operator in operation and configuration of the system.
 - b) On-line help shall be available for all system functions and shall provide the relevant data for each particular screen.
6. System Diagnostics
- a) The system shall automatically monitor the operation of all network connections, building management panels, and controllers
 - b) The failure of any device shall be annunciated to the operators.
7. Customizable Navigation Tree
- a) The Enterprise operator web interface shall include a fully customizable navigation tree that shall allow an operator to do the following:
 - (1) Move and edit any of the nodes of the tree.
 - (2) Move entire groups to any area of the tree
 - (3) Change the name of any node in the tree
 - (4) Create custom nodes for any page in the web interface including graphics, data log views, schedules, and dashboards.
 - (5) Support navigation from multi-building to single building view.
 - (6) Provide the ability to assign graphics to any node in the tree.
 - (7) Ability to create folders and assign and change hierarchy of nodes of the tree.

8. Equipment & Application Pages
 - a) The Enterprise operator web interface shall include standard pages for all equipment and applications. These pages shall allow an operator to obtain information relevant to the operation of the equipment and/or application, including:
 - (1) Animated Equipment Graphics for each major piece of equipment and floor plan in the System.
 - (2) Alarms relevant to the equipment or application without requiring a user to navigate to an alarm page and perform a filter.
 - (3) Historical Data (As defined in Data Log section below) for the equipment or application without requiring a user to navigate to a Data Log page and perform a filter.
 - (4) View of all custom graphical programming for supported controllers in real time.
 - (5) View and management of all points for equipment and applications.
 - (6) Support documents that have been assigned for that equipment.
 - (7) Live data view for any selected points.
 - (8) Touch friendly design for all action buttons, navigation, and spacing.
9. System Graphics. Enterprise operator web interface shall be graphically based and shall include at least one graphic per piece of equipment or occupied zone, graphics for each chilled water and hot water system, and graphics that summarize conditions on each floor of each building included in this contract. Indicate thermal comfort on floor plan summary graphics using colors to represent zone temperature relative to zone set point.
 - a) Functionality. Graphics shall allow operator to monitor system status, to view a summary of the most important data for each controlled zone or piece of equipment, to use point and-click navigation between zones or equipment, and to edit set points and other specified parameters.
 - b) Graphic imagery – graphics shall use 3D images for all standard and custom graphics. The only allowable exceptions will be photo images, maps, schematic drawings, and selected floor plans.
 - c) Animation. Graphics shall be able to animate by displaying different Image lies for changed object status.
 - d) Alarm Indication. Indicate areas or equipment in an alarm condition using color or other visual indicator.
 - e) Format. Graphics shall be saved in an industry-standard format such as BMP, JPEG, PNG, or GIF. Web-based system graphics shall be viewable on browsers compatible with World Wide Web Consortium browser standards. Web graphic format shall require no plug-in (such as HTML and JavaScript) or shall only require widely available no-cost plug-ins (such as Active-X and Macromedia Flash).
10. Custom Graphics
 - a) The operator interface shall be capable of displaying custom graphics in order to convey the status of the facility to its operators.
 - b) Graphical Navigation. The Enterprise operator web interface shall provide dynamic color graphics of building areas, systems and equipment.

- c) Graphical Data Visualization. The Enterprise operator web interface shall support dynamic points including analog and binary values, dynamic text, static text, and animation files.
 - d) Custom background images. Custom background images shall be created with the use of commonly available graphics packages such as Adobe Photoshop. The graphics generation package shall create and modify graphics that are saved in industry standard formats such as GIF and JPEG.
- 11. Graphics Library. Furnish a library of standard MECHANICAL equipment such as chillers, air handlers, terminals, fan coils, unit ventilators, rooftop units, and VAV boxes, in 3-dimensional graphic depictions. The library shall be furnished in a file format compatible with the graphics generation package program.
- 12. Document Support. The Enterprise operator web interface shall support the ability to import support files into a support files library.
 - a) Imported support files can include the following types of document formats: pdf, docx, xlsx, pptx, jpeg, tif, bmp, png, jpg, gif.
 - b) All imported support files can be associated directly with equipment or family types that can then be accessed directly from standard pages.
- 13. Manual Control and Override
 - a) Point Control. Provide a method for a user to view, override, and edit if applicable, the status of any object and property in the system. The point status shall be available by menu, on graphics or through custom programs.
 - b) Temporary Overrides. The user shall be able to perform a temporary override wherever an override is allowed, automatically removing the override after a specified period of time.
 - c) Override Owners. The system shall convey to the user the owner of each override for all priorities that an override exists.
 - d) Provide a specific icon to show timed override or operator override, when a point, unit controller or application has been overridden manually.
 - e) Global Point Control. Provide a method for a user to view, override, and edit if applicable, the status of multiple object and properties in the system. The point status shall be available by menu, on graphics or through custom programs.
- 14. Engineering Units
 - a) Allow for selection of the desired engineering units (i.e. Inch pound or SI) in the system.
 - b) Unit selection shall be able to be customized by locality to select the desired units for each measurement.
- 15. Scheduling. A user shall be able to perform the following tasks utilizing the Enterprise operator web interface:
 - a) Create a new schedule, defining the default values, events and membership.
 - b) Create expectations to a schedule for any given day.

- c) Apply an exception that spans a single day or multiple days.
- d) View a schedule by day, week and month.
- e) Exception schedules and holidays shall be shown clearly on the calendar.
- f) Modify the schedule events, members and exceptions.
- g) Create schedules and exceptions for multiple buildings.
- h) Apply emergency schedule to multiple buildings
- i) Drag and drop scheduling editing
- j) Global schedule and exceptions across multiple buildings

16. Time of day scheduling

- a) Individual time schedules shall be provided for all areas and as listed below. The schedules for each area shall operate independently and shall be configured to meet the requirements of the Owner. The start time of each area shall be configured with optimum start times software functions, stop times shall follow a simple off time schedule.

Areas	Approx. Occupied Time
Office Areas	06:30 - 17:00
Classroom	07:00 - 15:00
Library	07:00 - 15:00
Toilet Room Exhaust Fans	06:00 - 20:00
Gymnasium	09:00 - 15:00
Auditorium	09:00 - 15:00
Kitchen	06:00 - 1500
Open Area	07:00 - 17:00

Note: General equipment associated with a particular area shall follow the area start/stop time schedule (i.e. – classroom general exhaust fans shall stop @ 15:00).

17. Data Logs

- a) Data Logs Definition
 - (1) The Enterprise operator web interface shall allow a user with the appropriate security permissions to define a Data Log for any data in the system.
 - (2) The Enterprise operator web interface shall allow a user to define any Data Log options as described in the Application and Control Software section.
 - (3) Data Log viewing capabilities shall include the ability to show a minimum of 5 points on a chart.
 - (4) Each data point data line shall be displayed as a unique color.
 - (5) Data points can be hidden on the display view by clicking on the point.
 - (6) The operator shall be able to specify the duration of historical data to view by scrolling, zooming, or selecting from a pull down list.
 - (7) The system shall provide a graphical trace display of the associated time stamp and value for any selected point along the x-axis.
 - (8) Operator will have the ability to show alarms and overrides on any data log view.

- b) Export Data Logs
 - (1) The Enterprise operator web interface shall allow a user to export Data Log data in CSV, xlsx or text format for use by other industry standard word processing and spreadsheet packages.
- C. Central Server – Components (Provide server as required)
 - 1. The central physical or virtual server shall consist of the following (minimum):
 - 2. System shall utilize a server class PC, tower or rack mounted.
 - 3. Two 3.0 GHz, Quad Core
 - 4. 8GB, DDR266 SDRAM memory
 - 5. Hard Drive 73 GB
 - 6. RAID 5 (recommended)
 - 7. Microsoft Windows Server 2012/2014
 - 8. Microsoft SQL Server 2008/2012
 - 9. No Exception Taken Framework V3.5, 4.0
 - 10. TCP/IP Interface
- D. The central server shall provide the following applications within the system.
 - 1. Trend Log Application
 - a) The system shall automatically harvest trend logs for defined key measurements for each controlled MECHANICAL device and MECHANICAL application.
 - b) The automatic trend logs shall monitor these parameters for a minimum of 30 days at 15 minute intervals. The automatic trend logs shall be user adjustable.
 - 2. Site Management
 - a) The system must allow for grouping of the many sites in an enterprise in a logical manner.
 - b) The system shall provide a search function to allow users to search for sites or groups of sites by name or partial names.
 - c) The system must provide the necessary means to add, remove, and manage site.
 - 3. Automatic System Database Save and Restore
 - a) The central server shall store on the hard disk backup tables of data including trends, alarms, custom settings and user profiles.
 - b) The data shall be backed up once a day.
 - c) This database shall be updated whenever a change is made in the system.
 - d) The storage of this data shall be automatic and not require operator intervention.
 - e) This capability is completed through SQL scheduled automated tasks for backup and only available in full SQL, and not SQL Express.
 - 4. Manual Database Save and Restore. A system operator with the proper password clearance shall be able to archive the database manually at any time.
 - 5. System Configuration. The central server shall serve web pages as the interface for configuring the operator-level functions of the system. A user with proper security shall be able to configure the system to allow for future changes or additions.

- E. Portable Operator's Terminal P.O.T (where indicated).: (Intended for portable field diagnostic tool.) Provide laptop computer with terminal emulation software to interface with DDC panels. Computer shall be Windows platform with latest stable windows operating system (Windows 8.1) integral pointing device. Furnish unit with all interface cards, cables, and software necessary to operate with DDC communications network, and to communicate directly with unit control panels. Furnish with (2) sets interface cables. Provide Windows 8.1 software. Schedule of laptop computer requirements:

Processing Chip	Pentium N3540, 2.5 GHz
RAM Memory	4 GB
Hard Drive	500 GB 5400 RPM
Two USB	USB 2.0 Ports and 3.0 Ports
Display	15" LED True Life HD
Video	HDMI Port
Sound	Maxx Audio
LAN Comm.	Ethernet Communications Board, 3COMM; or equal
Wireless Card	3-1 Memory Card Reader

- F. Furnish the following applications software for building and energy management. All software applications shall reside and run in the system controllers. Editing of applications shall occur at the building operator interface.
1. Scheduling. Provide the capability to schedule each object or group of objects in the system based off of the owner's request. Each of these schedules shall include the capability for start, stop, optimal start, optimal stop, and night economizer actions. Each schedule may consist of up to [10] events. When a group of objects are scheduled together, provide the capability to define advances and delays for each member. Each schedule shall consist of the following:
 - a) Weekly Schedule. Provide separate schedules for each day of the week.
 - b) Exception Schedules. Provide the ability for the operator to designate any day of the year as an exception schedule. This exception schedule shall override the standard schedule for that day. Exception schedules may be defined up to a year in advance. Once an exception schedule is executed it will be discarded and replaced by the standard schedule for that day of the week.
 - c) Holiday Schedules. Provide the capability for the operator to define up to 99 special or holiday schedules. These schedules may be placed on the scheduling calendar and will be repeated each year. The operator shall be able to define the length of each holiday period.
 - d) Optimal Start. The scheduling application outlined above shall support an optimal start algorithm. This shall calculate the thermal characteristics of a zone and start the equipment prior to occupancy to achieve the desired space temperature at the specified occupancy time. The algorithm shall calculate separate sets of heating and cooling rates for zones that have been unoccupied for less then and greater than 24 hours. Provide the ability to modify the start algorithm based on outdoor air temperature. Provide an early start limit in minutes to prevent the system from starting before an operator determined time limit.
 2. Trend Log Application
 - a) Trend log data shall be sampled and stored on the System Controller panel and shall capable of being archived to a BACnet Workstation for longer term storage.
 - b) Trend logs shall include interval, start-time, and stop-time.

- c) Trend log intervals shall be configurable as frequently as 1 minute and as infrequently as 1 year.
- 3. Trend Logs
 - a) The system controller shall create trend logs for defined key performance indicators for each controlled MECHANICAL device and MECHANICAL application.
 - b) The trend logs shall monitor these parameters for a minimum of 7 days at 15 minute intervals. The automatic trend logs shall be user adjustable.
- 4. Alarm/Event Log
 - a) Any object in the system shall be configurable to generate an alarm when transitioning in and out of a normal or fault state.
 - b) Any object in the system shall allow the alarm limits, warning limits, states, and reactions to be configured for each object in the system.
 - c) An alarm/event shall be capable of triggering any of the following actions:
 - (1) Route the alarm/event to one or more alarm log
 - (2) The alarm message shall include the name of the alarm location, the device that generated the alarm, and the alarm message itself.
 - (3) Route an e-mail message to an operator(s).
 - (4) Log a data point(s) for a period of time.
 - (5) Run a custom control program.
- 5. Point Control. User shall have the option to set the update interval, minimum on/off time, event notification, custom programming on change of events.
- 6. Timed Override. A standard application shall be utilized to enable/disable temperature control when a user selects on/cancel at the zone sensor, building operator interface, or the local operator display. The amount of time that the override takes precedence will be selectable from the building operator interface.
- 7. Anti-Short Cycling. All binary output points shall be protected from short cycling.
- 8. Alarm/Event Notification:
 - a) An operator shall be notified of new alarms/events as they occur while navigating through any part of the system via an alarm icon.
 - b) The operator will have the option of selecting an audible alarm notification for all alarm classes they subscribe to.
 - c) The system operator will have the option of setting specific times and days that that they will receive alarm notifications.
 - d) Provide software alarm points as listed below and as required by the Owner. Contractor shall meet with the Owner to include additional alarm point annunciation as requested by the Owner.

Point	Alarm Function
Hardware	Communication Failure Hardware Failure
Space Temperature	Out of Limits ($\pm 5^{\circ}$ from setpoint)
Duct Air Temperature	Out of Limits ($\pm 10^{\circ}$ from setpoint)
Water Flow Switch	Loss of Flow
Air Flow Switch	Loss of Flow
Water Temperature	Out of Limits ($\pm 10^{\circ}$ from setpoint)
Freeze Stat	Report Freeze Condition
Current Flow Switch	Loss of Current (Fan/Pump)

9. User Change Log. The operator shall be able to view all logged user changes in the system from any Enterprise operator web interface.
 - a) An operator shall be able to group user changes by: date, affected, date & affected, user, date & user, transaction type, date & transaction type, or sort only.
 - b) The operator will have the option of additional filtering capability of: date, transaction, type, user, affected, and details that can be used individually or in conjunction with other filters.

2.04 BUILDING CONTROLLERS

- A. There shall be one or more independent, standalone microprocessor based System Controllers to manage the global strategies described in Application and Control Software section.
 1. The System Controller shall have sufficient memory to support its operating system, database, and programming requirements.
 2. The controller shall provide a USB communications port for connection to a PC.
 3. The operating system of the Controller shall manage the input and output communications signals to allow distributed controllers to share real and virtual point information and allow central monitoring and alarms.
 4. All System Controllers shall have a real time clock.
 5. Data shall be shared between networked System Controllers.
 6. The System Controller shall continually check the status of its processor and memory circuits. If an abnormal operation is detected, the controller shall.
 - a) Assume a predetermined failure mode.
 - b) Generate an alarm notification.
 - c) Create a retrievable file of the state of all applicable memory locations at the time of the failure.
 - d) Automatically reset the System Controller to return to a normal operating mode.
 7. Environment. Controller hardware shall be suitable for the anticipated ambient conditions. Controller used in conditioned ambient shall be mounted in an enclosure, and shall be rated for operation at -40°C to 50°C [-40°F to 122°F].

8. Clock Synchronization:
 - a) All System Controllers shall be able to synchronize with a NTP server for automatic time synchronization.
 - b) All System Controllers shall be able to accept a BACnet time synchronization command for automatic time synchronization.
 - c) All System Controllers shall automatically adjust for daylight savings time if applicable.
9. Serviceability
 - a) Provide diagnostic LEDs for power, communications, and processor.
 - b) The System Controller shall have a display on the main board that indicates the current operating mode of the controller.
 - c) All wiring connections shall be made to field removable, modular terminal connectors.
 - d) The System controller shall utilize standard DIN mounting methods for installation and replacement.
10. Memory. The System Controller shall maintain all BIOS and programming information indefinitely without power to the System controller.
11. Immunity to power and noise. Controller shall be able to operate at 90% to 110% of nominal voltage rating and shall perform an orderly shut-down below 80% nominal voltage.
12. BACnet Test Labs (BTL) Listing. Each System Controller shall be listed as a Building Controller (B-BC) by the BACnet Test Labs with a minimum BACnet Protocol Revision of 14.

2.05 ADVANCED APPLICATION CONTROLLERS

- A. Advance Application Controllers shall be used to control all equipment or applications of medium and high complexity, including but not limited to Air Handlers, Boiler Plants and Chiller Plants.
- B. For Stand-Alone Operation of Advanced Application Controllers:
 1. Shall operate a schedule in a standalone application using a Real Time Clock with a 7 day power backup.
 - a) The Controller shall have a built in schedule (assessable with or without a display).
 - b) Support will be for at least 3 schedules with up to 10 events for each day of the week.
 - c) Each of the 3 schedules can be Analog, Binary or Multi-State.
 - d) The controller shall support a minimum of 25 exceptions each with up to 10 events.
- C. For ease of troubleshooting, the Controller shall support data trend logging.
 1. 25,000 samples minimum

2. Trends shall be capable of being collected at a minimum sample rate of once every second.
 3. Trends shall be capable of being scheduled or triggered.
- D. To meet the sequence of operation for each application, the Controller shall use library programs provided by the controller manufacturer that are either factory loaded or downloaded with service tool to the Controller.
- E. Environment. Controller hardware shall be suitable for the anticipated ambient conditions.
1. Storage conditions:
 - a) Temperature: -67°F to 203°F (-55°C to 95°C).
 - b) Humidity: Between 5% to 100% RH (non-condensing).
 2. Operating conditions:
 - a) Temperature: -40°F to 158°F (-40°C to 70°C)
 - b) Humidity: Between 5% to 100% RH (non-condensing).
 3. Controllers used indoors shall be mounted in a NEMA 1 enclosure at a minimum.
 4. Controllers used outdoors and/or in wet ambient shall be mounted within NEMA 4 type waterproof enclosures, and shall be rated for operation at -40° F to 158° F [-40° C to 70° C].
- F. Input/Output: The Controller shall have on board or through expansion module all I/O capable of performing all functionality needed for the application. Controls provided by the equipment manufacture must supply the required I/O for the equipment. In addition other controls must meet the following requirements.
1. Shall support flexibility in valve type, the controllers shall be capable of supporting the following valve control types: 0-10VDC, 0-5VDC, 4-20mA, 24VAC - 2 position.
 2. Shall support flexibility in sensor type, the Controller shall be capable of reading sensor input ranges of 0 to10V, 0 to 20mA, 50ms or longer pulses, 200 to 20Kohm and RTD input.
 3. Shall support flexibility in sensor type, all Analog Outputs shall have the additional capability of being programmed to operate as Universal Inputs or Pulse Width Modulation Outputs.
 4. Shall support flexibility in sensor type, the Controller and/or expansion modules shall support dry and wetted (24VAC) binary inputs.
 5. The controller shall support pulse accumulator for connecting devices like energy meters.
 6. In order to support a wide range of devices, the Controller's binary output shall be able to drive at least 10VA each.
 7. Any unused I/O that is not needed for the functionality of the equipment shall be available to be used by custom programs on the Controller and by any other controller on the network.
 8. The Controller shall provide 24VAC and 24VDC power terminals sensors and other devices required.
 9. The Controller shall provide a dedicated static pressure input.

- G. Input/Output Expandability – The Controller shall provide the following functionality in order to meet current and future application needs:
1. For the application flexibility, the Controller shall be capable of expanding to a total of at least 100 hardware I/O terminations.
 2. Expansion I/O can be mounted up to 650 ft. (200m) from control.
 3. Expansion I/O can be added in as small as 4 point increments.
 4. To keep BACnet network traffic to a minimum, expansion I/O must communicate via an internal controller communication bus.
- H. Serviceability – The Controller shall provide the following in order to improve serviceability of the Controller.
1. Diagnostic LEDs for power/normal operation/status, BACnet communications, sensor bus communications, and binary outputs. All wiring connections shall be clearly labeled and made to be field removable.
 2. Binary and analog inputs and outputs shall use removable connectors or be connected to terminal strip external to the control box.
 3. Software service tool connection through all of the following methods: direct cable connection to the Controller, connection through another controller on BACnet link and through the Controller's zone sensor.
 4. For safety purposes, the controller shall be capable of being powered by a portable computer's USB port for the purposes of configuration, programming and testing programs so that this work can be accomplished with the power off to the associated equipment.
 5. The Controller software tool service port shall utilize standard off-the-shelf USB printer cable.
 6. Capabilities to temporarily override the BACnet point values with built-in time expiration in the Controller.
 7. To aid in service replacement, the Controller shall easily attached to standard DIN rail mounting.
 8. For future expansion, the Controller shall be capable of adding sequence of operation programming utilizing service tools software with a graphical programming interface (editing or programming in line code is not permissible).
 9. To aid in service replacement, the Controller shall allow for setting its BACnet address via controller mounted rotary switches that correspond to the numerical value of the address. (DIP switch methodologies are not allowed). Setting of the address shall be accomplished without the need of a service tool or power applied to the controller.
 10. Controller data shall be maintained through a power failure.
- I. Software Retention: All Controller operating parameters, setpoints, BIOS, and sequence of operation code must be stored in non-volatile memory in order to maintain such information for months without power.

- J. Transformer for the Controller must be rated at minimum of 115% of ASC power consumption, and shall be fused or current limiting type. 24 VAC, +/- 15% nominal, 50-60 Hz, 24 VA plus binary output loads for a maximum of 12 VA for each binary output.
- K. Controller must meet the following Agency Compliance:
 - 1. UL916 PAZX, Open Energy Management Equipment
 - 2. UL94-5V, Flammability
 - 3. FCC Part 15, Subpart B, Class B Limit
 - 4. BACnet Testing Laboratory (BTL) Listed.
- L. A Local Operator Touch Sensitive Display shall be provided for Central Plant and Air Handler Controllers at building locations where specified in the sequence of operations or point list.

2.06 APPLICATION-SPECIFIC CONTROLLERS

- A. Application Specific Controllers (ASC) shall be microprocessor-based DDC controllers which, through hardware or firmware design, control specified equipment. They are not user programmable, but are customized for operation within the confines of the equipment they are designed to serve.
 - 1. Application Specific Controller are only allowed when both the following are met.
 - a) The equipment is compressor based or boiler based.
 - b) The controller is provided by the equipment manufacturer and warrantied as part of the equipment.
- B. Zone Controllers are controllers that operate equipment that control the space temperature of single zone. Examples are controllers for VAV, Fan coil, Blower Coils, Unit Ventilators, Heat Pumps, and Water Source Heat Pumps.
 - 1. Software
 - a) To meet the sequence of operation for each zone control, the controller shall use programs developed and tested by the controller manufacturer that are either factory loaded or downloaded with service tool to the controller.
 - b) Stand-Alone Operation: Each piece of equipment specified in section "A" shall be controlled by a single controller and provide stand-alone control in the event of communication failure. In case of communications failure stand-alone operation shall use default values or last values for remote sensors read over the network such as outdoor air temperature.
 - c) For controlling ancillary devices and for flexibility to change the sequence of operation in the future, the controller shall be capable running custom programs written in a graphical programming language.
 - 2. Environment: Controller hardware shall be suitable for the anticipated ambient conditions.
 - a) Storage: -55° to 203° F and 5 to 95% Rh, non-condensing.
 - b) Operating: -40° to 158° F and 5 to 95% Rh, non-condensing.
 - c) Controllers used indoors shall be mounted in a NEMA 1 enclosure at a minimum.

- d) Controllers used outdoors and/or in wet ambient shall be mounted within NEMA 4 type waterproof enclosures, and shall be rated for operation at -40° to 158° F.
3. Input/Output:
- a) For flexibility in selection and replacement of valves, the controllers shall be capable of supporting all of the following valve control types 0-10VDC, 0-5VDC, 4-20mA, 24VAC floating point, 24VAC - 2 position (Normally Open or Normally Closed).
 - b) For flexibility in selection and replacement of sensors, the controllers shall be capable of reading sensor input ranges of 0 to 10V, 0 to 20mA, pulse counts, and 200 to 20Kohm.
 - c) For flexibility in selection and replacement of binary devices, the controller shall support dry and wetted (24VAC) binary inputs.
 - d) For flexibility in selection and replacement devices, the controller's shall have binary output which are able to drive at least 12VA each.
 - e) For flexibility in selection and replacement of motors, the controller shall be capable of outputting 24VAC (binary output), DC voltage (0 to 10VDC minimum range) and PWM (in the 80 to 100 Hz range).
 - f) For future needs, any I/O that is unused by functionality of equipment control shall be available to be used by custom program on the controller and by another controller on the network.
 - g) For future expansion and flexibility, the controller shall have either on board or through expansion, 20 hardware input/output points. Expansion points must communicate with the controller via an internal communications bus. Expansion points must be capable of being mounted up to 650ft. (200 m) from the controller. Expansion points that require the BACnet network for communication with the controller are not allowed.
4. Serviceability – The controller shall provide the following in order to improve serviceability of the controller.
- a) Diagnostic LEDs shall indicate correct operation or failures/faults for all of the following: power, sensors, BACnet communications, and I/O communications bus.
 - b) All binary output shall have LED's indicating the output state.
 - c) All wiring connectors shall removable without the use of a tool.
 - d) Software service tool connection through all of the following methods: direct cable connection to the controller, connection through another controller on BACnet link and through the controller's zone sensor.
 - e) For safety purposes, the controller shall be capable of being powered by a portable computer for the purposes of configuration, programming, and testing programs so that this work can be accomplished with the power off to the equipment.
 - f) Capabilities to temporarily override of BACnet point values with built-in time expiration in the controller.
 - g) BACnet MAC Address shall be set using decimal (0-9) based rotary switches.
 - h) Configuration change shall not be made in a programming environment, but rather by a configuration page utilizing dropdown list, check boxes, and numeric boxes.
 - i) BACnet trending objects resident on controller.
 - (1) Minimum of 20,000 trending points total on controller

- (2) Shall be capable of trending all BACnet points used by controller
 - (3) Shall be capable of 1 second sample rates on all points
5. Software Retention: All Zone Controller operating parameters, setpoints, BIOS, and sequence of operation code must be stored in non-volatile memory in order to maintain such information for months without power.
 6. Transformer for the controller must be rated at minimum of 115% of ASC power consumption, and shall be fused or current limiting type. 24 VAC, +/- 15% nominal, 50-60 Hz, 24 VA plus binary output loads, for a maximum of 12 VA for each binary output.
 7. Agency Approval: The controller shall have meet the Agency Compliance:
 - a) UL916 PAZX, Open Energy Management Equipment
 - b) UL94-5V, Flammability
 - c) FCC Part 15, Subpart B, Class B Limit

2.07 INPUT / OUTPUT INTERFACE

- A. Hardwired inputs and outputs may tie into the system through building, custom application, or ASCs.
- B. All input points and output points shall be protected such that shorting of the point to itself, to another point, or to ground will cause no damage to the controller. All input and output points shall be protected from voltage up to 24V of any duration, such that contact with this voltage will cause no damage to the controller.
- C. Binary inputs shall allow the monitoring of on/off signals from remote devices. The binary inputs shall provide a wetting current of at least 12 mA to be compatible with commonly available control devices and shall be protected against the effects of contact bounce and noise. Binary inputs shall sense "dry contact" closure without external power (other than that provided by the controller) being applied.
- D. Pulse accumulation input objects. This type of object shall conform to all the requirements of binary input objects and also accept up to 10 pulses per second for pulse accumulation.
- E. Analog inputs shall allow the monitoring of low voltage (0 to 10 VDC), current (4 to 20 mA), or resistance signals (thermistor, RTD). Analog inputs shall be compatible with and field configurable to commonly available sensing devices.
- F. Binary outputs shall provide for on/off operation or a pulsed low-voltage signal for pulse width modulation control. Binary outputs on building and custom application controllers shall have status lights. Outputs shall be selectable for either normally open or normally closed operation.
- G. Analog outputs shall provide a modulating signal for the control of end devices. Outputs shall provide either a 0 to 10VDC or a 4 to 20 mA signal as required to provide proper control of the output device. Analog outputs shall not exhibit a drift of greater than 0.4% of range per year.
- H. Tri-State Outputs. Provide tri-state outputs (two coordinated binary outputs) for control of three-point floating type electronic actuators without feedback. Use of three-point floating devices shall be limited to zone control and terminal unit control applications (VAV terminal units, duct-mounted heating coils, zone dampers, radiation, etc.). Control algorithms shall run the zone actuator to one end of its stroke once every 24 hours for verification of operator tracking.
- I. System Object Capacity. The system size shall be expandable to at least twice the number of input/output objects required for this project. Additional controllers (along with associated devices and

wiring) shall be all that is necessary to achieve this capacity requirement. The operator interfaces installed for this project shall not require any hardware additions or software revisions in order to expand the system.

2.08 POWER SUPPLIES

- A. Control transformers shall be UL listed. Furnish Class 2 current-limiting type or furnish overcurrent protection in both primary and secondary circuits for Class 2 service in accordance with NEC requirements. Limit connected loads to 80% of rated capacity.
 - 1. DC power supply output shall match output current and voltage requirements. Unit shall be full-wave rectifier type with output ripple of 5.0 mV maximum peak-to-peak. Regulation shall be 1.0% line and load combined, with 100-microsecond response time for 50% load changes. Unit shall have built-in overvoltage and overcurrent protection and shall be able to withstand a 150% current overload for at least three seconds without trip-out or failure.
 - a. Line voltage units shall be UL recognized and CSA approved.

2.09 AUXILIARY CONTROL DEVICES

- A. Motorized dampers, unless otherwise specified elsewhere, shall be as follows:
 - 1. **(D-1)**: Opposed blade damper.
 - 2. **(D-2)**: Parallel blade damper.
 - 3. Damper frames shall be 16 gauge galvanized sheet metal or 1/8" extruded aluminum with reinforced corner bracing.
 - 4. Damper blades shall not exceed 8" in width or 48" in length. Blades are to be suitable for medium velocity performance (2,000 fpm). Blades shall be not less than 16 gauge.
 - 5. Damper shaft bearings shall be as recommended by manufacturer for application.
 - 6. All blade edges and top and bottom of the frame shall be provided with compressible seals. Side seals shall be compressible stainless steel. The blade seals shall provide for a maximum leakage rate of 10 CFM per square foot at 2.5" w.c. differential pressure.
 - 7. All leakage testing and pressure ratings will be based on AMCA Publication 500.
 - 8. Individual damper sections shall not be larger than 48" x 60". Provide a minimum of one damper actuator per section.
 - 9. Control dampers shall be parallel or opposed blade types as scheduled on drawings.
 - 10. Acceptable Manufacturer shall be Ruskin, Greenheck, or equal.
- B. Electric damper/valve actuators **(ME-1, ME-2, ME-3)**
 - 1. ME-1: Modulating range.
 - 2. ME-2: Two Position.
 - 3. ME-3: Modulating range, for unit ventilators.

4. The actuator shall have electronic overload or digital rotation sensing circuitry to prevent damage to the actuator throughout the rotation of the actuator.
5. Where shown, for power-failure/safety applications, an internal mechanical, spring return mechanism shall be built into the actuator housing.
6. Proportional actuators shall accept a 0-10 VDC or 0-20 ma control signal and provide a 2-10 VDC or 4-20 ma operating range.
7. Actuators shall be Underwriters Laboratories Standard 873 listed.
8. Acceptable Manufacturer shall be Belimo or equal.

C. Control Valves

1. Control valves shall be two-way or three-way type for two-position or modulating service as scheduled or shown.
2. Size control valves according to chart below: (Maximum DP of 3 psi):

VALVE SIZE CHART		
Max GPM	VALVE SIZE	CV
7.5	1/2"	4.4
13	3/4"	7.5
24	1"	14
35	1-1/4"	20
48	1-1/2"	28
69	2"	40
113	2-1/2"	65
156	3"	156
294	4"	294

3. Close-off (differential) Pressure Rating: Valve actuator and trim shall be furnished to provide the following minimum close-off pressure ratings:
 - a) Water Valves:
 - (1) Two-way: 150% of total system (pump) head.
 - (2) Three-way: 300% of pressure differential between ports A and B at design flow or 100% of total system (pump) head.
 - b) Steam Valves: 150% of operating (inlet) pressure.
4. Water Valves
 - a) Body and trim style and materials shall be in accordance with manufacturer's recommendations for design conditions and service shown, with equal percentage ports for modulating service.
 - b) Sizing Criteria.
 - (1) **(CVI)** Two-position service.
 - (2) Two-way modulating service: Pressure drop shall be equal to twice the pressure drop through heat exchanger (load), 50% of the pressure difference between supply and return mains, or 3 psi, whichever is greater.

- (3) **(CVM, CVZM)** Three-way modulating service: Pressure drop equal to twice the pressure drop through the coil exchanger (load), 3 psi maximum.
- (4) Valves (1/2 in.) through (2 in.) shall be bronze body or cast brass ANSI Class 250, spring-return, PTFE packing, quick opening for two-position service. Two-way valves to have replaceable composition disc or stainless steel ball, 23°F - 250°F.
- (5) Valves (2 1/2 in.) and larger shall be cast iron ANSI Class 125 with guided plug and PTFE packing, globe valve.
- (6) Never provide a controls valve that is less than half the size of the supply line serving that system.

c) Terminal Unit Zone valves shall be sized to meet the control application and they shall be spring return so in the event of a power failure, they will go to full open.

5. Acceptable Manufacturer shall be Belimo; or equal

D. Binary Temperature Devices (**THL-1**)

- 1. Low-voltage space thermostat shall be 24 V, bimetal-operated, mercury-switch type, with either adjustable or fixed anticipation heater, concealed setpoint adjustment, 13°C to 30°C (55°F to 85°F) setpoint range, 1°C (2°F) maximum differential, and vented ABS plastic cover. Acceptable Manufacturer shall be Honeywell; or equal.
- 2. Line-voltage space thermostat shall be bimetal-actuated, open contact type, or bellows-actuated, enclosed, snap-switch type or equivalent solid-state type, with heat anticipator, UL listed for electrical rating, concealed setpoint adjustment, 13°C to 30°C (55°F to 85°F) setpoint range, 1°C (2°F) maximum differential, and vented ABS plastic cover. Acceptable Manufacturer shall be Honeywell; or equal.

E. Temperature Sensors (**TSB, TSR, TSD, TSDA, TS/HS**)

- 1. TSB: Flat plate thermistor room sensor. ACI R2; or equal.
- 2. TSR: Room sensor with LCD display and setpoint adjustability. ZS Pro-M, Automated Logic; or equal.
- 3. TSD/TSDA: duct mounted sensor.
- 4. TS/HS: Combination temperature and humidity sensor. A/RH1; Automation Components, Inc.
- 5. Combination Temperature and Humidity sensor.
- 6. Temperature sensors shall be RTD or thermistor.
 - a) Wireless space sensor component certifications shall include:
 - (1) UL 916 - Energy Management Equipment.
 - (2) UL 94 - The Standard for Flammability of Plastic Materials for Parts in Devices and Appliances.
 - (3) UL 873 - Temperature regulating and indicating equipment.
 - b) The wireless space sensor battery life shall provide at least 15 years life under normal operating conditions and must be readily available size AA, 1.5V.

7. Duct sensors shall be single point or averaging as shown. Averaging sensors shall be a minimum of 1.5 m (5 ft) in length per 1 m² (10 ft²) of duct cross section.
 8. Immersion sensors shall be provided with a separable stainless steel well. Pressure rating of well is to be consistent with the system pressure in which it is to be installed. The well must withstand the flow velocities in the pipe.
 9. Space sensors shall be equipped with setpoint adjustment, override, display, and/or communication port as shown on plans.
 10. Provide matched temperature sensors for differential temperature measurement.
- F. Humidity Sensors (**HSTS-wall mount / HSP-duct mount**)
1. Space Humidity Sensors shall have a sensing range of 20% to 80% with accuracy of +/- 2% RH.
 2. Duct Sensors and Outdoor air humidity sensors shall have a sensing range of 20% to 95% RH with an accuracy of +/- 2% RH.
 3. Humidity sensor's drift shall not exceed 1% of full scale per year.
 4. Acceptable Manufacturer shall be Omega; or equal.
- G. End Switch (**ES-1**)
1. Proof of closure of damper. Kele; or equal.
- H. Pressure Sensors (**DPT-1**)
1. Air pressure of differential pressure measurements in the range of 0 to 10" water column shall be accurate to +/- 1% of range. Acceptable Manufacturer shall be Setra; or equal.
 2. Liquid pressure or differential liquid pressure measurements shall be accurate to +/- 0.25% of range. Unit shall be provided with isolation and bypass manifold for startup and maintenance operations. Acceptable Manufacturer shall be Setra; or equal.
- I. Low Limit Thermostats (**LC-1**)
1. Safety low limit thermostats shall be vapor pressure type with an element 6m [20 ft] minimum length. Element shall respond to the lowest temperature sensed by any one foot section. Acceptable Manufacturer shall be Honeywell; or equal.
 2. Low limit shall be manual reset only.
- J. Carbon Dioxide Sensors (**CDS-1**)
1. Carbon Dioxide sensors shall measure CO₂ in PPM in a range of 50 ppm with drift not to exceed 20 ppm. Sensors shall be duct or space mounted as indicated in the sequence of operation.
 2. Acceptable Manufacturer shall be Dwyer; or equal.
- K. Flow Switches (**FS-1**)

1. Flow-proving switches shall be either paddle or differential pressure type.
2. Paddle type switches (water service only) shall be UL listed, SPDT snap-acting with pilot duty rating (125VA minimum) and shall have adjustable sensitivity with NEMA 1 enclosure unless otherwise specified. Manufacturer shall be Setra; or equal.
3. Differential pressure type switches (air or water service) shall be UL listed, SPDT snap-acting, pilot duty rated (125 VA minimum), NEMA 1 enclosure, with scale range and differential suitable for intended application or as specified. Acceptable Manufacturer shall be Setra; or equal.

L. Air Flow Probes (**AF-1**)

1. Provide an array of airflow traverse probes where indicated, capable of continuously monitoring the fan or duct capacities (CFM) they serve. Each airflow traverse probe shall contain multiple total and static pressure sensors located along the exterior surface of the cylindrical probe and internally connected to their respective averaging manifolds. The flow sensors shall not protrude beyond the surface of the probe(s), and shall be the offset type for static pressure and the chamfered impact type for total pressure measurement. The airflow sensing probe's measurement accuracy shall not be affected by directional flow having pitch and/or yaw angles up to 30°. Each airflow traverse probe shall be of extruded aluminum construction and furnished with mounting plate(s), gasket and signal fittings suitable for MECHANICAL duct installation.
2. The airflow traverse probe shall not induce a pressure drop in excess of 0.03" w.c. at 2000 FPM, nor measurably contribute to sound levels within the duct. Total and static pressure sensors shall be located at the centers of equal areas (for rectangular duct) or at equal concentric area centers (for circular ducts) along the probe length. The airflow traverse probe shall be capable of producing steady, non-pulsating signals of total and static pressure without need for flow corrections or factors, with an accuracy of 2-3% of actual flow, over a velocity range of 400 to 4000 FPM.
3. Provide the minimum number of probes indicated: Duct height 8 – 12", 1 probe; 13 – 30", 2 probes; 31 – 54", 3 probes; 55 – 84", 4 probes; 85 – 120", 5 probes; 121 – 180", 6 probes.
4. The airflow traverse probe shall be the VOLU-probe as manufactured by Air Monitor Corporation, or equivalent.

M. Hydronic Flow Meters (**FM-3**)

1. Insertion-Type Turbine Meter
 - a) Insertion type, complete with hot-tap isolation valves to enable sensor removal without water supply system shutdown.
 - b) Liquide flow measurement devices shall be accurate to +/- 1% over a turn down ratio of 10:1.
 - c) Each sensor shall be individually calibrated and tagged accordingly against the manufacturer's primary standards.
 - d) All wetted metal parts shall be constructed of 316 stainless steel.

- e) Analog outputs shall consist of non-interactive zero and span adjustments, a DC linearity of 0.1% of span, voltage output of 0–10 Vdc, and current output of 4–20 mA.
- f) Acceptable Manufacturer shall be Onicon; or equal.

N. Relays (**CR-1**)

- 1. Control relays shall be UL listed plug-in type with dust cover and LED “energized” indicator. Contact rating, configuration, and coil voltage shall be suitable for application.
- 2. Time delay relays shall be UL listed solidstate plug-in type with adjustable time delay. Delay shall be adjustable $\pm 200\%$ (minimum) from setpoint shown on plans. Contact rating, configuration, and coil voltage shall be suitable for application. Provide NEMA 1 enclosure when not installed in local control panel.
- 3. Acceptable Manufacturer shall be Functional Device Inc.; or equal.

O. Transformers and Power Supplies

- 1. Control transformers (**XT-1**) shall be UL listed, Class 2 current-limiting type, or shall be furnished with over-current protection in both primary and secondary circuits for Class 2 service.
- 2. Unit output shall match the required output current and voltage requirements. Current output shall allow for a 50% safety factor. Output ripple shall be 3.0 mV maximum Peak-to-Peak. Regulation shall be 0.10% line and load combined, with 50 microsecond response time for 50% load changes. Unit shall have built-in over-voltage protection.
- 3. Unit shall be UL recognized.
- 4. Acceptable Manufacturer shall be Functional Device Inc.; or equal.

P. Current Switches (**CFS-1**)

- 1. Current-operated switches shall be self-powered, solid state with adjustable trip current. The switches shall be selected to match the current of the application and output requirements of the DDC system.
- 2. Acceptable Manufacturer shall be Functional Device Inc.; or equal.

Q. Immersion Temperature Sensor (**ITS, ITS-1**)

- 1. Furnish with brass thermowell. Well insertion length to center of pipe. Glycol system require stainless steel well. ACI; or equal.

R. Motion Detector (**MDS-1**)

- 1. Ultra-sonic type omni directional transmitter, dual receivers, sensitivity gain control, 600 sq. ft. coverage, 24 Volt DC, Universal Energy Control Inc.; or approved equal.

S. Static Pressure Sensor (**SPS-1, SPNL-1**)

1. Model 264, pressure transmitter 4-20mA, 0-5VDC, 2.5VDC bidirectional output, 24VDC power by this Contractor, range 0-1.0" wg. or as applicable to individual systems needs. Setra; or approved equal.

T. Current transmitters

1. AC current transmitters shall be the self-powered, combination split-core current transformer type with built-in rectifier and high-gain servo amplifier with 4 to 20 mA two-wire output. Unit ranges shall be 10 A, 20 A, 50 A, 100 A, 150 A, and 200 A full scale, with internal zero and span adjustment and $\pm 1\%$ full-scale accuracy at 500 ohm maximum burden.
2. Transmitter shall meet or exceed ANSI/ISA S50.1 requirements and shall be UL/CSA recognized.
3. Unit shall be split-core type for clamp-on installation on existing wiring.
4. Acceptable Manufacturer shall be Functional Device Inc. or equal.

U. Power Monitors

1. Selectable rate pulse output for kWh reading, 4–20 mA output for kW reading, N.O. alarm contact, and ability to operate with 5.0 amp current inputs or 0–0.33 volt inputs.
2. 1.0% full-scale true RMS power accuracy, +0.5 Hz, voltage input range 120–600V, and auto range select.
3. Under voltage/phase monitor circuitry.
4. NEMA 1 enclosure.
5. Current transformers having a 0.5% FS accuracy, 600 VAC isolation voltage with 0 - 0.33 V output. If 0–5 A current transformers are provided, a three-phase disconnect/ shorting switch assembly is required.
6. Acceptable Manufacturer shall be Allen-Bradley; or equal.

V. Push Button (**PB-1**)

1. Flush mount, stainless steel plate, mushroom head, contact block with red nameplate, white lettering to identify fan and purpose.

W. Thermal Energy Meters

1. Matched RTD or thermistor temperature sensors with a differential temperature accuracy of $\pm 0.15^\circ\text{F}$.
2. Flow meter that is accurate within $\pm 1\%$ at calibrated typical flow rate and does not exceed $\pm 2\%$ of actual reading over an extended 50:1 turndown range.
3. Unit accuracy of $\pm 1\%$
4. NEMA 1 enclosure.
5. UL listed.

6. Isolated 4–20 ma signals for energy rate and supply and return temperatures and flow.
 7. Acceptable Manufacturer shall be Onicon; or equal.
- X. Carbon Monoxide Sensor (**CDS-1**)
1. Wall mounted Carbon Monoxide Sensor (CO) shall monitor CO over a range of 0-300 PPM.
 2. The device shall have an accuracy of +/- 3% and operate within the range of 32-110 deg F and 0-95% RH.
 3. Acceptable Manufacturer shall be Honeywell; or equal.
- Y. Local Control Panels (**TCP, TCP-1**)
1. All indoor control cabinets shall be fully enclosed NEMA 1 Type construction with hinged door, and removable sub-panels or electrical sub-assemblies.
 2. Interconnections between internal and face-mounted devices shall be pre-wired with color-coded stranded conductors neatly installed in plastic troughs and/or tie-wrapped. Terminals for field connections shall be UL listed for 600-volt service, individually identified per control/interlock drawings, with adequate clearance for field wiring. Control terminations for field connection shall be individually identified per control drawings.
 3. Provide on/off power switch with over-current protection for control power sources to each local panel.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. The Contract Documents shall be thoroughly examined for coordination of control devices, their installation, wiring, and commissioning. Coordinate and review mechanical equipment specifications, locations, and identify any discrepancies, conflicts, or omissions that shall be reported to the Architect/Engineer for resolution before rough-in work is started.
- B. The BAS manufacturer shall inspect the jobsite in order to verify that control equipment can be installed as required, and any discrepancies, conflicts, or omissions shall be reported to the Architect/Engineer for resolution before rough-in work is started.

3.02 PROTECTION

- A. The BAS installation contractor shall protect all work and material from damage by their work or personnel, and shall be liable for all damage thus caused.
- B. The BAS manufacturer shall be responsible for their work and equipment until final inspection, testing, and acceptance. The BAS installing contractor shall protect their work against theft or damage, and shall carefully store material and equipment received on site that is not immediately installed. The Contractor shall close all open ends of work with temporary covers or plugs during storage and construction to prevent entry of foreign objects.

3.03 COORDINATION

A. Site

1. Where the mechanical work will be installed in close proximity to, or will interfere with, work of other trades, the contractor shall assist in working out space conditions to make a satisfactory adjustment. If the contractor installs his/her work before coordinating with other trades, so as to cause any interference with work of other trades, the contractor shall make the necessary changes in his/her work to correct the condition without extra charge.
2. Coordinate and schedule work with all other work in the same area, or with work that is dependent upon other work, to facilitate mutual progress.

B. Submittals. Refer to the "Submittals," section of this specification for requirements.

C. Test and Balance

1. The contractor shall furnish a single set of all tools necessary to interface to the control system for test and balance purposes.
2. The contractor shall provide training in the use of these tools. This training will be planned for a duration of 4 hours.
3. The tools used during the test and balance process shall be returned to the contractor at the completion of the testing and balancing.

D. Life Safety

1. Duct smoke detectors required for air handler shutdown shall be supplied under Division 26 contract. The contractor shall interlock smoke detectors to air handlers for shutdown as described in the Sequences of Operation for this project.

E. Coordination with Controls Specified in Other Sections or Divisions. Other sections and/or divisions of this specification include controls and control devices that are to be part of or interfaced to the control system specified in this section. These controls shall be integrated into the system and coordinated by the contractor as follows:

1. All communication media and equipment shall be provided as specified in the "Communication" section of this specification.
2. Each supplier of a controls product is responsible for the configuration, programming, start-up, and testing of that product to meet the sequences of operation described in this section.
3. The Contractor shall coordinate and resolve any incompatibility issues that arise between the control products provided under this section and those provided under other sections or divisions of this specification.

F. Fire Alarm: Provide interface card to allow communications between temperature control network and fire alarm system. Coordinate exact requirements with Electrical Contractor. Provide all hardware and software necessary for full seamless interface. Show fire alarm failure on graphics.

3.04 GENERAL WORKMANSHIP

- A. Install equipment, piping, wiring/conduit, parallel to building lines (i.e. horizontal, vertical, and parallel to walls) wherever possible.
- B. Provide sufficient slack and flexible connections to allow for vibration of piping and equipment.
- C. Install all equipment in readily accessible locations as defined by National Electric Code (NEC). Control panels shall be attached to structural walls or properly supported in a free-standing configuration, unless mounted in equipment enclosure specifically designed for that purpose. Panels shall be mounted to allow for unobstructed access for service.
- D. Verify integrity of all control wiring to ensure continuity and freedom from shorts and grounds prior to commencing the startup and commissioning procedures.
- E. All control device installation and wiring shall comply with Contract Documents, acceptable industry specifications, and industry standards for performance, reliability, and compatibility. Installation and wiring shall be executed in strict adherence to local codes and standard practices referenced in Contract Documents.

3.05 FIELD QUALITY CONTROL

- A. All work, materials, and equipment shall comply with the rules and regulations of applicable local, state, and federal codes and ordinances as identified in Contract Documents.
- B. BAS manufacturer shall continually monitor the field installation for building code compliance and quality of workmanship. All visible piping and or wiring runs shall be installed parallel to building lines and properly supported.
- C. BAS installing Contractor(s) shall arrange for field inspections by local and/or state authorities having jurisdiction over the work.

3.06 WIRING

- A. All control and interlock wiring shall comply with the National, Local Electrical Codes, and Division 26 of these Contract Document specifications.
- B. All NEC Class 1 (line voltage) wiring shall be UL Listed in approved raceway according to NEC requirements.
- C. All wiring in plenum spaces shall be enclosed in conduit. Plenum rated cable can be used in accessible ceilings.
- D. Where Class 2 wires are in concealed and accessible locations; including ceiling return air plenums, approved cables outside of electrical raceway can be used provided that the following conditions are met:
 - 1. Circuits meet NEC Class 2 (current-limited) requirements. (Low-voltage power circuits shall be sub-fused when required to meet Class 2 current-limit.)
 - 2. All cables shall be UL listed for application (i.e., cables used in ceiling plenums shall be UL listed specifically for that purpose).
 - 3. Line Voltage Control Wiring:

- a) For control relays or other low amperage circuits #14 AWG THHN.
 - b) For direct line voltage control of equipment minimum conductor size #12 AWG THHN.
 - c) Electronic Sensor Wiring: 18 AWG, stranded (16x30) copper conductors, twisted pair, 100% overall aluminum polyester shield, 20 AWG CU drain wire. Polyethylene insulation, PVC jacket, 300V, 60°C. Furnish Belden; or equal.
 - d) Computer Communications Cable: 18 AWG, stranded (16x30) copper conductors, (2) twisted pair, 100% individual aluminum polyester shields each shield with 20 AWG CU drain wire. PVC insulated, PVC jacket, 300V. Furnish Belden; or equal.
Note: Actual # of conductors may be increased as required for actual communication requirement.
4. Provide minimum (1) spare shielded twisted pair conductors in each communications wiring run. Wiring runs between operator work stations (if any) provide (2) spare shielded twisted pair conductors.
- E. Do not install Class 2 wiring in conduits containing Class 1 wiring. Boxes and panels containing high voltage may not be used for low voltage wiring except for the purpose of interfacing the two via control relays and transformers.
- F. Where Class 2 wiring is run exposed, wiring shall be conduit
- G. Maximum allowable voltage for control wiring shall be 120Vac. If only higher voltages are available for use, the BAS manufacturer shall provide step-down transformers to achieve the desired control voltages.
- H. All control wiring shall be installed as continuous lengths, where possible. Any required splices shall be made only within an approved junction box or other approved protective device.
- I. Install plenum wiring in sleeves where it passes through walls and floors. Maintain fire rating at all penetrations in accordance with Contract Documents and National and/or Local Codes.
- J. Conduit and wire sizing shall be determined by the BAS manufacturer in order to maintain manufacturer's recommendation and meet National and Local Codes.
- K. Conduit Routing and termination
- 1. Conduits shall be installed so as to be concealed in all finished spaces at the conclusion of the project unless otherwise noted. Conduits may be exposed in mechanical and electrical rooms and unfinished storage, maintenance and production areas.
 - 2. Where it is impractical to conceal wiring or conduit in finished construction, cables shall be run in wiremold.
 - 3. Make neat runs parallel or perpendicular to structural elements (walls, ceilings, floors) of building with minimum number of couplings and bends. Install so that required conductors may be drawn without injury or excessive strain.

4. Provide double locknuts and insulation bushings on the end of each conduit entering an enclosure. If smaller holes are used in knockouts provide listed devices which overlap largest knockouts as required to strengthen the termination.
5. Cap or plug open ends of conduits during construction.
6. Conduits shall be continuous from equipment controls to cabinets, junction or pull boxes and shall enter and be secured to all boxes in such a manner that each system shall be electrically continuous.
7. Change in Direction of Conduit:
 - a) Concealed locations - use standard radius bend.
 - b) Exposed locations or concealed locations where conduit will be accessible; use standard radius bends or conduit body.
8. Install conduits to allow proper drainage. Do not form pockets.
9. Securely attach all conduits to building structure utilizing approved methods and fastening devices for support.
10. Clear obstructions in raceways or replace raceways at no additional contract cost. Demonstrate to Architect that spare conduits are free of obstruction at substantial completion and leave a drag line (1/8" polypropylene monofilament utility rope) for future use.
- L. Follow manufacturer's installation recommendations for all communication and network bus cabling. Network or communication cabling shall be run separately from all control power wiring.
- M. Adhere to the Division 26 requirements for installation of electrical raceways.
- N. BAS manufacturer shall terminate all control and/or interlock wiring and shall maintain updated (as-built) wiring diagrams with terminations identified at the job site.
- O. Flexible metal conduits and liquid-tight flexible metal conduits shall not exceed 3' in length and shall be supported at each end. Flexible metal conduit less than 1/2" electrical trade size shall not be used. In areas exposed to moisture, including chiller and boiler rooms, liquid-tight, flexible metal conduits shall be used.
- P. Penetrations:
 1. Provide fire stopping for all penetrations used by dedicated BMS conduits and raceways. All other project fire stopping to be by other trade.
 2. All openings in the fire proofed or fire stopped components shall be closed by using approved fire resistive sealant.
 3. All wiring passing through penetrations, including walls, shall be in conduit or enclosed raceway.
 4. Penetrations of floor slabs shall be by core drilling. All penetrations shall be plumb, true and square.
 5. No penetrations in structural elements shall be made before receipt of written approval from Engineer and/or Architect.

Q. BMS Raceway:

1. All wiring shall be installed in conduit or raceway except as noted elsewhere in this specification. Minimum control wiring conduit size 3/4".
2. Where it is not possible to conceal raceways in finished locations, surface raceway (wiremold) may be used as approved by the Engineer.
3. All conduits and raceways shall be installed level, plumb, at right angles to the building lines and shall follow the contours of the surface to which they are attached.
4. Flexible metal conduit shall be used for vibration isolation and shall be limited to 3' in length when terminating to vibrating equipment. Flexible metal conduit may be used within partition walls. Flexible metal conduit shall be UL listed.

3.07 COMMUNICATION WIRING

- A. All cabling shall be installed in a neat and workmanlike manner. Follow manufacturer's installation recommendations for all communication cabling.
- B. Do not install communication wiring in raceway and enclosures containing Class 1 or other Class 2 wiring.
- C. Maximum pulling, tension, and bend radius for cable installation, as specified by the cable manufacturer shall not be exceeded during installation.
- D. Contractor shall verify the integrity of the entire network following cable installation. Use appropriate test measures for each particular cable.
- E. When a cable enters or exits a building, a lightning arrestor must be installed between the line and ground.
- F. All runs of communication wiring shall be unspliced length when the length is commercially available.
- G. All communication wiring shall be labeled to indicate origin and destination.

3.08 FIBER OPTIC CABLE

- A. All cabling shall be installed in a neat and workmanlike manner. Minimum cable and unjacketed fiber bend radii as specified by cable manufacturer shall be maintained.
- B. Maximum pulling tensions as specified by the cable manufacturer shall not be exceeded during installation. Post installation residual cable tension shall be within cable manufacturer's specifications.
- C. Fiber optic cabinets, hardware, and cable entering the cabinet shall be installed in accordance with manufacturers' instructions. Minimum cable and unjacketed fiber bend radii as specified by cable manufacturer shall be maintained.

3.09 INSTALLATION OF SENSORS

- A. Sensors required for mechanical equipment operation shall be factory installed and wired as specified in mechanical equipment specifications. BAS manufacturer shall be responsible for coordinating these

control devices and ensuring the sequence of operations will be met. Installation and wiring shall be in accordance with the BAS manufacturer's recommendations.

- B. Sensors that require field mounting shall meet the BAS manufacturer's recommendations and be coordinated with the mechanical equipment they will be associated.
- C. Mount sensors rigidly and adequately for the environment the sensor will operate.
- D. Room temperature sensors shall be installed on concealed junction boxes properly supported by the block wall framing. For installation in dry wall ceilings, the low voltage sensor wiring can be installed exposed and must meet applicable National and Local Electrical Codes.
- E. All wires attached to wall mounted sensors shall be sealed off to prevent air from transmitting in the associated conduit and affecting the room sensor readings.
- F. Install duct static pressure tap with tube end facing directly down-stream of air flow.
- G. Install space static pressure sensor with static sensing probe applicable for space installation where applicable.
- H. Sensors used in mixing plenums, and hot and cold decks shall be of the averaging type. Averaging sensors shall be installed in a serpentine manner horizontally across duct. Each bend shall be supported with a capillary clip.
- I. All pipe mounted temperature sensors shall be installed in matched thermowells. Install all liquid temperature sensors with heat conducting fluid in thermal wells for adequate thermal conductance.
- J. Wiring for space sensors shall be concealed in building drywall. EMT conduit is acceptable within mechanical equipment and service rooms.
- K. Install outdoor air temperature sensors on north wall complete with sun shield at manufacturer's recommended location and coordinated with Engineer.

3.10 IDENTIFICATION OF HARDWARE AND WIRING

- A. All field wiring and cabling, including that within factory mounted, and wired control panels and devices for mechanical equipment, shall be labeled at each end within 2" of termination with a cable identifier and other descriptive information for troubleshooting, maintenance, and service purposes. BAS manufacturer to coordinate this labeling requirement with mechanical equipment manufacturer as it relates to controls.
- B. Permanently label or code each point of field terminal strips to show the instrument or item served and correlate them to the BAS design drawings.
- C. Identify control panels with plastic nameplates.

3.11 GROUNDING AND BONDING

- A. Equipment Grounding Conductors: All metallic non-current carrying parts of electrical equipment shall be grounded with equipment grounding conductors whether or not shown on the drawings. Equipment grounding conductors shall be green insulated copper conductors unless otherwise indicated.
1. Install green, equipment grounding conductor with all feeder and branch circuit conductors.
 2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.
 3. Enclosures: Ground all enclosures of electrical and electronic wiring and distribution equipment in accordance with requirements of the NEC Article 250.
 4. Equipment Enclosure Grounding: Bare wire, wrapped around connecting screws or mounting bolts and screws is not acceptable as a grounding connection. All ground lugs shall be of a noncorrosive material suitable for use as a grounding connection, and must be compatible with the type of metal being grounded. Ground lugs shall be mounted on clean, bare metal surfaces that are free of paint, rust, etc. Wire brush clean each surface to remove paint or oxidation prior to bolting jumper connectors in place. In general use tinned copper connectors for connections of dissimilar metals. Use of bimetal connectors shall only be allowed in special circumstances and only with the prior written approval.

3.12 CONNECTIONS

- A. General: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
1. Use electroplated or hot-tin-coated materials to assure high conductivity and to make contact points closer in order of galvanic series.
 2. Make connections with clean, bare metal at points of contact.
 3. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
- B. Terminate insulated equipment grounding conductors for feeders with pressure-type grounding lugs. Where metallic raceways terminate at non-metallic or non-conductive housings, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to the ground bus in the housing. Bond electrically non-continuous conduits at both entrances and exits with grounding bushings and bare grounding conductors.
- C. Raceway Grounding: Surface metal raceways, wireways, or cable trays or cable rack systems shall be installed in a manner that ensures electrical continuity. Short insulated green copper bonding jumpers shall be installed between adjacent raceway sections, on both sides of each joint, to ensure proper bonding. Unless otherwise indicated, the minimum size for these bonding jumpers shall be No. 6 AWG. Jumpers shall be provided with compression connectors at each end of cable. Surface metal raceways, wireways, cable trays or cable rack systems shall be field drilled to provide bolting point for securing bonding jumper. Wire brush clean each surface to remove paint or oxidation prior to bolting jumper connectors in place. Bolts and hardware shall be as per details or as approved for grounding purposes. All metallic raceway penetrations into a facility structure shall be bonded to the earth electrode system.

- D. Other Grounding Systems: Any additional grounding systems used for electronic equipment shall be connected to the facility main ground plate, structural steel or exterior earth electrode system as shown on drawings.
- E. Tighten grounding and bonding connectors and terminals, including screws and bolts, in accordance with torque tightening values specified in UL 486A.

3.13 CONTROL SYSTEM CHECKOUT AND TESTING

A. Acceptance Check Sheet:

1. The contractor shall prepare check commissioning sheets that include all points for all functions of each system as indicated on the temperature controls submittal documents.
2. Submit the check sheets to the engineer for approval within the temperature controls submittal documents.
3. Engineer will use the approved check sheets as the basis for acceptance of the BAS.
4. The contractor is perform complete commissioning reports for this project. Prior to final payment, contractor must submit signed commissioning checklist, approved by both the owner and engineer. The contractor must also prepare commissioning reports for each piece of equipment that is being controlled.

B. Start-up testing. All testing in this section shall be performed by the contractor and shall make up part of the necessary verification of an operating control system. This testing shall be completed before the owner's representative is notified of the system demonstration.

1. The contractor shall furnish all labor and test apparatus required to calibrate and prepare for service all of the instruments, controls, and accessory equipment furnished under this specification.
2. Verify that all control wiring is properly connected and free of all shorts and ground faults. Verify that terminations are tight.
3. Enable the control systems and verify calibration of all input devices individually. Perform calibration procedures according to manufacturer's recommendations.
4. Verify all binary output devices (relays, solenoid valves, two-position actuators and control valves, magnetic starter, etc.) operate properly and normal positions are correct.
5. Verify all analog output devices (I/Ps, actuators, etc) are functional, that start and span are correct, and that direction and normal positions are correct. The contractor shall check all control valves and automatic dampers to ensure proper action and closure. The contractor shall make any necessary adjustments to valve stem and damper blade travel.
6. Verify the system operation adheres to the sequences of operation. Simulate and observe all modes of operation by overriding and varying inputs and schedules. Tune all DDC loops and optimal start/stop routines.
7. Alarms and Interlocks
 - a) Check each alarm separately by including an appropriate signal at a value that will trip the alarm.

- b) Interlocks shall be tripped using field contacts to check the logic, as well as to ensure that the fail-safe condition for all actuators is in the proper direction,
 - c) Interlock actions shall be tested by simulating alarm conditions to check the initiating value of the variable and interlock action.
- C. Start-up testing. All testing in this section shall be performed by the contractor and shall make up part of the necessary verification of an operating control system. This testing shall be completed before the owner's representative is notified of the system demonstration.

3.14 CONTROL SYSTEM DEMONSTRATION AND ACCEPTANCE

- A. Acceptance: The BAS will not be accepted as meeting the requirements of Completion until all tests described in this specification have been performed to the satisfaction of both the Engineer and Owner. Any tests that cannot be performed due to circumstances beyond the control of the Contractor may be exempt from the Completion requirements if stated as such in writing by the Owner's representative. Such tests shall then be performed as part of the warranty.

3.15 TRAINING

- A. Provide minimum of 2 classroom training sessions, and 4 hours for each session, throughout the contract period. The training will be provided for personnel designated by the Owner.
- B. Provide course outline and materials prior to schedule training session. The instructor(s) shall provide one copy of training material per student.
- C. The instructor(s) shall be factory-trained and experienced in teaching this technical material.

END OF SECTION 23 0993

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including the General and Supplementary Conditions and Division 1 Specifications Section, apply to the work of this section.

1.02 SUBMITTALS

- A. Product data.

1.03 REMOVALS

- A. If any glycol is removed from the building's systems and is to be disposed of, the Contractor is responsible to remove the glycol from the site and have it properly disposed of with respect to EPA and all local guidelines. The contractor shall carry the cost of removal within his bid. Putting the product down a drain will not be acceptable.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Contractor is responsible for supplying the proper amount of the product to the heating and chilled water glycol systems, contractor to reference contract drawings for piping sizes and lengths to determine volume. Contractor is responsible for filling system to 40% concentration. A written report is to be completed as specified in Part 3 – Execution.
- B. All anti-freeze on this project is to be 100% virgin anti-freeze. Any anti-freeze that is recycled or partially recycled formula shall be rejected without review. The submittal must state that anti-freeze is 100% virgin. If anti-freeze has been installed and found to have recycled component it shall be removed and replaced with new 100% virgin at contractor's expense.

2.02 PROPYLENE GLYCOL, DOWFROST (PG)

- A. Dow Chemical Co. inhibited glycol based heat transfer fluid, 95.5% glycols and 4.5% inhibitors and water by weight. Capable of protection from freezing to -23°F @ 42% and -12°F @ 30% and boiling to 250°F. Fluid shall contain special corrosion inhibitors that passivate the surface of metals and buffer any acids that form from normal oxidation. Fluid shall have a low acute oral toxicity.

2.03 ANTIFREEZE TESTER

- A. Model #YA845, Snap-On-Tools Corp.; or equal. Contains six temperature compensating discs to show degree of protection thru a magnified tube. Shall have a scale range of 25°F to overprotection. Also includes flexible rubber hose.

2.04 INJECTION TANKS (IT-1)

- A. Chemical Feed system for glycol solution. Each system to include one 50 gallon polyethylene tank with hinged cover and one feed pump with 1/2 HP motor mounted below tank. Motor to be 115V/1Ph. Pump suction of PVC tubing to include ball valve and strainer. Pump discharge of schedule 80 PVC pipe includes ball valve and check valve. Additional accessories to include: PVC float switch, pressure switch, relief valve, pressure gauge on discharge and NEMA 12, 115V control panel. Controls to include a 24 volt control circuit, H-O-A for pump, low tank level indicator and pump "on" indicator.

PART 3 - EXECUTION

3.01 GENERAL

- A. Fill system 100% with water. Hydrostatically test the system to check for any leaks.
- B. Remove all air from the system as per filling instructions. See Section 232113 - Piping Systems & Accessories.
- C. Partially drain system to accommodate the appropriate quantity of glycol.
- D. Disposal of anti-freeze: all fluid removed from fluid cooler which contains anti-freeze solution shall be pumped into temporary tankage and disposed of offsite in an approved manner. Do not drain fluids containing anti-freeze on the ground or directly into building floor drains
- E. Add the appropriate amount of glycol fluid to the system and circulate for 24 hours to insure complete mixing.
- F. Test concentration of solution using tester specified and add any necessary amount of glycol to reach the desired level.
- G. Provide written report to Architect stating volume of antifreeze solution added, concentration level of antifreeze and expected freeze point of solution.

END OF SECTION 23 2510

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including the General and Supplementary Conditions and Division 1 Specification Sections, apply to the work of this section.

1.02 SUBMITTALS

- A. Schedule of all components.
- B. Product data sheets on all equipment.
- C. Submit shop drawings on all equipment. Include all performance and dimensional data.

1.03 GENERAL REQUIREMENTS

- A. All control dampers shall have published performance data taken from test made in accordance with AMCA Standard 500 and in compliance with the AMCA certified ratings program for air performance and air leakage performance.
- B. All fire dampers shall be rated for 1-1/2 hrs (unless specifically noted otherwise) under UL Standard 555 and shall meet NFPA 90A construction requirements.
- C. Backdraft dampers shall have performance data published under the guidelines of AMCA and conform to all safety standards as set forth by NFPA 90A.

PART 2 - PRODUCTS

2.01 VOLUME DAMPERS

- A. Provide where indicated on drawings or required to control air flow, for air balancing, size as required, manually operated.
- B. For Rectangular Ducts up to 12" Max Dimension: Single blade volume damper for use by air balancing contractor. Damper may be fabricated by sheetmetal contractor. Damper blade shall be fabricated from stiff material and be free from operating noise. Ensure sufficient clearance between damper blade and duct wall to prevent noise. Provide external position indication and locking quadrant.
- C. For Rectangular Ducts Over 12": Furnish and install where indicated on drawings, size as required, manually operated, opposed blade damper, 16 ga. galvanized steel construction, concealed linkage, with manual locking quadrant. Model #VCD-20, Greenheck Fan Corporation; or equal.
- D. For Round Ducts: When volume damper is not an integral part of branch connection, furnish and install where indicated, size as required, manually operated, round air balancing damper, galvanized steel construction with manual locking quadrant. Model VCDR-53, Greenheck Fan Corporation.
- E. BD-1: Backdraft damper, nonmetallic type with blades constructed of neoprene coated fiberglass. Extruded aluminum channel. Model #BD51, Pottorff Mfg.; or an approved equal. Don't have a vinyl blade damper.

- F. BD-2: Counter balanced backdraft damper, constructed of 75 aluminum blades with neoprene blade seal and steel axles will ride on ball bearing. Model #EM-30, Greenheck Fan Corporation.
- G. OBVD-1: Opposed Blade Volume Damper, aluminum construction, parallel blade, Oilite Bronze bearings, Stainless steel jamb seals and vinyl blade seals, stainless steel linkage. Model #VCD-43, Greenheck Fan Corporation.

2.02 REMOTE CONTROL DAMPER REGULATORS

- A. RC-1: Concealed damper regulator, ceiling installation, embedded in the finished ceiling so unit is flushed with finished surface. Cover plate shall be 2-5/8". Finish shall be cadmium. Ceiling remote controller shall be Young Regulator Co., #301-HRS-3/8" with coupling; or equal. Furnish OBD control damper, Model #820A-C for operation from ceiling regulator, as manufactured by Young Regulator Company.
- B. RC-2: Round Duct: Furnish remote control circular damper, #850, as manufactured by Young Regulator Co.; or an approved equal. Furnish corner pulleys, union connectors, compression fittings and brass tubing, quantity as required. Furnish remote operator, #700-SM.
 - 1. Rectangular Duct: Furnish remote control OBD, extruded aluminum construction, Model #830A, as manufactured by Young Regulator Company; or an approved equal. Furnish with corner pulleys, compression fittings, union connectors, brass tubing and cable all as required for complete and proper installation. Furnish operator Model #700-SM, for surface mounting, Type "C" indicator dial, as manufactured by Young Regulator Company; or an approved equal.

2.03 FIRE DAMPERS

- A. FRD-A: Fire dampers used in transfer air sleeves between adjacent rooms above ceilings, UL listed 1-1/2 hour rating. Nailor Industries Model #0110 or equal.
- B. FRD-B: Fire dampers shall be manufactured, tested and labeled in accordance with UL 555 Safety Standard for Fire Dampers - Sixth Edition, June 1999, and shall have 1-1/2 hour fire resistance rating. Each fire damper shall bear a UL label verifying fire resistance rating in addition to intended mounting position. Fire dampers shall be suitably constructed for vertical or horizontal installation as required for each specific location. Each fire damper shall be complete with a 165°F (74°C) UL Listed fusible link. Fire dampers shall each include a steel sleeve of appropriate length/gauge and retaining angles, supplied by damper manufacturer to ensure proper installation in accordance with damper manufacturer's instructions. Damper to have blades out of air stream. Contractor shall provide and install an access door at each fire damper, of appropriate size to allow for inspection, testing and fusible link replacement. Information submitted for approval shall include confirmation of UL qualifications, pressure drop data and manufacturer's installation instructions. Fire dampers shall be Nailor Industries Models 0120 (Type B), or equal. Use Model 0130V or 0130H for round ducts.
- C. FRD-S: Provide fire/smoke dampers where indicated on drawings. UL 555S classified Class II leakage rating at 250 degrees and UL 555 listed 1-1/2 hour labeled. Nailor Model # 1270ERL with min. 16" long 20 gauge sleeve and 120 volt electric actuator, with actuator out of airstream, and 165°F heat responsive device. Contractor shall provide and install an access door at each fire damper, of appropriate size to allow for inspection and testing. Electrical contractor shall furnish smoke detector to heating contractor – heating contractor to install within 5'-0" of damper. Install detector per manufacturer's recommendations and requirements.

2.04 DUCT ACCESS DOORS

- A. Furnish and install where indicated on plans and/or required for access to life safety dampers, control probes, etc.; galvanized door with manual lock(s), double wall, 1" internal fiberglass insulation, galvanized steel frame, foam gasket seal, minimum 24 gauge construction. Label each access door at fire dampers with "Fire Damper" in letters no less than 1/2" high.
1. Hinged Type: Model #H-10, Buckley Air Products
 2. Double Latch Type: Model #C-10, Buckley Air Products

2.05 ARCHITECTURAL ACCESS DOORS

- A. Ceiling/Wall Access Door: door and frame for use in existing ceiling or walls. Door and frame fabricated from galvanized steel, thickness as scheduled, with rounded edges and concealed pivoting rod hinge. Frame shall be one piece construction with no miters or welds exposed on face. Door shall include screw driver type latch mechanism.
- B. For Existing Ceilings: Provide concealed 1-1/2"x 1-1/2" support angles to be used as a sub-structure to support door frame above existing ceiling.
- C. For Fire Rated Doors: Doors shall be UL Listed for fire rated service as scheduled. Door shall include heavy duty spring closer.

Tag	AD	ADF
Model #	BNTC 24x24	BIT 24x24
Manufacturer	Babcock-Davis	
Fire Rating (hours)	None	1.5
Fire Rating Label	None	B
Steel Thickness	16 gauge	16 gauge
Size (inches)	24x24	24x24
Weight (lbs)	16	24.5
Latches (Qty)	3	1
Notes	(1)(2)	(1)(2)

Notes:

- (1) Finish factory prime coat, contractor shall field paint white to match ceiling where located.
- (2) Contractor shall verify actual size prior to ordering if required to fit actual ceiling tile arrangement, size may be adjusted to 22x22. However, no gaps are to be allowed from door frame flange and adjacent existing ceiling tiles around perimeter.

2.06 CODE REQUIREMENTS

- A. All work shall be in accordance with all applicable codes including NFPA 90A, 90B, and SMACNA requirements.

PART 3 - EXECUTION

3.01 GENERAL

- A. Install all equipment in strict accordance with manufacturer's instructions.

3.02 DAMPERS

- A. Contractor to furnish all required hardware to complete installation of air split damper and regulator.
- B. Provide access doors for dampers not accessible from grilles.
- C. Dampers shall be installed so as not to cause stress or strain on the frames. Fasteners shall not interfere with proper operation of blades or linkages.
- D. Lubricate and thoroughly clean all moving parts according to the manufacturer's recommendations before initial operation.
- E. Seal all seams.
- F. Make all necessary adjustments to linkages to insure dampers open fully and close tightly over full stroke of actuator.
- G. Replace any damaged parts including blades, seals, linkages, etc.
- H. Install automatic vent damper in strict accordance with manufacturer's instructions and NFPA 54.

END OF SECTION 23 3300

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections apply to work of this section.

1.02 SUBMITTALS

- A. See Section 233330 for submittal requirements.

1.03 WORK INCLUDED

- A. Contractor shall provide all hangers and supports for all ductwork and air system equipment and accessories.
- B. Contractor shall field verify and coordinate all ductwork hangers and supports, dimensions, clearances, and ductwork elevations with new and existing building structure.

1.04 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 233330 - Low Velocity Ductwork
- B. Section 230713 - Duct Insulation

1.05 QUALITY ASSURANCE

- A. SMACNA Manual: Methods of supporting ductwork shall be in accordance with the SMACNA Manual, Section 1 - Low Velocity Systems", unless otherwise shown on the drawings or specified herein.
- B. SMACNA - Sheetmetal and Air Conditioning Contractors National Association, Inc.
- C. Electrically operated and power actuated tools for installing welded studs and power driven fasteners shall be listed by a nationally recognized test agency.

PART 2 - PRODUCTS

2.01 DUCT HANGERS

- A. All Hangers Shall Be Rod Type Hangers: Mild carbon steel, unless otherwise specified; fully threaded or threaded each end, with (2) removable nuts each end for positioning and locking rod in place. Unless galvanized or cadmium plated, provide a shop coat of red lead or zinc chromate primer paint.
- B. Hangers for ducts shall be as specified in the SMACNA Manual, with the following exceptions:
 - 1. Lower hanger attachments for rectangular duct with any dimension 18" and above shall be trapeze hangers, supported by threaded rods (3/8" dia. min.).
 - 2. Trapeze hangers shall be minimum 1-1/2" x 1-1/2" x 1/4" angle or larger size as required by larger or heavier ductwork. Ductmate trapeze hanger size AS and AT is acceptable.

3. Lower hanger attachments for rectangular duct with maximum dimension less than 18" may be flat strap attached directly to duct. Fasteners penetrating ducts must be completely sealed.
4. Wire used as supports or as banding shall not be acceptable.
5. Fasteners used on hanger system shall not penetrate supported ductwork. (Exception: Flat strap hangers, see above.)
6. Threaded support rods shall utilize sufficient support, jamb, and lock nuts to allow adjustment of duct heights.

2.02 MISCELLANEOUS FASTENERS AND UPPER HANGER ATTACHMENTS

- A. Machine Bolts and Nuts: Galvanized or cadmium plated steel.
- B. Steel "C" Clamp with Locknut: Elcen Co.; No. 29L, with 25B steel retaining clips.
- C. Structural Aluminum Shapes and Aluminum Plates.
- D. Structural Steel Shapes and Steel Plates: ASTM A-36, shop primed.
- E. Self Drilling Expanding Fasteners: Phillips type.

2.03 BRANCH FITTINGS, JOINTS & TURNING VANES

- A. Provide supports necessary for lengths over 16" or heights over 8".

PART 3 - EXECUTION

3.01 UPPER HANGER ATTACHMENTS

- A. General Notes: Upper hanger attachments for ductwork shall be secured to overhead structural steel or steel bar joists wherever possible, unless otherwise specified.
- B. In addition, when required by ductwork support spacing schedules, provide intermediate structural steel members, framed to span the structural steel or steel bar joists. The minimum size of structural steel members, for use as intermediate steel framing, shall be 2-1/2" x 2-1/2" x 1/4" steel angles. Intermediate steel members shall be shop prime coated prior to installation. Intermediate steel will be sized for span and load to show no deflection.
- C. Secure upper hanger attachments to bar joists at the panel points of joists.
- D. Do not drill holes in main structural steel members.
- E. Exercise extreme care in the field drilling of holes in precast or pre-stressed concrete work, so as to avoid damage to reinforcing. Power driven types of fastening devices shall have be utilized in the attachment of hangers to precast or pre-stressed concrete work.

- F. Upper hanger attachments shall be as specified in the Manual, with the following exceptions:
1. Do not use flat bar, bent rod, power actuated drive pins or expansion nails as upper hanger attachments in concrete construction.
- G. Attachment to Structural Steel: Secure to steel beams with beam clamps, welded studs, power actuated fasteners, or "C" clamps with lock nuts and minimum 1/8"x1" wide safety bars.
- H. Do not use power actuated fasteners except by written permission from the Engineer's Representative.
- I. Do not attach welded studs or powder actuated fasteners to steel less than 3/16" in thickness.
- J. Do not use power drive on beam clamps.
- K. Attachment to New Poured Concrete Construction: Support hangers from concrete insets. Properly locate and install concrete inserts in concrete form work as required, in ample time so as not to delay the construction work. Bolt band iron hangers to inserts with 3/8" bolts. Screw rods into proper size inserts and secure with lock nuts and washers.
- L. Attachment to Cellular Steel or Fluted Metal Decks: Do not support ductwork from cellular steel or fluted metal roof decks. Attach hangers to structural steel members wherever possible, and where required intermediate structural steel supporting members shall be provided, framed to span the structural steel.
- M. For attachment to overhead cellular steel or fluted metal decking, other than roof decks, hangers may be attached by means of welded studs with double nuts. The maximum load on any one stud shall be 250 lbs. **UNDER NO CIRCUMSTANCES SHALL UPPER ATTACHMENTS PENETRATE STEEL DECKING, OR ROOF DECK.**
- N. Riser Supports: Support vertical rectangular ducts by means of two steel angles or channels, anchor bolted to floor slab or adjacent structural member at every floor through which the riser passes. Steel angles or channels shall contact a transverse joint and be secured to the joints by means of 1/8" bolts, or by welding.
- O. Steel angle or channel support sizes shall be as follows:

Max. Side Dimension	Support Angle	Support Channel	Bear on Concrete or Structural Support
36"	1"x1"x1/8"	1"x1/2"x1/8"	2"
48"	1-1/2"x1-1/2"x1/8"	1-1/2"x3/4"x1/8"	3"
60"	2"x2"x1/8"	2"x1"x1/8"	3"
Over 60"	2-1/2"x2-1/2"x3/16"	2"x1"x3/16"	4"

3.02 DUCT HANGER SPACING

- A. The duct hanging method must be in accordance with this specification and is subject to Engineer's approval.
- B. Duct hanger spacing shall be in strict accordance with SMACNA and as follows:
1. Rectangular Duct Hangers Min. Sizes:

<u>Max. Half of Duct Perimeter</u>	<u>Rod Pair at 10' Spacing</u>	<u>Rod Pair at 8' Spacing</u>	<u>Rod Pair at 6' Spacing</u>	<u>Rod Pair at 4' Spacing</u>
Up to 72	1/4"	1/4"	1/4"	1/4"
73 to 96	3/8"	1/4"	1/4"	1/4"
97 to 120	3/8"	3/8"	1/4"	1/4"
121 to 168	1/2"	3/8"	3/8"	3/8"
169 to 192	1/2"	1/2"	3/8"	3/8"
Above	SEE SMACNA FOR SPECIAL CONDITIONS			

2. Round Duct Hanger Strap Sizes:

<u>Duct Diameter</u>	<u>Strap Hangers</u>	<u>Max. Spacing</u>
Up to 26"	One 1" x 22 Ga.	12 Ft.
27" - 36"	One 1" x 18 Ga.	12 Ft.
37" - 50"	One 1" x 16 Ga.	12 Ft.
51" - 60"	Two 1" x 18 Ga.	12 Ft.

See SMACNA, Table 5-3 for allowable loading for trapeze angles.

END OF SECTION 23 3310

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this section.

1.02 SUBMITTAL

- A. Layouts of duct systems shown on contract drawings are diagrammatic. Actual duct layout and fabrication shop drawings are required to be submitted for approval. Coordinate these shop drawings with other trades and existing conditions, as required for proper installation, prior to submittal.
- B. Please note that ductwork CAD files will not be given to the contractor. Contractor is expected to field verify and draw all ductwork.
- C. General duct layout, 3/8" = 1'-0" scale, of all duct systems, including dimensions and elevations.
- D. Ductwork shop drawings shall be fabrication drawings, showing actual intended location of ductwork and clearances. Ductwork elevations and architect's ceiling heights shall be noted on drawings.
- E. All areas where ductwork is below the architect's ceiling height shall be noted and clouded. **FAILURE TO NOTE BOTH BOTTOM OF DUCT ELEVATIONS AND ARCHITECT'S CEILING HEIGHTS WILL BE CAUSE FOR REJECTION.**
- F. Duct shop drawings shall show actual existing and/or new structural steel arrangements, and shall be coordinated to properly fit in intended spaces.
- G. Sheetmetal contractor shall verify that ductwork layouts are coordinated with all other construction trades which might cause a conflict. This contractor is required to provide copies of duct shop drawings to all applicable contractors for their use in coordination efforts.
- H. Immediately notify Engineer if a duct layout conflict is discovered.
- I. Submittal packages which do not include all items listed in this section will be considered incomplete and will be returned to the contractor without review.
- J. If a significant number of shop drawings are required, individual drawings may be submitted for review. Duct construction booklet must accompany initial submittal or it will be considered incomplete and returned without review.
- K. Fabrication of installation of ductwork shall not be permitted unless duct shop drawings and construction booklet are approved by Engineer.
- L. Contractor will be required to remove ductwork installed without duct submittals conforming to requirements of this section and approved by the Engineer.

1.03 DUCT CONSTRUCTION BOOKLET

- A. Duct construction booklet shall be submitted with initial duct layout drawing submittal.

B. The following is a basic list of materials, devices, methods, etc. that shall be described in the ductwork construction booklet submittal:

1. Manufacturer's data sheets for all purchased duct accessory components (damper hardware, duct liner, access doors, etc.)
2. Gauges of ductwork, material, method of construction, types of reinforcing and joints, etc.
3. Transverse and Longitudinal Joints
4. Duct Fitting Construction
5. Duct Sealing & Sealants
6. Duct Hangers, Type, Spacing, Upper, Lower
7. Special Supply Air Duct Construction Details (i.e. 14 gauge)
8. Branch Duct Connections Details
9. Acoustic Lining
10. Flexible Ductwork
11. Flexible Connection (to AHU's etc.)
12. Access Doors
13. Duct Accessories
14. Volume Dampers
15. Locking Quadrants
16. Remote Control Damper Regulators
17. Turning Vanes
18. Penetration Trim Frames
19. Fire Damper Installation Details
20. Fire Proofing Penetrations, Chase Safing
21. Specialty Duct Construction and Installation Methods
22. Other Specialty Equipment Connections

1.04 RELATED SUBMITTALS

A. The following shop drawings are required under other specification sections and must be submitted as separate packages (in addition to ductwork submittals detailed in this section).

1. Exhaust Fans
2. Louvers
3. Roof Hoods
4. Diffusers, Registers, Grilles
5. Ductwork Accessories:
 - a) Special volume control dampers
 - b) Fire and/or smoke dampers
 - c) Remote control damper actuators

1.05 WORK REQUIRED

- A. Contractor shall furnish materials and labor and shall fabricate and erect all sheetmetal ductwork including connections to units, all dampers, registers, diffusers and accessories as shown on the drawings, described herein and/or as required to make the air handling installations complete.
- B. Complete supply and return air ductwork serving all units.
- C. All exhaust air ductwork.
- D. Relief air ductwork.
- E. Ductwork and connection into existing air systems where applicable in existing building.
- F. Installation of all intakes and discharges including exhaust fans, louvers, roof hoods.
- G. Specialty ductwork and specialty equipment for applicable kitchen, fume exhaust, safety hoods, and other specialty systems where indicated.
- H. Modification of existing air system equipment to meet new air system requirements (i.e. - fan drives, belts, sheaves, fan motors, etc.).
- I. Complete balancing of all air systems.
- J. Contractor shall field verify and coordinate all ductwork, dimensions, clearances, and ductwork elevations with existing building structure.

1.06 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 230005 - MECHANICAL Work General
- B. Section 230593 - Testing, Adjusting & Balancing
- C. Section 230713 - Ductwork Insulation
- D. Section 233300 - Ductwork Accessories
- E. Section 233310 - Ductwork Hangers & Supports

1.07 QUALITY ASSURANCE

- A. SMACNA Manual: Gauges of materials, fabrication and installation of ductwork shall be in accordance with the SMACNA Manual, Section 1 - "Low Velocity Systems", unless otherwise shown on the drawings or specified herein.

- B. SMACNA - Sheetmetal and Air Conditioning Contractors National Association, Inc.
- C. New York State Energy Code.
- D. 2016 New York State Building Code.
- E. Electrically operated and power actuated tools for installing welded studs and power driven fasteners shall be listed by a nationally recognized test agency.

1.08 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect materials of this Section before, during and after installation and to protect installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.
- C. Delivery and storage: Deliver all materials to the jobsite in their original unopened containers with all labels intact and legible at time of use. Store in strict accordance with the manufacturer's recommendations.
- D. Ductwork that is shop fabricated shall be delivered to the site in quantities acceptable to the storage area that the General Contractor has available.

PART 2 - PRODUCTS

2.01 GENERAL

- A. For the purpose of establishing equality, certain manufacturers have been specified herein. In no way shall this be construed as limiting competition. Products of other manufacturer's may be proposed in accordance with the provisions of the Contract.
- B. Fabrication: All ducts, unless otherwise allowed, shall be true to dimensions indicated upon plans, straight and smooth on inside, with neatly finished joints. Securely anchor to building construction in acceptable manner, free from vibration under all conditions of operation, and properly brace and reinforce with aluminum angle or other structural members. Slip joints shall be in direction of flow. Elbows shall have centerline radius equal to 1-1/2 times width of duct.
- C. **NOTE: ALL DUCTWORK SERVING A VAV SYSTEM SHALL BE RATED FOR 3 IN. W.G. STATIC (POSITIVE OR NEGATIVE) AND SHALL CONFORM TO SMACNA. ALL OTHER DUCTWORK SHALL BE RATED FOR 2 IN. W.G. STATIC (POSITIVE OR NEGATIVE).**
- D. All ductwork with a 4 to 1 ratio, and higher shall have a Condu-lock internal reinforcing at midpoint between joints, both horizontally and vertically.
- E. All ductwork 10 ft downstream of a VAV to be internally lined, whether shown or not.

2.02 SHEETMETAL

- A. Galvanized Steel: ASTM A653/A653M lock forming quality – zinc-coated (galvanized): ASTM A653/A653M commercial coating class – 0.9 oz. per sq. ft.

- B. 2" W.G. Low Pressure Rectangular Duct Construction:
1. Note: These gauges are 1 gauge heavier than required by SMACNA.

<u>Longest Side</u>	<u>Gauge</u>	<u>SMACNA Rigid Class (1)</u>	<u>Stiffeners Spacing</u>
0-12"	24	A	5'
13-30"	22	B	5'
31-54"	20	B	5'
55-84"	18	E	5'

- C. 2" W.G. Low Pressure Round Duct Construction:

<u>Diameter</u>	<u>Gauge</u>
0-12"	26
13-24"	24
25-36"	22

- D. Aluminum Ductwork: Use 1 gauge heavier than required by SMACNA Standards.

2.03 LONGITUDINAL JOINTS FOR RECTANGULAR DUCT

- A. Seams shall be formed and assembled with proper dimensions for tight and secure fit. Notching shall be minimal consistent with transverse joint requirements.
- B. Standard longitudinal seam shall be Pittsburgh Lock. Standing seams are not acceptable.

2.04 TRANSVERSE JOINTS FOR RECTANGULAR DUCT

- A. Joint type shall be selected on the basis of $\pm 2"$ wg. Pressure class, materials, support intervals, and other provisions for proper assembly of ductwork.
- B. All transverse joints with any dimension greater than 16" shall be constructed with the Duct Mate system; or an approved equal. All transverse joints 16" and less shall be slip and drive.
- C. Contractor shall submit for approval the intended joint type with the duct construction detail book submittal.
- D. Turning Vanes and Vane Runners: Weld runners to duct and weld vanes to runners, all as shown on the drawings. All turning vanes shall be air foil type.

2.05 DUCTWORK FITTINGS

- A. All elbows on main supply ducts shall be radiused type fittings.
- B. Where square elbows are allowed, turning vanes shall be used. Square fittings without turning vanes are not permitted.

2.06 BRANCH CONNECTIONS

- A. Furnish and install where indicated on drawings, size as required, the following:
 1. For rectangular branch ducts: 45 degree cinch collar, each branch duct to include a volume damper.

2. For round duct branches: High efficiency take-off type fitting with integral volume damper.
3. Branch duct connections regardless of size or type will be fully sealed by an approved method.

2.07 ROUND DUCT CONSTRUCTION

- A. Round duct seams shall be spiral lockseam type. Snap lock or lap seams are not acceptable. Duct and fittings shall be single wall Uni-Seal Duct, United McGill Corp.; or equal, unless noted otherwise.

2.08 FLAT OVAL

- A. Duct shall be of a spiral lock seam construction with a mechanically formed seam locking indentation evenly spaced along the spiral seam. All spiral duct 8" diameter and larger shall incorporate multiple corrugations between spiral seams. Duct shall be galvanized steel that conforms to ASTM standards A653 and A924 and be in accordance with SMACNA 2005 Duct Construction Standards and shall conform to SMACNA's MECHANICAL Duct Construction Standards for +10" water gauge pressure. Connection methods shall be slip-fit with all joints being sealed by the installer during the installation process. The type of sealant used as well as the method and level of application should be in accordance with the sealant manufacturer's published installation instructions and as specified hereinafter. All fittings that are either spot-welded or button punched construction are internally sealed. All transitions and divided flow fittings which convert from flat-oval to round 60" diameter or less. Provide 1" lining where indicated on drawing.

2.09 DUCT SEALING REQUIREMENTS

- A. All ductwork, fittings, connections to equipment, damper connections, branch duct connections, and other duct system joints shall be sealed in accordance with the duct system sealing schedule.
- B. The term sealed requires the use of liquids, mastics, combination mastics and open weave fabric, gaskets, or other sealing compounds made exclusively for duct work applications. Oil base caulking and glazing compounds shall not be used.
- C. Tapes shall not be applied to metal surfaces or to dry sealant.
- D. Liquid: As recommended by the manufacturer of the ductwork.
- E. Mastic: 3M Co. #ED-800 or 900.
- F. Gaskets: Soft neoprene or reinforced inert plastic of the self conforming type.
- G. Special Note: All sealants must be applied in ambient temperatures exceeding manufacturer's recommendations to insure proper setup.
- H. Seal all penetrations with Manville Pyro-Fiber safing; or equal. Provide safing clips and joint sealant.

2.10 DUCT SYSTEM SEALING SCHEDULE

- A. Supply, Return & Exhaust Ductwork: Completely seal all transverse joints and longitudinal seams.
- B. Connection to Equipment: Use flanged connections to equipment, provide gasket to seal between flanges. Bent sheetmetal is not acceptable as a flange. Use steel angle or heavy gauge flat bar as a back up surface.

2.11 DUCT LINER

- A. Furnish and install where indicated on drawings, acoustic duct liner.
- B. Duct liner shall: made from flame attenuated glass fibers bonded with a thermosetting resin, air stream side to be coated with a non abrasive black surface. Furnish 2" thick, permacoat Linacoustic manufactured by Johns Manville; or equal. Duct liner rated for use at 250°F, 5000 fpm, with a k-factor of 0.25 and acoustical performance NRC of 0.70.
- C. Ductwork having internal lining is not to be externally insulated, unless otherwise noted.
- D. Any lined duct that has had water on the liner, shall be deemed unusable and will be required to be immediately removed from the site. The contractor shall provide an new section at no cost to the owner.
- E. Note: Duct sizes shown are net inside duct dimensions, not including internal liner. Failure to comply with this requirement will be grounds for rejection.

2.12 FLEXIBLE DUCTWORK

- A. Furnish and install where indicated on drawings, bi-directional reinforced metallized vapor barrier with triple ply stand-up seam; acoustically rated black CPE liner permanently bonded to a coated spring steel wire helix and supporting a thick blanket of fiberglass insulation. UL listed, Class 1 air duct. Flexible Tubing Division, Thermaflex, Type MKE; or equal. For connections to rectangular duct, use Bellmouth fittings with integral volume damper. Flex duct is not to be connected directly to rectangular main ducts. Duct centerline radius to duct diameter ratio not to exceed 1.5. Flex duct to have minimum R-value of 6.0.
- B. Maximum length of flexible ductwork not to exceed 8'-0".

2.13 EQUIPMENT CONNECTIONS

- A. All equipment shall be connected to ductwork with flexible duct collars.
- B. Flexible connection shall be heavy glass fabric, coated with "Durolon", weighing approximately 24 oz. per sq. yard, as manufactured by Duro Dyne Corp.
 - 1. For ducts 30" and below use 3" free length
 - 2. For ducts above 30" use 5" free length.

2.14 TRIM FRAMES

- A. Whenever ductwork passes through masonry, furnish and install mitered angle trim frames around ductwork to conceal rough masonry opening.

2.15 EXTERIOR DUCTWORK

- A. If there is any exterior ductwork to be installed on the project, there shall be a mandatory meeting with the MC, the sheetmetal subcontractor, insulation subcontractor, the owner's representative and the engineering field representative prior to any duct being fabricated.
- B. The MC shall produce a detail of how they will install the ductwork with respect to attachment to the

duct supports, detail of how the duct shall penetrate a wall or roof and installation of insulation and external weather wrap.

- C. All exterior ductwork shall be pressure tested prior to insulation being installed \ to a minimum of 2 in wg. A report shall be given to the owner's representative and the engineer stating that the duct had been tested, any leaks have been sealed and the duct retested to ensure no leakage.
- D. All exterior ductwork over 18" shall be a minimum of 18 gauge, with a ductmate connection every 5 ft. All ductwork over 24" shall have condu-lock-internal reinforcing at every joint and at midpoint between joints. Exterior supports shall be a minimum of every 8 ft.
- E. All exterior ductwork transverse connections shall be ductmate connection. TDF will not be acceptable on the exterior of the building. All longitudinal seams will be sealed.
- F. There shall be no breaks in the external wrap on the ductwork. If there are any openings that need to be made (balancing, equipment, etc) the MC is fully responsible for sealing the opening immediately. If rain goes on the ductwork prior to the wrap being sealed, the MC shall be fully responsible to remove all wrap and insulation to the owner's representative and engineering field representative's satisfaction that there is no water on the insulation and provide new insulation and new external wrap per specifications.

PART 3 - EXECUTION

3.01 APPLICATION

- A. Properly seam, brace, stiffen, support and render ducts mechanically air tight. Where SMACNA plates and/or the specifications indicate duct stiffeners or reinforcing angles, they shall be continuous around all four sides and interlock at corners.
- B. Adjust ducts to suit local conditions, and if necessary to accomplish this, dimensions may be changed, as approved, but maintain cross sectional area. Install ductwork so as to provide maximum headroom, unless otherwise noted on the drawings.
- C. In addition to having all shop joints in ductwork fabricated in accordance with the Manual, all field joints shall be sealed air tight in accordance with the duct seal schedule.
- D. Where turning vanes, balancing damper or any other kind of products are installed, ductwork must be reinforced at all four sides and interlocked at corners.

3.02 FLEXIBLE DUCTWORK CONNECTIONS

- A. Flexible connections shall be made with tie straps as made by Panduit; or equal. Straps shall be used to clamp both inner and outer liner to diffuser and branch ductwork. (2) straps are required at each end of flexible ductwork.

3.03 CONNECTIONS TO MISCELLANEOUS DUCT EQUIPMENT

- A. All duct connections to duct coils, etc. must be made with smooth transitions in accordance with SMACNA. Duct dimensions specified upstream and downstream (net free area) must be maintained. Sizing ductwork to match miscellaneous equipment is not acceptable, unless design conditions are met.

END OF SECTION 23 3330

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including the General and Supplementary Conditions and Division 1 Specification Sections apply to the work of this section.

1.02 SUBMITTALS

- A. See Section 233330 for submittal requirements.
- B. In addition to plan layouts, provide vertical sections describing all vertical grease duct runs.
- C. Shop drawings shall indicate allowance for fire proof insulation.
- D. Construction booklet shall include all special construction methods for grease duct.
- E. Detail all grease duct special access doors and openings.

1.03 WORK INCLUDED

- A. Definition: For the purposes of this specification, ductwork serving cooking hood exhaust shall also be known as grease duct.
- B. Furnish materials, labor to fabricate and erect sheetmetal ductwork and all accessories specified in this section.
 - 1. Complete cooking hood exhaust air ductwork system.
 - 2. Connection to kitchen hood & exhaust fan.
 - 3. Access door assemblies. Access doors shall be located at each floor penetration and at each change of direction.

1.04 RELATED WORK

- A. Work in this section shall be in accordance with applicable provisions in section 233330 - Low Velocity Ductwork.
 - 1. Section 233310 - Ductwork Hangers and Supports
 - 2. Section 233813 - Kitchen Exhaust Hoods
 - 3. Section 230713 - Ductwork Insulation

1.05 CODE REQUIREMENTS

- A. All work shall be in accordance with all applicable codes including NFPA 90A, 90B, and SMACNA requirements.
- B. All ductwork covered under this section shall be in strict accordance with NFPA 96 (standard for "Installation of equipment for removal of smoke and grease laden vapors from commercial cooking equipment").

PART 2 - PRODUCTS

2.01 DUCTS SERVING TYPE I HOODS (GREASE AND SMOKE)

- A. Kitchen hood ducts shall be black carbon steel minimum thickness No. 16 MSG (0.054").

- B. All seams, joints and penetrations shall have a liquid tight continuous external weld.
- C. No internal projections or obstructions of any kind will be allowed in grease ductwork.
- D. Use of bolted or flanged type connections are not permitted. The outer surface of the grease ducts shall be smooth with no flanges or other projections (exception: external weld bead).
- E. Use of fasteners which penetrate the duct wall or project into the duct are not permitted.
- F. Duct systems shall be continuous and liquid tight with no penetrations except access doors.
- G. All fittings shall be radiused type ELLS; no mitered elbows, turning vanes, or joints are permitted.
- H. Connections to equipment shall be by an approved method and shall be liquid tight.
- I. Ductwork accessories shall be listed for this application.
- J. All grease ducts shall be hung with trapeze hangers.
- K. Contractor Option: Supply listed prefabricated grease ductwork. A pre-engineered UL listed for grease duct system is acceptable as a substitution.
- L. Access Doors:
 - 1. Factory-fabricated, -listed, and -labeled, double-wall access doors tested according to UL 1978 and rated for 500 deg F continuously, or 2000 deg F for 30 minutes; with positive or negative duct pressure and complying with NFPA 211.
 - 2. Construction: 0.0625 inch ASTM A666, Type 304 stainless-steel inner shell and aluminized-steel outer cover with two handles.
 - 3. Fasteners: Stainless-steel bolts and wing nuts.
 - 4. Access Door Dimensions: 18 x 12 inches or as shown on drawings and required to fit duct.
 - 5. Door Label: Mark door with uppercase lettering as follows: "ACCESS PANEL. DO NOT OBSTRUCT."

2.02 DUCTS SERVING TYPE II HOODS (HEAT AND STEAM)

- A. Ducts shall be Type 304, stainless-steel sheet, No. 2D finish
- B. All longitudinal seams shall be welded.
- C. All transverse joints shall either be welded or flanged with watertight EPDM gaskets.
- D. All ductwork shall be hung with trapeze hangers.
- E. No internal projections, obstructions, or fasteners of any kind will be allowed ductwork.
- F. Duct systems shall be continuous and liquid tight with no penetrations except access doors.
- G. All fittings shall be radiused type ELLS; no mitered elbows, turning vanes or joints are permitted.
- H. Connections to equipment shall be by an approved method and shall be liquid tight.

PART 3 - EXECUTION

3.01 DUCTS SERVING TYPE I HOODS (GREASE AND SMOKE)

- A. Install all ducts without dips and traps that may hold grease, and sloped a minimum of 2 percent to drain grease back to the hood.
- B. All joints shall be welded and shall be telescoping, bell, or flange joint as per NFPA 96.
- C. Ductwork shall be sized to maintain a minimum air velocity of not less than 1500 FPM (unless shown on drawings sized for higher velocity).
- D. Dampers and auxiliary equipment shall not be installed in grease ducts unless listed for use in this application.
- E. Access doors shall be provided at each change in direction and at each floor penetration.
- F. For access doors, weld 3/8" studs to 3" deep extension frame, studs shall be spaced 4" O/C. Fully welded door shall be formed to fit into extension frame to allow a flush inner surface. Provide 1500°F high temperature gasket for each door. Weld flat stock handle to project through insulation on each plate. Ensure fasteners do not penetrate interior of duct space.
- G. Access doors shall not be located on the bottom side of ductwork, unless specifically allowed by the Engineer. Openings for access doors shall be cut into the side of ducts approximately 2" minimum above bottom surface to prevent possible leakage.
- H. Testing: Prior to the use or concealment of any portion of grease ductwork, a leakage test shall be performed by passing a light over the entire section of ductwork to be tested per section 506.3.2.5 of the Mechanical Code.

3.02 DUCTS SERVING TYPE II HOODS (HEAT AND STEAM)

- A. Install dishwasher exhaust ducts and other exhaust ducts from wet, high-humidity locations without dips and traps that may hold water. Slope ducts a minimum of 2 percent back to dishwasher or toward drain.
- B. Provide a drain pocket at each low point and at the base of each riser with a 1-inch trapped copper drain from each drain pocket to open site floor drain.
- C. Minimize number of transverse seams.
- D. Do not locate longitudinal seams on bottom of duct.

END OF SECTION 23 3351

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary conditions and Division 1 Specification Sections, apply to work in this section.

1.02 SUBMITTALS

- A. Schedule of exhaust fans and all accessories.
- B. Sound power ratings.
- C. Product data sheets for all equipment.
- D. Dimensioned shop drawings.
- E. Special Note: Fans sizes may be selected for future capacities. Fan size substitutions which do not meet intended future capacities will not be accepted.
- F. Provide submittal indicating maximum, minimum and design RPM for fan size.

1.03 GENERAL REQUIREMENTS

- A. Provide supply, and exhaust fans to fit intended use and location as indicated on plans and/or specified.
- B. Capacity, size and arrangement, static pressure, brake horsepower, component parts and accessories as scheduled and/or as necessary to obtain required results and allow for proper maintenance. Motor efficiency shall comply with EISA standards.
- C. Ratings based on tests made in strict accordance with current AMCA sound and performance standards including standard #210.
- D. Each size fan to be supplied shall be tested in the manufacturer's laboratory under simulated installation **CONDITIONS**. Ratings based on test, not on interpolated or extrapolated calculation.
- E. Submit certified performance tests by AMCA for all centrifugal fans 5,000 CFM and larger.
- F. Guaranteed full capacity delivery through duct systems finally installed and under conditions listed.
- G. Guaranteed sound-power level ratings not exceeding those of design equipment.
- H. All equipment statically and dynamically balanced to acceptable tolerances with all weights permanently fastened.
- I. When dampers are supplied, furnish all necessary relays and devices to permit operation.

PART 2 - PRODUCTS

2.01 CENTRIFUGAL FANS DESCRIPTION

- A. Centrifugal fan belt driven (unless otherwise noted). Fabricated from formed and curved material with continuously welded seams. Provide removable covers or access doors to allow access to internal parts. Drive frame structure constructed of heavy gauge galvanized steel.
- B. Drive assembly and wheel shall be removable without disassembly of fan housing. Fan shaft shall be painted to avoid corrosion. Furnish accessory hinging kit to facilitate access to fan internal components and ductwork.

2.02 MOTORS

- A. All motors shall be general purpose squirrel-cage induction type, NEMA Design 8, Class 8 insulation, continuous duty, 40°C ambient, single or multiple speed as scheduled, designed for 60 hertz operation.
- B. All three phase motors shall be NEMA Premium Efficiency design. Motor efficiency shall be indicated on the motor nameplate by the manufacturer per IEEE Standard 112 Method 8 in accordance with following tables:

Open Drip Proof (ODP)

Horsepower	1200 RPM	1800 RPM	3600RPM
1	82.5%	85.5%	77.0%
1.5	86.5%	86.5%	84.0%
2	87.5%	86.5%	85.5%
3	88.5%	89.5%	85.5%
5	89.5%	89.5%	86.5%
7.5	90.2%	91.0%	88.5%
10	91.7%	91.7%	89.5%
15	91.7%	93.0%	90.2%
20	92.4%	93.0%	91.0%
25	93.0%	93.6%	91.7%
30	93.6%	94.1%	91.7%

Totally Enclosed Fan-Cooled (TEFC)

Horsepower	1200 RPM	1800 RPM	3600 RPM
1	82.5%	85.5%	77.0%
1.5	87.5%	86.5%	84.0%
2	88.5%	86.5%	85.5%
3	89.5%	89.5%	85.5%
5	89.5%	89.5%	86.5%
7.5	91.0%	91.7%	98.5%
10	91.0%	91.7%	90.2%
15	91.7%	92.4%	91.0%
20	91.7%	93.0%	91.0%
25	93.0%	93.6%	91.7%
30	93.0%	93.6%	91.7%

- C. Single speed motors shall operate at 1750 RPM unless otherwise indicated.

D. For All Motors with Motor Starters:

1. Provide premium efficiency motor.
2. Fractional HP motors shall be equipped with internal automatic reset thermal overload switch.
3. Provide factory mounted and wired safety disconnect switch; locate in motor compartment. When disconnect will not fit in motor compartment furnish weatherproof NEMA 3R safety switch for external mounting.

E. Motors for Units With Variable Frequency Drives:

1. Motor shall be rated for inverter duty.
2. Provide motor of continuous duty, 1.15 SF, NEMA Class F insulation
3. For fractional horse motors with variable frequency applications provide permanently split capacitor or shaded pole type motor.
4. See Specification Section 238505 - Variable Frequency Drive Systems for further details.

F. ECM Motors

1. Motor to be an electronic commutation (EC) motor specifically designed for fan applications. AC induction type motors are not acceptable.
2. Motors shall be permanently lubricated with heavy-duty ball bearings to match the fan load and prewired to the specific voltage and phase.
3. Internal motor circuitry shall convert AC power supplied to the fan to DC power to operate the motor.
4. Motor shall be speed controllable down to 20% of full speed (80% turndown).
5. Provide fan with the following fan speed control device (unless otherwise noted):
 - a) Constant Speed Operation: Fan speed potentiometer, factory mounted and wired, for fan operation at a constant volume. Potentiometer shall be utilized for balancing.
 - b) Variable Speed Operation: When scheduled with multiple airflows, a fan speed controller capable of accepting a 0-10 VDC signal from BMS, and any required transformer for powering controller to allow for variable speed operation throughout the range indicated. Contractor shall be responsible for any field wiring of components if they do not come factory mounted and wired.
6. Motor shall be a minimum of 85% efficient at all speeds.

2.03 FAN DRIVE ASSEMBLIES

- A. Fan manufacturer shall furnish motors, V-belts and drives complete and ready to operate. Drives shall include the following:
1. Drives rated at 150% of motor horsepower.

2. Motors 5 HP and larger: Minimum of two belts.
 3. Use only matched belt sets for multiple drives.
 4. Cast iron or cast steel pulleys.
 5. Provide test holes in belt guards for speed checks.
 6. Provide shaft guards where shafts extend beyond belt guards.
 7. Adjustable type motor pulley with 15% speed adjustment above and below rated speed.
 8. Drive ratio not over 4:1 except as otherwise approved.
- B. For Variable Frequency Applications:
1. Do not use belt drives
 2. All variable frequency applications shall utilize direct drive fans.

2.04 FAN BEARINGS

- A. Fan manufacturer shall furnish all fans with self-aligning, grease lubricated, ball or spherical roller bearings selected in accordance with rating method of Anti-Friction Bearing Manufacturers' Association, so "rating life" is not less than 50,000 "life hours" continuous operation at maximum speed and pressure for each AMCA fan class. If requested by Engineers, submit bearing selection calculations for approval.

2.05 VIBRATION ISOLATION

- A. Fan manufacturer to furnish vibration isolation equipment for each piece of equipment supplied.

2.06 KITCHEN FANS

- A. Equipment shall meet latest edition of NFPA Article 96 (Requirements for commercial cooking equipment).
- B. Kitchen fans shall be similar to standard exhaust fans with the following additional requirements:
1. Fan(s) shall be upblast vertical discharge type.
 2. Motor and drives isolated from air stream with insulated barrier.
 3. Oversized air tube for motor cooling located away from fan discharge.
 4. Grease trough with drain connection to baffled grease trap container.
 5. Vented curb extension to meet 40" minimum discharge height above roof surface.
 6. Weatherproof NEMA 3R disconnect switch mount on curb extension (wiring connections in liquid tight flexible conduit by EC).
 7. Hinging kit to allow fan to be opened to facilitate access to ductwork.
 8. Fans must be UL/cUL 762 listed.

2.07 ROOF CURBS

- A. Furnish prefabricated welded galvanized steel roof curb for all roof fans. Roof curb with rigid fiberglass insulation and wood nailer held in place by metal wrap-around. Standard height to be 12"

above finished roof unless otherwise noted. Roof curbs will be fully assembled and placed onto the roof by the MC for installation by GC.

- B. Bottoms of curbs to sit level on roof. Contractor is to verify any roof pitches prior to submittal. Provide pressure treated wood blocking to raise roof curb base to top of finished roof surface.
- C. Roof curb to include metal liner to protect insulation (NO EXCEPTIONS!).
- D. Cant strips formed into curb body. Provide raised cant for use with insulated roof decks. For fans located on rubber roof membranes raised cant is not to be supplied with curb.
- E. For units with dampers furnished by fan manufacturer provide damper shelf mounted inside of curb. Alert duct sub-contractor to this condition for proper damper and duct installation.

2.08 UTILITY SET

A. Description:

- 1. Factory-fabricated, -assembled, -tested, and -finished, centrifugal fan utility vent sets, consisting of housing, wheel, fan shaft, bearings, motor, drive assembly, and support structure. Fan shall be belt or direct driven per equipment schedule.

B. Housings:

- 1. Housing Material: Reinforced steel., treated with a high performance powder coating, unless otherwise noted.
- 2. Formed panels to make curved-scroll housings with shaped cutoff.
- 3. Panel Bracing: Steel angle- or channel-iron member supports for mounting and supporting fan scroll, wheel, motor, and accessories.
- 4. Discharge Arrangement: Fan scroll housing field rotatable to any multiple discharge positions. Provide fan with discharge positioned in proper direction to minimize connected duct turns.

C. Wheels:

- 1. Wheel Configuration: SWSI, with hub keyed to shaft, statically and dynamically balanced.
- 2. Wheel and Blade Materials: Steel unless otherwise noted to attain a spark resistant construction rating per equipment schedule.

D. Shafts:

- 1. Turned, ground, and polished steel; keyed to wheel hub. First critical speed at least 1.4 times maximum class speed.

E. Required Accessories:

- 1. Companion Flanges: Rolled flanges for duct connections of same material as housing.

2. When motorized dampers are not indicated, provide backdraft dampers of gravity actuated type with counterweight and interlocking aluminum blades, with felt edges in steel frame installed on fan discharge.
 3. Belt Guard: OSHA-compliant, completely enclosed shaft and drive components.
 4. Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
 5. Equipment Rails with housed vibration isolators – isolators shall be appropriate for mounting type and location.
- F. Additional required accessories when roof mounted:
1. Drain Connections: NPS 3/4 threaded coupling drain connection installed at lowest point of housing.
 2. Weather Hoods: Weather resistant with stamped vents over motor and drive compartment.
 3. Roof Equipment Support Rails: This contractor shall furnish prefabricated 18 gauge welded galvanized steel rail with integral base plate. Size to be 12" larger than unit that it supports or a minimum of 8" overhang each end over joist (whichever dimension is larger). This contractor shall verify actual length dimensions required. This Contractor shall provide pressure treated top rail/wood blocking and metal cap flashing of sufficient width and length to cover insulation. Insulation, flashing, roof membrane, cap flashing and sealants shall be installed on rail by General Contractor. Rail to be Model ER-2B; RPS Corporation.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install equipment in strict accordance with manufacturer's instructions and so as to be compatible with intent of the respective system performance requirements.
- B. Field services shall be provided by a factory trained representative to fully set-up and adjust the new units, after the installations have been completed and before the units are placed in service. Written start-up report to be furnished. Factory alignment, mechanical seals, lubrication, three phase motor rotation, and all necessary commissioning tests shall be completed and checked before units are placed in service.
- C. Install vibration isolators in strict accordance with manufacturer's instructions.
- D. Provide all necessary supporting ironwork for equipment requiring same.
- E. Provide guards for all exposed belts, shafts or fan wheels.
- F. Change pulley sizes as many times as necessary, as part of contract, to make systems deliver specified quantities of air.
- G. Roof curb must be roofed and flashed to the top of wooden nailer to assure weather tightness.
- H. Bolt fan housing to curb.

- I. Install vibration isolation per manufacturer's requirements. Bolt, provide hold down tabs over bottom isolator plate, or lag to equipment rail, floor, support steel, or other mounting location to ensure a stable, secure installation of equipment.

END OF SECTION 23 3416

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.02 SUBMITTALS

- A. Schedule indicating drawing no., room location, quantity, size, throw, direction of throw, accessories, finish, material type, color chart, etc.
- B. Product data sheet for each unit indicating throw, noise criteria ratings, directional data (four-way, etc.) material, accessories, mounting details, etc.
- C. Noise criteria shall conform with specified equipment performance data.
- D. If requested by Engineer, provide sample of diffuser, register, grille, etc.

1.03 GENERAL REQUIREMENTS

- A. Duct drawings are diagrammatic and do not provide exact locations for diffusers, registers and grilles. Contractor shall reference reflected ceiling plans or instructions by Architect for a more exact location of diffusers, etc., with respect to ceiling grid, light fixture and sprinkler etc.
- B. Each manufacturer shall check noise level ratings for their equipment to insure that the sizes selected will not produce noise to exceed 30 db, "A" scale, measured at occupant level; notify Engineer of any problems in this regard and change equipment size accordingly.

1.04 REQUIREMENTS FOR DIFFUSERS, REGISTERS AND GRILLES

- A. All units and accessories shall be installed "sight-proof" where possible.
- B. Borders and frames shall be of same material and color as specified for grille face.
- C. Total quantity of air equally divided, or as required and/or shown, where diffusers blow in more than one direction. Provide blank off plate (finished to match unit) to match blow pattern shown on drawings.
- D. Each supply register and diffuser shall be guaranteed to deliver indicated capacity and proper throw with draftless diffusion, and within acceptable noise level.
- E. Limit terminal velocity at walls of room, below 25 fpm, measured 4' above floor.
- F. Contractor shall provide proper duct connection to all diffusers, registers and grilles. Ductwork connections shall be as required by unit manufacturer. Connections required by Contractor include but are not limited to square/round adapter, transitions, flanges, neck rings, etc.
- G. Because of intricate system designs and special performances required, all devices may not be of same make.
- H. Suitable for recessed mounted unless otherwise indicated.

- I. Diffusers and registers that are scheduled with integral opposed blade volume damper at neck must match unit construction and must be able to be adjusted through face, without removing unit.
- J. Diffusers, registers and grilles do not require volume control dampers unless specifically indicated.
- K. All exposed fasteners must be tamper proof.
- L. Security Grille Face: Where indicated, provide heavy duty security type, tamper proof, secure grille face. Grille shall be 12 ga. thick cold rolled steel 1/2" sq. perforated grille. Fasteners shall be located 6" C/C around perimeter. Unit shall have white prime finish suitable for field painting. Provide A.J. Manufacturing Co.; or equal.

PART 2 - PRODUCTS

2.01 GENERAL

- A. See drawings for schedule.

2.02 TRANSFER GRILLE ASSEMBLY

- A. TG-1: Furnish and install where indicated on drawings, TG-1 assembly consisting of: (2) grilles, (1) fire damper and (1) duct sleeve. Each grille shall include plaster frame. Fire damper shall be 1-1/2hr, Air Balance Model #119AF; or equal. Locate as shown. Paint all visible interior surfaces flat black. Do not paint fire damper.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. All equipment specified under this section shall be installed where called for on plans and in compliance with the contract documents.
- B. Install equipment in strict accordance with manufacturer's instructions and so as to be compatible with intent of the respective system performance requirements.
- C. Diffusers in lay-in type ceiling tiles shall be located at center of tile, squared with tile edges.

END OF SECTION 23 3713

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions and Division 1 Specification Sections, apply to the work of this section.

1.02 SUBMITTALS

- A. Submit shop drawings on all equipment specified. Operation and maintenance manuals.

PART 2 - PRODUCTS

2.01 GENERAL PROVISIONS

- A. Furnish and install a complete kitchen exhaust hood and system components as manufactured by Econovent Systems, Inc. The exhaust system is to be the compensating type, using un-tempered filtered outside air introduced into the hood front.
- B. Exhaust double wall canopy shall be constructed of 16 ga. polished No. 304 stainless steel with No.4 finish; both the exterior shell and interior liner. Exterior shell shall be liquid tight, continuously welded, with all visible welds ground smooth and blended, conforming to the latest edition of NFPA Bulletin No. 96. Exhaust canopy shall bear the NSF No. 1113 label, BOCA label per research report 78-46, and UL label listing fusible link fire damper at the exhaust collar.
- C. The supply air chamber shall have a fully insulated interior with 1", 3 lb. density aluminum skin vapor barrier insulation. Insulation shall be fastened to the chamber walls with a cured mastic tape. Below each supply air inlet opening, a perforated metal air diffuser plate shall be installed to ensure an even air distribution.
- D. The exhaust canopy shall include UL listed 115V vaporproof incandescent lights. All lights shall be factory mounted and wired in conduit to a power junction box, for field connection to the power supply. Light bulbs are not included.
- E. Exhaust canopy shall include 2" deep UL listed aluminum panel extractors or mesh grease filters. Filter removal tool shall be included.
- F. The kitchen exhaust fans shall be as manufactured by Jenn-Air, upblast configuration for use in kitchen grease exhaust systems. Fan(s) must include all aluminum construction and internal service disconnect switch.
- G. Supply air fans shall be Econovent Systems. All air must pass thru metal mesh air filters mounted before the centrifugal fan wheel. Fan(s) must include internal service disconnect switch.
- H. All roof curbs are to be provided by the fan supplier and shall conform to local codes. Curb construction shall be aluminum with a 2"x2" wood nailer around the full perimeter of the curb inside diameter. All exhaust canopies include an opposed blade balancing damper for field installation at each canopy's supply air damper.

- I. A control panel is provided by the kitchen exhaust system supplier to interface with and control the exhaust system operation. This panel shall include fan motor starters and fuses, light interlocks, and pilot lights to indicate supply fan or exhaust fan operation.
- J. All supply air and exhaust air openings are to be on the centerline of the canopy and these openings must be factory cut with duct collar.
- K. Fire Suppression System: All hoods shall be served by a single fire suppression system located on the KEH-1 hood as shown on drawings. The system shall automatically: protect the exhaust ducts, hood, and cooking appliances and shut off the main fuel supply to the appliances by means of a mechanically activated gas line shut off valve. The valve shall have resilient seating with an aluminum body and stainless steel internal parts. In addition, the valve shall have an external indicator of the closed or open position. The system shall be furnished with manual pull stations where shown on drawings. The system enclosure shall be an integral part of the exhaust hood and shall match the hood finish. The enclosure shall also provide enough room to house the electrical control panel serving the hood. The enclosure access door shall be custom made to accommodate the ceiling recess of 4". The system shall be Ansul #R-102; or equal.
- L. Skirting: Provide closure panel (height as scheduled) to run vertically from top of hood to ceiling height. Panels shall be removable for service.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. This installing contractor shall guarantee all materials and workmanship for one (1) full year from the date of system acceptance by Owner.
- B. All exhaust ductwork from the exhaust canopy to the exhaust fan shall be 16 ga. welded black iron, liquid tight, and shall conform to the latest NFPA Bulletin 96, and to all local codes regarding elbows, traps, access doors and insulation. All ductwork from the un-tempered supply air fan to the exhaust canopy shall conform to current SMACNA standards and the latest edition of NFPA Bulletin 96. The exterior of this ductwork shall be fully insulated and wrapped, per local codes.
- C. Provide 16 gauge enclosure from top of canopy to finished ceiling to match hood finish. Install in removable sections to enable access for dampers and maintenance.
- D. Check, Test & Balance: Kitchen exhaust system shall be inspected, tested and balanced by an Econovent Systems, Inc. factory representative to ensure proper and satisfactory operation. Econovent Systems, Inc. must provide a written and detailed report of this check, test and start-up service to the specifying engineer and owner.
- E. The fire protection system shall be installed by a factory authorized contractor.
- F. This contractor shall provide training for the Owner's personnel in the operation of the system, and service for a period of (1) year.

END OF SECTION 23 3813

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.02 SUBMITTALS

- A. Submit shop drawings of units with all accessories as specified in this section. Shop drawings shall include schedule of units including ratings of fan and coils. Sound power levels shall be submitted. Submit (3) copies of installation, operation and maintenance manuals.
- B. Submittals shall be marked to show specified information.

1.03 GENERAL REQUIREMENTS

- A. Provide outdoor, roof curb mounted, packaged air conditioning units to fit intended use and location as indicated on Plans and/or specified:
- B. Capacity, size and arrangement, static pressure, brake horsepower, component parts and accessories as scheduled and/or as necessary to obtain required results and allow for proper maintenance. Ratings based on Standard Test Code for Centrifugal Fans, adopted jointly AMCA and ASHRAE. Each size fan to be supplied shall be tested in the manufacturer's laboratory under simulated installation conditions. Ratings based on test, not on interpolated or extrapolated calculation. Guaranteed full capacity delivery through duct systems finally installed and under conditions listed. Guaranteed sound-power level ratings not exceeding those of design equipment. All equipment statically and dynamically balanced to acceptable tolerances with all weights permanently fastened. Fan bearings shall be rated for 200,000 hour life continuous operation at maximum speed and pressure in accordance with ANSI Code B3.15.
- C. Equipment shall include motors, belt drives, belts, and required accessories; horsepower as scheduled. Motor efficiency shall comply with EISA standards.
- D. Equipment manufacturer shall furnish vibration isolators for each piece of unit as required; spring type or unit fully internally isolated with thrust restraint springs, flexible connections and deflection springs.

PART 2 - PRODUCTS

2.01 PRODUCT DESCRIPTION

- A. Roof Curb:
 - 1. Where scheduled furnish prefabricated, 12 ga. galvanized roof curb height above insulation 12": to be supplied by unit manufacturer.

B. Unit Casing:

1. Unit shall to be furnished with insulated discharge plenum.
2. Unit shall be completely insulated with 2" thick neoprene coated glass fiber secured to side, top and end panels with adhesive and mechanical fasteners. Lifting brackets with lifting holes shall be provided on the unit base to accept cable or chain hooks.
3. Filters shall be 2" thick, removable throwaway filters.
4. Where roof curb scheduled; unit frame and base shall be 14 ga. galvanized steel. Unit to have formed recess that seats on roof curb gasket to provide watertight seal.
5. Where roof curb not required provide weatherproof sheet metal bottom pan with full thickness insulation.

C. Supply Fan:

1. Supply fan shall be centrifugal, forward curve, statically and dynamically balanced for quiet operation. Fan motor shall be heavy duty, open drip proof with re-lubricative ball bearings.
2. Furnish fan assembly with vibration isolated floating frame.

D. Gas Heat Section:

1. Unit shall include indirect fired separated combustion heating furnace with heat exchange (material as scheduled) including induced draft blower, electric pressure switch to lock out gas valve. Furnish gas ignition system with electronic ignition, modulating (see schedule) gas valve and safety system.

E. Heating Coil Sections:

1. Steam coils non freeze type (IDT) shall have aluminum fins helically wound to 518" OD copper tubes. Steam shall be distributed into each tube by an inner distributing perforated tube. Tube shall be brazed to steel headers with NPT connections. Working pressure 175 psig at 400°F.
2. Hot water heating coils shall be aluminum plate fins with belled collars bonded to 1/2" minimum OD copper tubes by mechanical expansion. Galvanized steel casings and steel headers with threaded connections. WP 300 psig, at 200°F. Coils shall be drainable, no turbulence promoting devices, headers shall have drain and vent connections.

F. Compressor:

1. Shall be heavy duty, scroll type, semi-hermetic type with reversible, positive displacement oil pump, and overload protection. Each compressor shall have a complete refrigeration circuit including, sightglass, filter drier, manual shutoff valve and relief valve. Compressor shall be mounted on vibration isolation blocks.

G. Cooling System:

1. Cooling Coil shall be seamless copper tubing, mechanically bonded to corrugated aluminum fins. Coils shall be factory leak tested. Furnish with factory mounted expansion valves. Cooling coils shall be circuited for combination row/face split.
2. Drain Pan with a mastic coating shall be provided with the cooling coil and extend beyond the leaving side of the coil and underneath the cooling coil connections. The drain pan shall be connected to a threaded drain connection extended through the unit base. Units shall be provided with a secondary mastic coated drain pan connected to the primary drain pan.
3. Furnished cooling system complete with refrigeration controls. Where scheduled furnish optional unloading steps complete with suction switches and step controller. The refrigeration controls shall include expansion valve, safety hi/low pressure switches and anti cycling timer.

H. Relief Type:

1. Gravity relief system (where scheduled) shall include exhaust air damper 0-100% rated SA located in the return air section to relieve air out the back of the unit. Exhaust dampers shall be sealed with urethane gasketing on the contact edge. Exhaust louvers and bird screen shall be provided.
2. Powered relief (where scheduled) shall include powered relief exhaust air fan, sized for 100% relief, with a relief air damper. Fan shall be controlled with an integral VFD factory wired speed controller.

I. Heat Recovery System:

1. Heat wheel (where scheduled) unit shall include an ARI rated heat wheel system, factory mounted and wired .
2. Wheel shall be a total energy (sensible) type unit with a cleanable, lightweight polymer material with a bonded desiccant coating. Unit shall be equipped with upstream disposable 4" pleated OA filters.
3. Wheel drive motor and controls shall be factory mounted and wired.

J. Electrical Power Requirements:

1. Weatherproof safety disconnect switch with external lever shall be provided by unit manufacturer.
2. Unit shall be equipped with a single point connection. All internal motors sub feeds shall have individual overcurrent protection housed in an electrical enclosure which shall include terminal blocks for all field connections.
3. All motors shall include integral motor starter or variable frequency drive as indicated and shall be factory mounted and wired.

K. Controls: Controls by Temperature Control Contractor. See Specification Sections 230993 and 230994 for details.

2.02 MOTORS

- A. All motors shall be general purpose squirrel-cage induction type, NEMA Design 8, Class 8 insulation, continuous duty, 40°C ambient, single or multiple speed as scheduled.
- B. All three phase motors shall be NEMA Premium Efficiency design. Motor efficiency shall be indicated on the motor nameplate by the manufacturer per IEEE Standard 112 Method 8 in accordance with following tables:

Open Drip Proof (ODP)

Horsepower	1200 RPM	1800 RPM	3600RPM
1	82.5%	85.5%	77.0%
1.5	86.5%	86.5%	84.0%
2	87.5%	86.5%	85.5%
3	88.5%	89.5%	85.5%
5	89.5%	89.5%	86.5%
7.5	90.2%	91.0%	88.5%
10	91.7%	91.7%	89.5%
15	91.7%	93.0%	90.2%
20	92.4%	93.0%	91.0%
25	93.0%	93.6%	91.7%
30	93.6%	94.1%	91.7%

Totally Enclosed Fan-Cooled (TEFC)

Horsepower	1200 RPM	1800 RPM	3600 RPM
1	82.5%	85.5%	77.0%
1.5	87.5%	86.5%	84.0%
2	88.5%	86.5%	85.5%
3	89.5%	89.5%	85.5%
5	89.5%	89.5%	86.5%
7.5	91.0%	91.7%	98.5%
10	91.0%	91.7%	90.2%
15	91.7%	92.4%	91.0%
20	91.7%	93.0%	91.0%
25	93.0%	93.6%	91.7%
30	93.0%	93.6%	91.7%

- C. Single speed motors shall operate at 1750 RPM unless otherwise indicated.
- D. Motors controlled by Variable Frequency Drive (VFD) units shall be rated for inverter duty (NEMA MG1, Part 31).

PART 3 -EXECUTION

3.01 GENERAL

- A. Install in strict accordance with manufacturer's instructions.
- B. Duct connection to units shall have flexible connections.
- C. Furnish (1) spare set of filters for each unit.
- D. This Contractor is responsible to furnish and install condensate trap and drain external to unit; drain shall discharge to roof.

E. Roof curbs to be fully assembled and placed onto roof by HC, for installation GC.

END OF SECTION 23 7500

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including all General Conditions, Supplementary Conditions, Division 1 specification sections as well as Information to Bidders requirements that are included in the project documents, apply to the work of this Contract.

1.02 ALLOWANCES, ALTERNATES, AND UNIT PRICES

- A. Refer to Division 1 specifications for allowances, alternates and unit prices required as part of this Contract.

1.03 INTENT

- A. The intent of the drawings and these specifications is to provide all systems complete and operative. Whether indicated on the drawings and/or included in the specification or not, provide all materials, equipment and labor usually furnished with such systems.

1.04 DEFINITIONS

As Called for	Materials, equipment including the execution specified/shown in the contract documents.
Code Requirements	Minimum requirements.
Concealed	Work installed in pipe and duct shafts, chases or recesses, inside walls, above ceilings, in slabs or below grade.
Design Make	Indicates minimum requirements for equipment.
ERL	Existing to be relocated. (see definition of relocate).
EXR	Existing to remain. Make connections to maintain circuit.
Exposed	Work not identified as concealed.
Acceptance	Owner acceptance of the project from Contractor upon certification by Owner's Representative.
Furnished by Others	Receive delivery at job site or where called for and install.
Inspection	Visual observations by Owner's site Representative.
Install	Mount or set equipment, device or fixture and make electric connections.
Labeled	Refers to classification by a standards agency.
Make Provide	Refer to the article, BASIS OF DESIGN. Furnish and install complete.

Relocate	Disassemble, disconnect, store and transport equipment to new locations, then clean, test, and install ready for use.
Replace	Remove and provide new item.
Review	A general contractual conformance check of specified products.
Roughing	Pipe, duct, conduit, equipment layout and installation.
Satisfactory	As specified in contract documents.
Site Representative	Construction Manager or Owner's Inspector at the work site.

Refer to General Conditions of the Contract for additional definitions.

1.05 WORK INCLUDED

- A. In general, the electrical work includes, but is not necessarily limited to the following:
 - 1. Provide Removal Work and all temporary electric and communications connections to maintain services during construction.
 - 2. Provide Grounding of services, raceway systems, disconnects and devices, etc.
 - 3. Provide Interior lighting, wiring, conduits and switching.
 - 4. Provide Power and convenience outlet branch circuits, devices, etc.
 - 5. Provide Exit and emergency lighting.
 - 6. Provide power circuits and select controls to mechanical equipment.
 - 7. Provide modifications to existing Simplex Fire Alarm System.
 - 8. Provide Interior Horizontal Communications raceways and cable.
 - 9. Provide modifications to existing IP cameras at direction of owner's security contractor.
- B. Refer to Division 1 front end specifications for additional scope requirements and phasing.

1.06 BASIS OF DESIGN

- A. The contract documents are prepared on basis of one manufacturer as "design equipment," even though other manufacturers' names are listed as acceptable makes. If Contractor elects to use one of the listed makes other than "design equipment," submit detailed drawings, indicating proposed installation of equipment. Show maintenance clearances, service removal space required, and other pertinent revisions to the design arrangement. Make required changes in the work of other trades, at no increase in any contract. Provide larger electrical feeders, circuit breakers, equipment, additional control devices and other miscellaneous equipment required for proper operation and assume responsibility for proper location of roughing and connections by other trades. Remove and replace door frames, access doors, walls ceilings or floors required to install other than design make equipment. If revised arrangement submittal is rejected, revise and resubmit specified "design equipment" item which conforms to contract documents.

1.07 QUALITY ASSURANCE

- A. Manufactures of equipment shall be firms regularly engaged in the production of factory fabricated systems and equipment whose products have been in satisfactory use in similar service for not less than (3) years.
- B. Suppliers of equipment must have factory trained and authorized personnel for the service of all equipment provided

1.08 LICENSING

- A. The contractor shall hold a license, issued, or recognized by the Authority Having Jurisdiction, to perform electrical work.

1.09 INSPECTIONS

- A. Provide rough in and final inspection by an electrical inspector certified by the AIAEI (the American International Association of Electrical Inspectors).

1.10 REMOVAL, DISPOSAL AND HAZARDOUS MATERIALS

- A. All removed electrical equipment shall be removed from the site and properly disposed of.
- B. All hazardous materials must be disposed of in compliance with ENCON and all other regulatory agencies.
- C. The Owner may wish to keep certain equipment, therefore, check with Owner before removals to determine what may be salvageable.

1.11 TEMPORARY SERVICES

- A. Contractor shall provide a complete temporary light and power service in accordance with requirements of specification section 260016 - Temporary Electric Power.
- B. Refer to Division 1 sections for additional requirements.

1.12 CONTINUITY OF UTILITY SERVICES

- A. It is of paramount importance that each utility service operates continuously and without interruption. Whenever this contractor plans to make changes or alterations to any existing utility service, such plans shall result in no or minimum service interruption or inconvenience to Owner. This contractor shall plan and schedule any change or alteration to an existing utility service with Architect and Owner. Such planning, timing, and/or scheduling shall be approved by both these parties.

1.13 CODES AND STANDARDS

- A. National Electrical Code: All work covered under these Contract Documents shall conform to the latest issue of the National Electrical Code.
- B. Standards: All equipment shall meet all the requirements of ANSI, NEMA, IES, and IEEE standards.
- C. Listing: All equipment and devices for which Underwriters' Laboratory has a listing service, shall be UL listed and bear the UL listing label.
- D. All materials and installation methods shall comply with the following:
 - 1. 2020 New York State Building Code, including all applicable amendments supplements to the following:
 - a. 2020 International Building Code
 - b. 2020 International Existing Building Code
 - c. 2020 International Fire Code
 - d. 2020 International Plumbing Code
 - e. 2020 International Mechanical Code
 - f. 2020 International Fuel Gas Code
 - g. 2020 International Energy Conservation Code
 - 2. National Fire Protection Association (NFPA).
 - 3. New York State Department of Labor Rules and Regulations.
 - 4. The Americans with Disabilities Act.
 - 5. New York State Department of Health.
 - 6. Local Municipality/City Codes and Ordinances and the Authority Having Jurisdiction.
 - 7. Local Fire Department.
 - 8. Insurance Carrier.
 - 9. National Electrical Contractors Association (NECA)
 - 10. Occupational Safety and Health Administration. (OSHA).

1.14 SUBMITTALS & SUBMISSION REQUIREMENTS

- A. All submittals shall be in accordance with Division 1 requirements, the following requirements listed below, and also as indicated in each specification section. All submittals not complying with the listing above will be returned to the contractor without being reviewed. Rejection by Architect or Engineer of any items submitted shall require resubmittal of acceptable items.
1. Within (30) days after receiving signed contract or notice to proceed, submit to Architect for review complete descriptive dimensional data and ratings for equipment and materials proposed to be furnished and installed. Submit (8) copies of data unless otherwise specified by the architect.
 2. All materials submitted shall clearly state the job name and specification section(s) that it applies to.
 3. Any package containing more than one piece of equipment or material shall also contain a schedule clearly listing all items in submittal. Schedule page (s) shall also indicate project name and building name.
 4. All submittals must be clearly marked using nomenclature used in this specification for proper item identification, schedule of usages, model numbers, construction materials, performance, data, etc.
 5. Projects involving multiple buildings must have the submittals separated by building. Submittals in which buildings are combined will not be accepted. (Exception: When specifically approved by engineer, basic materials may be submitted once.)
 6. The Contractor shall insure that dimensions of equipment to be used conform to the space allocated for the equipment on the drawings.
 7. Submittals traced or copied from contract drawings are not acceptable and will be returned without review.
 8. In the event material and/or equipment is installed prior to obtaining approval of shop drawings, and in the sole opinion of the Owner's Agent, this material and/or equipment does not meet the specifications, the Contractor shall be liable for the removal and the replacement at no additional cost to the contract.
- B. Samples: When requested by Engineer, provide samples of both specified equipment and proposed substitutions for review by the Owner's Agent. Such equipment shall be delivered to a location designated, or erected at the job site as directed. When neither is physically possible, arrange for the Owner's Agent to visit an acceptable site where the proposed equipment can be inspected.
- C. Substitutions:
1. Submittals for equipment or materials other than as specified shall be accepted for review by the Owner's agent.
 2. Approval of substitute equipment shall be based on functional, physical and aesthetic compatibility to the equipment specified as determined by the Owner's agent and approved by the engineer.

3. Where substitute equipment is approved, the contractor shall be responsible for, and bear the cost of any necessary changes by his trade or other trades to make the system complete and operable.
4. Contractor is fully responsible for providing coordination between all trades affected by equipment substitution.
5. When requested, contractor shall submit layout drawings indicating new dimensions and arrangements of substituted equipment. Layout drawings shall indicate all revisions necessary for all services affected by substitution.

1.15 FIELD INSPECTION

- A. As there are various conditions at the site which do not show on the accompanying drawings, or which are at variance with the conditions indicated on the drawings, it is important that each bidder visit the site and acquaint himself with existing conditions, and take these conditions into consideration when preparing his proposal. Each bidder shall obtain information or make any measurement desired. Lack of knowledge relative to existing conditions will not be allowed as a basis for extra compensation.
- B. This contractor and his subcontractors shall inspect existing equipment to remain prior to any of his new work in order to determine that all equipment is in good operating condition. If equipment is found to be lacking components, is inoperable, damaged, etc., contractor shall provide immediate written notice to the Owner. The Owner or his representative shall determine if any additional work is necessary and the method by which any work shall be performed.

1.16 PERMITS, CERTIFICATES AND FEES

- A. This Contractor shall obtain and pay for permits, certificates, fees etc. listed below. Costs for permits, fees etc. shall be included in the base bid amount.
 1. All required applications and permits to begin work.
 2. Certificate of inspection including Third-Party Agency.
 3. Fees and charges shall be obtained directly from the respective authority having jurisdiction.

1.17 GUARANTEE

- A. Contractor shall guarantee all work furnished through this contract including work performed by subcontractors, for a period of (1) year (unless otherwise noted), from the date of final acceptance. Contractor agrees to repair or replace any defective work or materials at no additional cost to the Owner. Contractor shall also pay for any damage to other work resulting from repairs to defects. Contractor shall furnish written guarantees to the Owner's agent in accordance with the general conditions.

1.18 TESTING AND INSPECTION

- A. Inspections required for any ordinances, regulations, instructions, laws, rules, standards and practices that require any work to be inspected or tested shall be performed. Contractor shall give Owner, Architect and Engineer timely notice of readiness of work for inspection or testing and the date fixed for said inspection or testing.
- B. Third-Party Agency must inspect completed installation and present Owner with Certificate of Inspection showing approval.

- C. Required local or municipal inspection. Process and present Owner with certificate indicating approval of such governing bodies.
- D. Contractor shall submit a written report to Architect, copy to Engineer, on results of each inspection or test on system or equipment supplied. Report shall contain all pertinent information, recommendations, approvals, additional work required, etc.
- E. Contractor is responsible to check rotation on all three phase equipment prior to turning on equipment for temporary or permanent use.
- F. Panelboard, Circuit Breaker, Transformer and Fuse Tests:
 - 1. Energize all possible lighting and equipment loads for a period of not less than eight hours.
 - 2. Check all fuses and circuit breakers for faulty tripping and excessive heat.
 - 3. Tabulate phase current on all feeders.
 - 4. Tabulate voltages at each panelboard (phase to phase and phase to neutral).
 - 5. Reconnect branch circuits that vary over 5% between high and low current.
 - 6. Reconnect transformer taps as required to adjust for high or low voltages.
 - 7. All tabulation sheets shall be presented to the Architect for approval, make any corrections determined by the Architect.

1.19 RECORD DOCUMENTS

- A. When required by general conditions or other Division 1 Section this Contractor shall prepare and turn over to Owner's agent record as-built documents. As-built drawings will include actual equipment location layout, service connections, etc.
- B. In all projects, contractor shall provide record drawings of all underground equipment and service runs. As-built drawings for underground work will include dimensions to actual locations finish grade elevations, and actual invert to underground structures equipment and service runs.

1.20 PENETRATIONS THRU FIRE RATED CONSTRUCTION

- A. All penetrations for new work or left from removed work by this contract through rated construction shall be sealed fire safe by a UL listed approved method.
- B. All electrical penetrations through walls, floors, etc. shall be conduit sleeved.
- C. All conduit penetrations through fire rated partitions, walls, floors, etc. shall be installed as follows; penetration shall be oversized 1/2" to 3/4" maximum. This Contractor shall pack with fireproofing insulation, type FS cerablanket. Outside of penetrations shall be caulked and sealed with flame stop V, as manufactured by Flame Stop, Inc.; or an approved equal. Flame stop sealant shall be troweled smooth for finishing as required.

- D. Electric panels installed in one- or two-hour fire rated walls shall be wrapped in an approved endothermic mat rated to maintain the assembly.

1.21 CONFINED SPACES

- A. All work in pipe tunnels, mechanical pits, well manholes, etc. shall be performed by skilled tradesman and laborers with current certification for working in confined space. Contractor shall bear all costs to provide all safety equipment, ventilation, etc. as required by State and Federal Regulations and shall obtain all necessary permits for such work.
- B. Contractor shall submit copy of current certifications and photo I.D. of all tradesman and laborers who will be working in confined spaces on this project.

1.22 INTENT OF DRAWINGS

- A. The drawings are diagrammatic, unless detailed dimensioned drawings are included. Drawings show approximate locations of equipment, fixtures, panelboards, and wiring devices. Exact locations are subject to the approval of the Owner's Representative. The general run of electrical feeders, branch circuits, and conduits, indicated on the drawings, is not intended to be the exact routing. Circuit designations, in the form of "Home Runs" on branches, indicate the designation of the branch circuit, and the panelboard or interconnection box from which the branch circuit is served.
- B. Drawings show general design and arrangement. Verify exact location and elevations at the job location. Do not scale plans and diagrams.
- C. Drawings do not show all offsets, fittings, interferences, and elevation changes. Adjust installation of conduit, equipment location, etc. to accommodate work with the obstacles and interferences. Where a major and important rearrangement is necessary, report same to Architect for review. Obtain written approval for all major changes.
- D. Prior to roughing in any back boxes for power or communications devices, thoroughly examine the architectural elevations, enlarged plans and details. Also exam vendor drawings and manufacturer instructions for equipment furnished by others or as part of this contract. Install back boxes in locations and at heights as indicated on these documents. If the locations are not detailed, issue an RFI to the construction manager to obtain them. Boxes that are roughed in without detailed location and heights will re-located at no additional cost to the contract by the electrical contractor.
- E. Cooperate with all Contracts and Owners and determine the exact route of all raceway and location of all equipment.

1.23 COORDINATION DRAWINGS

- A. Before construction work commences, Contractors for all trades shall submit Coordination Drawings at not less than 1/4" = 1'-0" scale. Coordination Drawings are required throughout all areas for all trades. These drawings shall identify and show resolutions of trade conflicts. Mechanical Equipment Rooms shall be drawn early in the Coordination Drawing process, simultaneous with all other congested areas. Prepare Coordination Drawings As Follows:

1. HVAC Contractor will prepare the base plan Coordination Drawings showing all ductwork and all pertinent piping and equipment. These drawings may be CAD drawings of the required ductwork Shop Drawings. The drawings shall be coordinated with cable tray, lighting fixtures, sprinklers, air diffusers, other ceiling mounted items, ceiling heights, structural work, maintenance clearances, electric code clearance, reflected ceiling plans, and other contract requirements. Reposition proposed locations of work after coordination drawing review by the Construction Manager and the Architect. Provide adjustments to exact size, location and offsets of ducts, pipes, conduit, etc., to achieve reasonable appearance objectives. Provide these adjustments as part of Base Bid Contracts. Minor revisions need not be redrawn.
 2. HVAC Contractor will provide prints and Cad drawings and submit the base plan to all major trades' Contractors.
 3. Electrical, Plumbing and Fire Protection Contractors will draft location of piping and equipment on the base plan, indicating areas of conflict and suggested resolutions.
- B. Contractors who proceed without approved coordination drawings will be responsible at no additional cost to move, reroute or replace their work that is in conflict.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. All materials, unless otherwise specified, shall be new and be the standard products of the manufacturer. Used equipment or damaged material will be rejected.
- B. The listing of a manufacturer as "acceptable" does not indicate acceptance of a standard or catalogued item of equipment. All equipment and systems conform to the Specifications.

2.02 ACCESS DOORS

- A. Steel Access Doors and Frames: Fabricate units of continuous welded steel construction, unless otherwise indicated. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to existing ceiling support system. Furnish with manufacturer's factory applied prime paint and top coat of white enamel.
 1. Frames: Fabricate from 16-gage steel. Frames shall be compatible with the existing ceiling suspension system.
 2. Flush Panel Doors: Fabricate from not less than 14-gage sheet steel, with concealed spring hinges or concealed continuous piano hinge set to open 175 degrees.
- B. Locking Devices: Furnish flush, screwdriver-operated cam locks of number required to hold door in flush, smooth plane when closed. Provide a minimum of (2) cam locks for any units over 324 sq. inches.
- C. Acceptable Manufacturers: Karp Associates, Inc.; Meadow Craft, Inc.; Milcor, Div.; Inryco, Inc.

2.03 U.L. LISTING

- A. Equipment shall bear the Underwriter's Laboratories (UL), or other approved agency listing label. This listing requirement applies to the entire assembly. Any modifications to equipment to suit the intent of the specifications shall be performed in accordance with the National Electric Code and listed by U.L.

2.04 FIRE STOPPING FOR POWER AND COMMUNICATION OUTLETS

- A. Provide fire rated moldable putty around all power and communication outlet boxes in resident rooms. The putty shall meet the following:
 - 1. Firestop tested up to 4 hours in accordance with ASTM E 814 and (UL 1479)
 - 2. Wall opening protective tested up to 2 hours in accordance with UL 263
 - 3. Pliable and conformable to mold easily into required shape
 - 4. Re-enterable/repairable
 - 5. Halogen-free and solvent-free
- B. Design Make: 3M™ Fire Barrier Moldable Putty Pads MPP+ 6.

2.05 FIRE STOPPING FOR OPENINGS IN RATED WALLS

- A. Provide Fire-stopping for Openings through Fire and Smoke Rated Walls and Floor Assemblies shall be listed or classified by an approved independent testing laboratory for "Through-Penetration Fire-Stop Systems." The system shall meet the requirements of "Fire Tests of Through-Penetration Fire-Stops" designated ASTM E814.
- B. Acceptable Manufacturers:
 - 1. Dow Corning Fire-Stop System Foams and Sealants.
 - 2. Nelson Electric Fire-Stop System Putty, CLK and WRP.
 - 3. Thomas & Betts - S-100 FS500/600.
 - 4. Carborundum Fyre Putty.
 - 5. Hilti Firestop Systems.
 - 6. 3M Interam Endothermic Mats

PART 3 - EXECUTION

3.01 ROUGHING

- A. Obtain approved roughing diagrams and exact locations of equipment for items furnished under other Divisions of the specifications. Do not rough in without approved drawing.
- B. Due to small scale of Drawings, it is not possible to indicate all offsets, fittings, changes in elevation, etc. Verify final locations for rough-ins with field measurements and with the equipment being connected. Verify exact location and elevations at work site prior to any rough in work. DO NOT SCALE PLANS. If field conditions, details, changes in equipment or shop drawing information require a significant change to the original documents, contact the owners' representative for approval before proceeding.
- C. All equipment locations shall be coordinated with other trades to eliminate interference with required clearances for equipment maintenance and inspections.

- D. Do not rough in outlets back-to-back in adjoining walls offset as required by field conditions and provide fire rated putty around boxes.
- E. Coordinate work with other trades and determine exact routing of all duct, pipe, conduit, etc., before fabrication and installation. Coordinate with Architectural Drawings. Verify with Owner's Representative exact location of all equipment in finished areas, such as thermostat, fixture and switch mounting heights, and equipment mounting heights.
- F. Coordinate all work with the architectural reflected ceiling plans and/or existing Architecture. Mechanical and electrical drawings show design arrangement only for diffusers, grilles, registers, air terminals, lighting fixtures, sprinklers, speakers and other items. Do not rough-in contract work without reflected ceiling location plans.
- G. Before roughing for equipment furnished by Owner or in other contracts, obtain from Architect and other Contractors, approved roughing drawings giving exact location for each piece of equipment. Do not "rough in" services without final layout drawings approved for construction. Cooperate with other trades to insure proper location and size of connections to insure proper functioning of all systems and equipment. Obtain written authorization from the Owners representative or other contractor for any "rough ins" that, due to project schedule, are required before approved coordination drawings are available. Any work installed without written authorization or approved coordination drawings, causing a conflict will be relocated by the electrical contractor at no expense to the Owner.
- H. For equipment and connections provided in this contract, prepare roughing drawings as follows:
 - 1. Existing equipment being relocated: Measure the existing equipment and prepare drawings for installation in new location.
 - 2. New equipment: Obtain equipment roughing drawings and dimensions, then prepare rough-in drawings.
 - 3. Where more than one trade is involved in an area, space or chase, all shall cooperate and install their own work to utilize the space equally between them in proportion to their individual requirements. In general, ductwork shall be given preference except where grading of piping becomes a problem, followed by piping then electrical wiring. If, after installation of any equipment, piping, ducts, conduit, and boxes, it is determined that ample maintenance and passage space has not been provided, rearrange work and/or furnish other equipment as required for ample maintenance space. Any changes in the size or location of the material or equipment supplied, which may be necessary in order to meet field conditions or in order to avoid conflicts between trades, shall be brought to the immediate attention of the Owner's Representative and approval received before such alterations are made.
 - 4. Provide easy, safe, and code mandated clearances at controllers, motor starters, valve access, and other equipment requiring maintenance and operation. Contractor shall relocate existing work in the way of new construction. VISIT SITE BEFORE BIDDING TO DETERMINE SCOPE OF WORK. Provide new materials, including new piping and insulation for relocated work.

3.02 CUTTING AND PATCHING

- A. Provide cutting and patching required by and for the installation of the electrical work.
- B. Patching of fire rated floors, walls, partitions, etc. shall be made using new materials equal to the fire rating of the existing.
- C. Should changes, omissions or errors in electrical work require cutting, patching or making alterations in any portion of new construction, such work will be performed by a qualified tradesman.
- D. Cutting and patching of roof surfaces and structures shall only be performed by a qualified contractor, as approved by the Architect. The contractor shall bear the cost of above mentioned cutting and patching. This contractor shall insure that existing roof warranties remain in force.
- E. This contractor shall furnish lintels, sized to accommodate structure above opening, where cutting and patching is to be performed on load bearing walls. Contractor shall obtain written approval for all lintels prior to installation.
- F. Cutting shall be done in a manner which will not adversely affect the strength of the building. Holes and openings shall be neatly cut so as to provide a finished appearance and shall be patched around the edge where required for a finished appearance. Provide temporary bracing, shoring, etc. as required.
- G. Patching shall be structurally sound and match the existing materials and finish of adjacent materials. Patching is required in finished areas, wherever existing work is removed, at the sides of openings, etc. Patching shall include repairs, painting, etc.
- H. At the completion of the work, all evidence of alteration will be as inconspicuous as possible.

3.03 OPENINGS, SLEEVES, AND CHASES

- A. Certain chases, openings, and shafts will be provided as shown as part of General Construction Plans and Specifications.
- B. Provide all other openings and sleeves for conduit etc. through floors, walls, partitions, ceilings, roofs, etc. for Division 26-E work.
- C. Assume responsibility for correct and final location and size of such openings; furnish templates if required. Correct improperly located and sized or omitted chases and openings as required. Plug all abandoned sleeves left as part of this Contract.

3.04 SEALING AND FIRESTOPPING

- A. Installation of Fire-stopping for Openings Through Fire and Smoke Rated Walls and Floor Assemblies shall be as follows:
 - 1. Provide fire-stop system seals at all locations where piping, tubing, conduit, electrical busways/cables/wires, ductwork and similar utilities pass through or penetrate fire rated wall or floor assembly. Provide fire-stop seal between sleeve and wall for dry wall construction.
 - 2. The minimum required fire resistance ratings of the wall or floor assembly shall be maintained by the fire-stop system. The installation shall provide an air and watertight seal.

3. The methods used shall incorporate qualities that permit the easy removal or addition of electrical conduits or cables without drilling or use of special tools. The product shall adhere to itself to allow repairs to be made with the same material and permit the vibration, expansion and/or contraction of any items passing through the penetration without cracking, crumbling and resulting reduction in fire rating.
 4. Provide rigid steel sleeves where non-armored cables pass through fire rated walls and barriers.
 5. Where boxes are installed flush in a rated wall provide an approved endothermic wrap around the entire enclosure. Seal conduit penetrations with approved fire putty.
- B. Installation of Fire-stopping around junction boxes between resident rooms and in rated walls in other areas of the building.
1. Provide fire rated putty around all boxes in all boxes in rated walls other than in resident walls.
 2. Mold the putty to the box and the connector for a complete seal of all openings and knock outs in the box.
 3. The surface of the electrical box, or opening and any penetrating items must be cleaned (i.e. free of dust, grease, oil, loose materials, rust or other substances)
 4. Ensure that the surface of the substrates are not wet and are frost-free.
- C. All penetrations from abandoned or removal electrical work shall be sealed fire safe by this contract.

3.05 SUPPORTS

- A. Provide required supports for work of this Contract, including beams, angles, channel, hangers, rods, columns, plates, bases, braces, etc. to properly support all work.
- B. Provide steel angles, channels and other materials necessary for the proper support and erection of motor starters, distribution panelboards, large disconnect switches, pendant-mounted lighting fixtures, etc.
- C. Panelboards, cabinets, large pull boxes, cable support boxes and starters shall be secured to ceiling and floor slab and not supported from conduits. Small panelboards, etc., as approved by Owner's Representative, may be supported on walls. Racks for support of conduit and heavy electrical equipment shall be secured to building construction by substantial structural supports.
- D. Provide concrete bases for all floor mounted equipment. Provide 3,000 lb. concrete, chamfer edges, trowel finish, securely bond to floor by roughening slab and coating with cement grout. Bases 2" high; shape and size to accommodate equipment. Set anchor bolts in sleeves before pouring and after anchoring and leveling, fill equipment bases with grout.
- E. See Specification Section 260190 – Supporting Devices for additional requirements

3.06 CONCEALMENT

- A. Unless otherwise specifically indicated, all work shall be concealed above ceiling space, in wall space, below slabs in crawl spaces, and elsewhere throughout the building.

- B. In areas with no ceilings, install only after Architect reviews and comments on arrangement and appearance.

3.07 TEMPORARY LIGHT AND POWER

- A. Provide temporary electric system as called for in specification section 260016.

3.08 ROOF AND ROOF DECK CUTTING AND FLASHING

- A. All penetrations through roofing and decking shall be accomplished by the roofing manufacturer's Certified Roofing Contractor in order to maintain roof system warranty.

3.09 EQUIPMENT INSTALLATION

- A. All installations shall comply with the following requirements:
 - 1. Provide code required disconnects for all electrical equipment that is furnished or connected by the electrical contractor.
 - 2. Coordinate electrical systems, equipment, and materials installation with other building components. Be responsible for any changes in openings and locations necessitated by the equipment installed.
 - 3. The architect shall control the placement of all wall and ceiling mounted electrical equipment and devices in all rooms except for mechanical and electrical equipment rooms. When drawing details are not available, consult with the Architects representative for actual location.
 - 4. Verify all dimensions with field measurements.
 - 5. Arrange for all chases, slots and openings in other building components that are not indicated on drawings, to allow for electrical installations.
 - 6. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.
 - 7. Coordinate ordering and installation of all equipment with long lead times or having a major impact on work by other trades so as not to delay the job or impact the construction schedule. Pay close attention to equipment that must be installed prior to building enclosure.
 - 8. Where mounting heights are not detailed or dimensioned, install systems, materials and equipment to provide the maximum headroom possible.
 - 9. Install systems, materials and equipment to conform with approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer the conflict to the Architect.
 - 10. Store Materials on dry base, at least 6" above-ground or floor. Store so as not to interfere with other work or obstruct access to buildings or facilities. Provide waterproof/windproof covering. Remove and provide special storage for items subject to moisture damage. Protect against theft or damage from any cause. Replace items stolen or damaged, at no cost to Owner.

11. Set all equipment to accurate line and grade, level all equipment and align all equipment components.
 12. All tolerances in alignment and leveling, and the quality of workmanship for each stage of work shall be as required by the manufacturer and subject to approval by the owner's representative.
 13. All finished equipment surfaces damaged during construction shall be brought to "as new" condition by touch up or repainting. Any rust shall be removed and primed prior to repainting.
 14. Workmanship shall be as called for in the "Standard of Installation" published by the National Electrical Contractors Association (NECA).
 15. Provide all scaffolding, rigging, hoisting and services necessary for erection and delivery of equipment and apparatus furnished into the premises. These items shall be removed from premises when no longer required.
 16. No electrical equipment shall be hidden or covered up prior to inspection by the owners' representative. All work that is determined to be unsatisfactory shall be corrected immediately.
 17. All electrical work shall be installed level and plumb, parallel and perpendicular to other building systems and components.
 18. Conceal all contract work above ceilings and in walls, below slabs, and elsewhere throughout building. If concealment is impossible or impractical, notify Owner's Representative before starting that part of the work and install only after his approval. In areas with no ceilings, install only after Owner's Representative reviews and comments on arrangement and appearance.
 19. Install access panel or door where units are concealed behind finished surfaces.
- B. Provide complete power connections to all electrical equipment. Provide control connections to equipment where indicated on the drawings. Provide disconnect ahead of each piece of equipment. Ground all equipment in accordance with the latest version of the National Electrical Code.
- C. Provide all power wiring, electric equipment, control wiring, switches, lights, receptacles, and connections as required for proper equipment operation of Owner-Furnished Equipment and Equipment furnished by other contracts,
- D. Refer to Manufacturer's drawings/specifications for requirements of special equipment. Verify connection requirements before bidding and confirm prior to roughing.
- E. This contractor shall coordinate scheduling and installation of work with other contractors, sub-contractors and other trades. The contractor is also required to coordinate all work with owner supplied materials, direct contracts, and normal building operations, if any.
- F. All finished work shall be neat and workmanlike. All work of a special nature shall be performed by skilled and qualified workmen who can present credentials showing experience in said trade. New systems shall be delivered to Owner complete in perfect working order, tested and balanced in full accordance with plans and specifications. Existing systems shall function in same manner as before this work was performed. Any malfunctions which arise in existing systems as a result of demolition or alteration of parts of such systems shall be corrected.

- G. Layout of equipment, accessories and electrical systems in plan is generally diagrammatic unless specifically dimensioned or detailed. Check project drawings and existing site conditions before installing work for interferences as governed by structural or other conditions. Owner reserves the right to make reasonable changes in location of equipment, accessories or electrical systems prior to "roughing-in" without involving additional expense. Exact dimensions shown upon plans will be subject to verification and confirmation of exact conditions at site at time of construction. "Plus or minus" dimensions are shown upon drawing as a guide only. Exact surrounding conditions are governed by final equipment selection and/or other like details.
- H. Furnish all new equipment and materials as described herein. Any material, operation, method or device mentioned, listed or noted within this specification, if not specifically mentioned as furnished or installed by others, shall be furnished and installed by this contractor.

3.11 REMOVAL OF BALLAST IN EXISTING LIGHT FIXTURE

- A. Assume ballasts contain PCB materials unless labeled otherwise, or test samples to show materials are not PCB; submit test report. Remove all ballasts from existing light fixtures indicated on contract documents. Dispose of all ballasts which do not have non-PCB labels in PCB containers, and pay all costs to have containers taken to EPA-approved incinerators and disposed of per all EPA regulations. Follow all EPA regulations for transporting containers and materials. If ballast has leaked in existing fixture, remove material deposited in fixture, and dispose of those materials as listed above. Provide Certificate of Disposal and all associated paperwork to Owner's Representative.

3.12 FIRE ALARM DETECTOR COVERS

- A. Electrical Contractor is responsible to provide dust covers on all detectors whether new or existing in any area of construction. This shall be done in any area of construction even if there is no electrical work being done in this area. Coordinate with all trades.

3.13 ROOF PENETRATIONS

- A. Electrical Contractor is to refer to Division 7 for warranty requirements on existing roofs prior to any roof penetrations made.

3.14 PAINTING

- A. This Contract Includes the following:
 - 1. Painting for all cut and patch work performed as part of Division 26 and 27 work
 - 2. Painting required for touch-up of surfaces damaged due to the installation of electrical work.
 - 3. Painting as required to repair finish of equipment furnished.
 - 4. Painting of all surface mounted raceways in finished areas.

3.15 CLEANING

- A. After all tests are made and installations completed satisfactorily:
- B. Thoroughly clean entire installation, both exposed surfaces and interiors.
- C. Remove all debris caused by work.
- D. Remove tools, surplus, materials, when work is finally accepted.

3.16 CONTINUITY OF SERVICES

- A. The building will be in use during construction operations. Maintain existing systems in operation within all rooms of building at all times. Refer to "General Conditions of the Contract for Construction" for temporary facilities for additional contract requirements. Schedules for various phases of contract work shall be coordinated with all other trades and with Owner's Representative. Provide, as part of contract, temporary mechanical and electrical connections and relocation as required to accomplish the above. Obtain approval in writing as to date, time, and location for shut-down of existing mechanical/electrical facilities or services.

3.17 OPERATION AND MAINTENANCE MANUALS

- A. Provide Operation and Maintenance Manuals. For projects containing multiple buildings, (3) three manuals shall be submitted separately for each building. Include the following:
 - 1. Equipment wiring diagrams.
 - 2. Manufacturer's instructions.
 - 3. Include typewritten instructions, describing equipment, starting/operating procedures, emergency operating instructions.
 - 4. Recommended maintenance procedures.
 - 5. Include name, address, and telephone number of supplier manufacturer.
 - 6. Representative and service agency for all major equipment items.
 - 7. Panel schedules in hard copy and word or excel format.
 - 8. Bind above items in a three-ring binder with name of project on the cover.
 - 9. Provide USB drive with all data in word, pdf, or excel format.
- B. Refer to specific specification electrical specification sections for additional requirements.
- C. Deliver to Owner's Representative before request for acceptance.

3.18 ASBESTOS RECOGNITION AND PRECAUTIONS

- A. The contractor shall be responsible for coordination of all required removal work, coring, cutting and patching with the owner's asbestos management plan. Prior to performing such work identify areas containing asbestos. Notify the Owner so that they may make arrangements for abatement and/or containment prior to work proceeding. The contractor shall be responsible for cleaning all areas where asbestos is released due to the failure to coordinate with the asbestos management plan. Refer to Division 1 sections for further requirements.
- B. The disturbance or dislocation of asbestos-containing materials causes asbestos fibers to be released into the building's atmosphere, thereby creating a health hazard to workmen and building occupants. Consistent with Industrial Code Rule 56 and the content of recognized asbestos-control work, the Contractor shall apprise all of his workers, supervisory personnel, subcontractors, Owner and Consultants who will be at the job site of the seriousness of the hazard and of proper safeguards and work procedures which must be followed, as described in New York State Department of Labor Industrial Code Rule 56.

END OF SECTION 26 0010

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

1.02 SECTION INCLUDES

- A. Interior demolition, removal and abandonment of interior electrical systems including fire alarm.
- B. Cleaning and repair of existing equipment to remain.
- C. Construction managers Front end and Phasing documents for the description of work.
- D. 260016 - Temporary Electric Power
- E. 283111 - Addressable Fire Detection and Alarm
- F. Division 01 and 02 Specification sections.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching work: As specified in individual sections.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to beginning work inspect and test all existing electrical systems that will be affected by the work in this contract. Provide a report with photographs to the Owner indicating any problems or defects found. If no problems or system defects are submitted, the contractor shall be responsible for correcting problems found at the completion of the project that are determined to be caused by the work of this contract.
- B. Inspect the entire work area for defects in the existing construction such as scratches, holes etc. Submit a complete list and photographs of existing damage, to the owner prior to beginning work. If existing damage is not documented the contractor shall repair all damage to like new condition, that is determined to have been caused by the work in this contract.
- C. Verify circuiting arrangements are as shown on Drawings.
- D. Verify that abandoned wiring and equipment serve only abandoned facilities.
- E. Demolition Drawings are based on casual field observation and existing record documents. Report discrepancies to Architect/Engineer before disturbing existing installation.
- F. Beginning of demolition means installer accepts existing conditions.

3.02 PREPARATION

- A. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.

- B. Coordinate utility service outages with the owner and Utility Company.
- C. Provide temporary wiring and connections to maintain existing systems in service during construction.
- D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Obtain permission from Owner and Architect/Engineer at least (72) hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area. Refer to section 260010 and Division 1 for additional requirements.
- E. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Notify Owner, Architect/Engineer, and local fire service at least (72) hours before partially or completely disabling system. Minimize outage duration. Refer to 283100 and Division 1 for additional requirements.

3.03 DEMOLITION EXISTING ELECTRICAL WORK

- A. Demolish existing electrical work under provisions of Division 01, Division 02 and this section.
- B. Remove existing installations to accommodate requirements for new construction.
- C. Remove abandoned wiring to source of supply.
- D. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- E. Disconnect abandoned outlets and remove devices. Provide blank cover for abandoned boxes which are not removed.
- F. Disconnect and remove abandoned panelboards and distribution equipment.
- G. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- H. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
- I. Repair adjacent construction and finishes damaged during demolition work.
- J. Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.
- K. Where branch circuit home run is called to be reused label circuit in junction box and remove all branch and switch leg wiring.
- L. Where removal of branch circuit wiring effects devices or fixtures upstream or downstream, make permanent connections to maintain circuits. Existing circuits to must remain active. All required connections to maintain existing circuits must be made after normal hours and coordinated with the owner.

3.04 EXISTING BACK BOXES

- A. Where it is practical, and they will not interfere with new work from any other trade, existing back boxes and raceway may be reused. Obtain the approval from the construction manager prior to reusing backboxes or raceways.

3.05 RESUPPORT OF DEVICES CONDUIT AND WIRING AFTER CEILING REMOVAL

- A. Where existing ceilings are removed re-support all conduit 8 ft on center and all open cabling 4 foot on center.
- B. Utilize open top cable hangers for supporting cables.
- C. Where existing equipment, fixtures or devices are scheduled for reuse in new ceilings, remove and store in safe dry space. Make temporary connections to maintain through wiring where devices are removed.

3.06 RELOCATION OF EXISTING ELECTRICAL WORK

- A. Where drawings indicate, equipment is to be relocated the contractor shall do all of the following:
 - 1. Disconnect and remove the device or piece of equipment.
 - 2. Clean, box and store the device or piece of equipment.
 - 3. Make temporary connections to maintain the system that is effected by the relocation
 - 4. Reinstall the device or piece of equipment where indicated on new work plans.

END OF SECTION 26 0015

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract including the General and Supplementary conditions and Division 1 Specification Sections apply to the work of this Section.

1.02 SUBMITTALS

NOT REQUIRED.

1.03 GENERAL REQUIREMENTS

- A. Electrical Contractor shall furnish, install and maintain temporary electric system for lighting and power as described herein.
- B. All temporary electric system work shall comply with all applicable OSHA Standards.
- C. All temporary electric system work shall comply with all applicable N.E.C. Standards and local regulations.
- D. Power shall be supplied from the source listed in Part 3.
- E. Temporary service shall be installed on the jobsite where appropriate for the level of construction and as directed by Architect.
- F. Temporary service and all devices and wiring shall be removed from the site when permanent facilities are available.
- G. Temporary services including wire and cabling shall not interfere or impede movement of construction vehicles.
- H. Contractor shall provide all maintenance necessary for continuous operation for temporary electric system throughout the duration of system operation.

PART 2 - PRODUCTS

2.01 PRODUCTS

- A. Refer to Sections 260190, 260533, 260519

PART 3 - EXECUTION

3.01 TEMPORARY SUB-FEED FROM EXISTING BUILDING TO WORK AREAS

- A. Provide temporary power from existing building panels to each construction area. Refer to phasing plans for requirements.
- B. Route temporary power through existing ceilings to work site.

- C. Verify power sources with construction manager. Utilize distribution panels near the work site. Each phase of work will be serviced from different existing distribution panels.
- D. Provide a 480-single phase – 120/240V single phase 45 KVA transformer to be used for temporary power from existing 480V distribution panels
- E. Provide a 175A main circuit breaker load center to service the temporary power called for.

3.02 TEMPORARY LIGHTING IN WORK AREAS

- A. Provide temporary branch circuits with weatherproof medium base lamp holders equipped with guards for lighting of 10 foot-candles in work area. Provide replacement lamps where required for the duration of system operation.
- B. Provide temporary lighting in all work areas.
- C. Provide temporary lighting for corridors, walk areas, stairs, etc. for safe entrance and egress.
- D. Existing fixtures scheduled for demolition may be used for temporary lighting in renovation areas. Temporarily resort these fixtures as required.
- E. Provide temporary lighting as required for security purposes for building exterior and applicable site locations, and building interior locations.
- F. Provide lighting in specific areas as directed by Architect.

3.03 TEMPORARY CONVENIENCE POWER IN WORK AREAS

- A. Provide temporary convenience power distribution for the use of tradesman hand tools and other devices as requested by construction trades.
- B. Branch circuits with GFCI type receptacle outlets for single phase 120 volt, 20-amp power.
- C. Convenience power distribution shall cover all work areas of building within a 100' extension cord reach. Each contractor using power shall provide their own ground fault device protection.

3.04 TEMPORARY EQUIPMENT POWER

- A. Provide temporary equipment power feeds for temporary heating equipment. Temporary heating equipment shall be furnished by others.
- B. Branch circuits for heating equipment shall be connections with single phase 208 volt, 30-amp power. Coordinate exact locations with HC.

3.05 TEMPORARY CONSTRUCTION TRAILERS

- A. Provide a 120/240V temporary power service from the existing National Grid utility pole to the trailer area on the construction site.
- B. Provide a 400A, 120/240V 1PH/3W MCB distribution panel with 60A breakers for each trailer.

C. Provide 60A feeds from the temporary panel to the following contractor trailers.

1. Construction Manager
2. General Construction Contractor
3. Plumbing Contractor
4. Fire Protection Contractor
5. HVAC Contractor
6. Electric Contractor

3.06 WIRE AND CABLES

- A. Exterior Locations: Site wiring shall be by overhead methods where possible. Overhead wiring shall be a minimum of 18' above grade. For other locations, wiring shall be run underground in GRS conduit.
- B. Interior Locations: Lighting circuits shall utilize suspended open type festoon style wiring. Power circuits shall be run flexible or rigid conduit as appropriate for each application.

END OF SECTION 26 0016

PART 1 -GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

1.02 SECTION INCLUDES

- A. Conduit and equipment supports.
- B. Anchors and fasteners.

1.03 REFERENCES

- A. Refer to Division 1.
- B. NECA Standard of Installation (National Electrical Contractors Association).
- C. NFPA 70 - National Electrical Code.

1.04 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.01 ANCHORING DEVICES

- A. Sleeve Anchors (FS FF-S-325 Group II, Type 3, Class 3): Molly/Emhart's Parasleeve Series, Phillips' Red Head AN, HN, FS Series, or Ramset's Dynabolt Series.
- B. Wedge Anchors (FS FF-S-325 Group II, Type 4, Class 1): Hilti's Kwik Bolt Series, Molly/Emhart's Parabolt Series, Phillips' Red Head WS, or Ramset's Trubolt Series.
- C. Self-Drilling Anchors (FS FF-S-325 Group III, Type 1): Phillips' Red Head Series S or Ramset's Ram Drill Series.
- D. Non-Drilling Anchors (FS FF-S-325 Group VIII, Type 1): Hilti's Drop-In Anchor Series, Phillips' Red Head J Series, or Ramset's Dynaset Series.
- E. Stud Anchors (FS FF-S-325 Group VIII, Type 2): Phillips' Red Head JS Series.

2.02 CAST-IN-PLACE CONCRETE INSERTS

- A. Continuous Slotted Type Concrete Insert, Galvanized:
 - 1. Load Rating 1300 lbs./ft.: Kindorf's D-986.
 - 2. Load Rating 2400 lbs./ft.: Kindorf's D-980.
 - 3. Load Rating 3000 lbs./ft.: Hohmann & Barnard Inc.'s Type CS-H.
 - 4. Load Rating 4500 lbs./ft.: Hohmann & Barnard Inc.'s Type CS-HD.

- B. Threaded Type Concrete Insert: Galvanized ferrous castings, internally threaded.
- C. Wedge Type Concrete Insert: Galvanized box-type ferrous castings, designed to accept bolts having special wedge shaped heads.

2.03 MISCELLANEOUS FASTENERS

- A. Except where shown otherwise on the Drawings, furnish type, size, and grade required for proper installation of the Work, selected from the following: Furnish galvanized fasteners for exterior use, or for items anchored to exterior walls, except where stainless steel is indicated.
 - 1. Standard Bolts and Nuts: ASTM A 307, Grade A, regular hexagon head.
 - 2. Lag Bolts: FS FF-B-561, square head type.
 - 3. Machine Screws: FS FF-S-92, cadmium plated steel.
 - 4. Machine Bolts: FS FF-B-584 heads; FF-N-836 nuts.
 - 5. Wood Screws: FS FF-S-111 flat head carbon steel.
 - 6. Plain Washers: FS FF-W-92, round, general assembly grade carbon steel.
 - 7. Lock Washers: FS FF-W-84, helical spring type carbon steel.
 - 8. Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class and style as required to sustain load.
- B. Stainless Steel Fasteners: Type 302 for interior Work; Type 316 for exterior Work; Phillips head screws and bolts for exposed Work unless otherwise specified.

2.04 HANGER RODS

- A. Mid low carbon steel, unless otherwise specified; fully threaded or threaded each end, with nuts as required to position and lock rod in place. Unless galvanized or cadmium plated, provide a shop coat of red lead or zinc chromate primer paint.

2.05 "C" BEAM CLAMPS

- A. With Conduit Hangers:
 - 1. For 1 Inch Conduit Maximum: B-Line Systems Inc.'s BG-8, BP-8 Series, Caddy/Erico Products Inc.'s BC-8P and BC-8PSM Series, or GB Electrical Inc.'s HIT 110-412 Series.
 - 2. For 3 Inch Conduit Maximum: Appleton Electric Co.'s BH-500 Series beam clamp with H50W/B Series hangers, Kindorf's 500 Series beam clamp with 6HO-B Series hanger, or OZ/Gedney Co.'s IS-500 Series beam clamp with H-OWB Series hanger.
 - 3. For 4 Inch Conduit Maximum: Kindorf's E-231 beam clamp and E-234 anchor clip and C-149 series lay-in hanger; Unistrut Corp.'s P2676 beam clamp and P-1659A Series anchor clip with J1205 Series lay in hanger.
- B. For Hanger Rods:
 - 1. For 1/4 Inch Hanger Rods: B-Line Systems Inc.'s BC, Caddy/Erico Products Inc.'s BC, GB Electrical Inc.'s HIT 110, Kindorf's 500, 510, or Unistrut Corp.'s P1648S, P2398S, P2675, P2676.
 - 2. For 3/8 Inch Hanger Rods: Caddy/Erico Products Inc.'s BC, Kindorf's 231-3/8, 502, or Unistrut Corp.'s P1649AS, P2401S, P2675, P2676.

3. For 1/2 Inch Rods: Appleton Electric Co. BH-500 Series, Kindorf's 500 Series, 231-1/2, OZ/Gedney Co.'s IS-500 Series, or Unistrut Corp.'s P1650AS, P2403S, P2676.
4. For 5/8 Inch Rods: Unistrut Corp.'s P1651AS beam clamp and P1656A Series anchor clip.
5. For 3/4 Inch Rods: Unistrut Corp.'s P1653S beam clamp and P1656A Series anchor clip.

2.06 CHANNEL SUPPORT SYSTEM

- A. Channel Material: 12 gage steel.
- B. Finishes:
 1. Phosphate and baked green enamel/epoxy.
 2. Pre-galvanized.
 3. Hot dipped galvanized.
 4. Polyvinyl chloride (PVC), minimum 15 mils thick.
- C. Fittings: Same material and finish as channel.
- D. UL Listed Systems:
 1. B-line Systems Inc.'s B-22 (1-5/8 x 1-5/8 inches), B-12 (1-5/8 x 2-7/16 inches), B-11 (1-5/8 x 3-1/4 inches).
 2. Grinnell Corp.'s Allied Power-Strut PS 200 (1-5/8 x 1-5/8 inches), PS 150 (1-5/8 x 2-7/16 inches), PS 100 (1-5/8 x 3-1/4 inches).
 3. Kindorf's B-900 (1-1/2 x 1-1/2 inches), B-901 (1-1/2 x 1-7/8 inches), B-902 (1-1/2 x 3 inches).
 4. Unistrut Corp.'s P-3000 (1-3/8 x 1-5/8 inches), P-5500 (1-5/8 x 2-7/16 inches), P-5000 (1-5/8 x 3-1/4 inches).
 5. Versabar Corp.'s VA-1 (1-5/8 x 1-5/8 inches), VA-3 (1-5/8 x 2-1/2 inches).

2.07 MISCELLANEOUS FITTINGS

- A. Side Beam Brackets: B-Line Systems Inc.'s B102, B103, B371-2, Kindorf's B-915, or Versabar Corp.'s VF-2305, VF-2507.
- B. Pipe Straps:
 1. Two Hole Steel Conduit Straps: B-Line Systems Inc.'s B-2100 Series, Kindorf's C-144 Series, or Unistrut Corp.'s P-2558 Series
 2. One Hole Malleable Iron Clamps: Kindorf's HS-400 Series, or OZ/ Gedney Co.'s 14-G Series, 15-G Series (EMT).
- C. Deck Clamps: Caddy/Erco Products Inc.'s DH-4-T1 Series.
- D. Fixture Stud and Strap: OZ/Gedney Co.'s SL-134, or Steel City's FE-431.

- E. Supporting Fittings for Pendent Mounted Industrial Type Fluorescent Fixtures on Exposed Conduit System:
1. Ball Hanger: Appleton Electric Co.'s AL Series, or Crouse-Hinds Co.'s AL Series.
 2. Flexible Fixture Hanger: Appleton Electric Co.'s UNJ-50, UNJ-75, or Crouse-Hinds Co.'s UNJ115.
 3. Flexible (Hook Type) Fixture Hanger: Appleton Electric Co.'s FHMF, or Crouse-Hinds Co.'s UNH-1.
 4. Eyelet: Unistrut Corp.'s M2250.
 5. Eyelet with Stud: Kindorf's H262, or Unistrut Corp.'s M2350.
 6. Conduit Hook: Appleton Electric Co.'s FHSN, or Crouse-Hinds Co.'s UNH-13.
- F. Supporting Fasteners (Metal Stud Construction): Metal stud supports, clips and accessories as produced by Caddy/Erco Products Inc.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Where specific fasteners are not specified or indicated for securing items to in-place construction, provide appropriate type, size, and number of fasteners for a secure, rigid installation.
- B. Install anchoring devices and other fasteners in accordance with manufacturer's printed instructions.
- C. Make attachments to structural steel wherever possible.

3.02 FASTENER SCHEDULE

- A. Material:
 1. Use cadmium or zinc coated anchors and fasteners in dry locations.
 2. Use hot dipped galvanized or stainless-steel anchors and fasteners in damp and wet locations.
 3. For corrosive atmospheres or other extreme environmental conditions, use fasteners made of materials suitable for the conditions.
- B. Types and Use: Unless otherwise specified or indicated use:
 1. Cast-in-place concrete inserts in fresh concrete construction for direct pull-out loads such as shelf angles or fabricated metal items and supports attached to concrete slab ceilings.
 2. Anchoring devices to fasten items to solid masonry and concrete when the anchor is not subjected to pull out loads, or vibration in shear loads.
 3. Toggle bolts to fasten items to hollow masonry and stud partitions.

4. TPR fasteners to fasten items to plywood backed gypsum board ceilings.
5. Metallic fasteners installed with electrically operated or powder driven tools for approved applications, except:
 - a. Do not use powder driven drive pins or expansion nails.
 - b. Do not attach powder driven or welded studs to structural steel less than 3/16 inch thick.
 - c. Do not support a load, in excess of 250 lbs from any single welded or powder driven stud.
 - d. Do not use powder driven fasteners in precast concrete.

3.03 ATTACHMENT SCHEDULE

- A. General: Make attachments to structural steel or steel bar joists wherever possible. Provide intermediate structural steel members where required by support spacing. Select steel members for use as intermediate supports based on a minimum safety factor of 5.
 1. Make attachments to steel bar joists at panel points of joists.
 2. Do not drill holes in main structural steel members.
 3. Use "C" beam clamps for attachment to steel beams.
- B. Where it is not possible to make attachments to structural steel or steel bar joists, use the following methods of attachment to suit type of construction unless otherwise specified or indicated on the drawings:
 1. Attachment to Steel Roof Decking (No Concrete Fill):
 - a. Decking with Hanger Tabs: Use deck clamps.
 - b. Decking Without Hanger Tabs:
 1. Before Roofing Has Been Applied: Use 3/8 inch threaded steel rod welded to a 4 x 4 x 1/4 inch steel plate and installed through 1/2 inch hole in roof deck.
 2. After Roofing Has Been Applied: Use welding studs, or self-drilling/tapping fasteners. Exercise extreme care when installing fasteners to avoid damage to roofing.
 2. Attachment to Concrete Filled Steel Decks (Total thickness, 2-1/2 inches or more):

Before Fill Has Been Placed:

 - a. Use thru-bolts and fish plates.
 - b. Use welded studs. Do not support a load in excess of 250 pounds from a single welded stud.
 - c. After Fill Has Been Placed: Use welded studs. Do not support a load in excess of 250 lbs. from a single welded stud.
 3. Attachment to Cast-In-Place Concrete:
 - a. Fresh Concrete: Use cast-in-place concrete inserts.
 - b. Existing Concrete: Use anchoring devices.
 4. Attachment to Cored Precast Concrete Decks:
 - a. New Construction: Use thru-bolts and fish plates before Construction concrete fill is placed over decks.

5. Attachment to Hollow Block or Tile Filled Concrete Deck:
 - a. New Construction: Use cast-in-place concrete inserts by having Construction Work Contractor omitting blocks and pouring solid blocks with insert where required.
6. Attachment to Waffle Type Concrete Decks:
 - a. New Construction:
 1. Use cast-in-place concrete inserts in fresh concrete.
 2. If concrete fill has been applied over deck, thru-bolts and fish plates may be used where additional concrete or roofing is to be placed over the deck.
7. Attachment to Precast Concrete Planks: Use anchoring devices, except do not make attachments to precast concrete planks less than 2-3/4 inches thick.
8. Attachment to Precast Concrete Tee Construction:
 - a. New Construction:
 1. Use tee hanger inserts between adjacent flanges.
 2. Use thru-bolts and fish plates, except at roof deck without concrete fill.
 - b. Existing Construction:
 1. Use anchoring devices installed in webs of tees. Install anchoring devices as high as possible in the webs.
 - c. Do not use powder driven fasteners.
 - d. Exercise extreme care in drilling holes to avoid damage to reinforcement.
9. Attachment to Metal Stud Construction: Use supporting fasteners manufactured specifically for the attachment of raceways and boxes to metal stud construction.
 - a. Support and attach outlet boxes so that they cannot torque/twist. Either:
 1. Use bar hanger assembly, or:
 2. In addition to attachment to the stud, also provide far side box support.

3.04 CONDUIT SUPPORT SCHEDULE

- A. Provide number of supports as required by National Electrical Code. Exception: Maximum support spacing allowed is 4'-0" for conduit sizes 3 inches and larger supported from wood trusses.
- B. Use pipe straps and specified method of attachment where conduit is installed proximate to surface of wood or masonry construction.
 1. Use hangers secured to surface with specified method of attachment where conduit is suspended from the surface.
- C. Use "C" beam clamps and hangers where conduit is supported from steel beams.
- D. Use deck clamps and hangers where conduit is supported from steel decking having hanger tabs.
 1. Where conduit is supported from steel decking which does not have hanger tabs, use clamps and hangers secured to decking, utilizing specified method of attachment.
- E. Use channel support system supported from structural steel for multiple parallel conduit runs.
- F. Where conduits are installed above ceiling, do not rest conduit directly on runner bars, T-Bars, etc.
 1. Conduit Sizes 2-1/2 Inches and Smaller: Support conduit from ceiling supports or from construction above ceiling.

2. Conduit Sizes Over 2-1/2 Inches: Support conduit from beams, joists, or trusses above ceiling.

3.05 LIGHTING FIXTURE SUPPORT SCHEDULE

- A. General: Do not support fixtures from ceilings or ceiling supports unless it is specified or indicated on the drawings to do so.
 1. Support fixtures with hanger rods attached to beams, joists, or trusses. Hanger rod diameter, largest standard size that will fit in mounting holes of fixture.
 - a. Where approved, channel supports may span and rest upon the lower chord of trusses and be utilized for the support of lighting fixtures.
 - b. Where approved, channel supports may span and be attached to the underside of beams, joists, or trusses and be utilized for the support of lighting fixtures.
 2. Use 2 nuts and 2 washers on lower end of each hanger rod to hold and adjust fixture (one nut and washer above top of fixture housing, one nut and washer below top of fixture housing).
 - a. Where specified that an adequately supported outlet box is to support a fixture or be utilized as one point of support, support the box so that it may be adjusted to bring the face of the outlet box even with surface of ceiling.
- B. Number of Supports for Ceiling Mounted Lighting Fixtures: Provide at least the following number of supports. Provide additional supports when recommended by fixture manufacturer, or shown on the drawings.
 1. Commercial and Industrial Fixtures:
 - a. Support individual fixtures less than 2 feet wide at 2 points.
 - b. Support continuous row fixtures less than 2 feet wide at points equal to the number of fixtures plus one. Uniformly distribute the points of support over the row of fixtures.
 - c. Support individual fixture 2 feet or wider at 4 corners.
 - d. Support continuous row of fixtures 2 feet or wider at points equal to twice the number of fixtures plus 2. Uniformly distribute the points of support over the row of fixtures.
 - e. An adequately supported outlet box may be utilized as one point of support for fixtures weighing less than 50 pounds.
- C. Number of Supports for Wall Mounted Lighting Fixtures: Provide at least the following number of supports. Provide additional supports when recommended by fixture manufacturer, or shown on the drawings.
 1. Commercial and Industrial Fixtures:
 - a. Support individual fixtures 2 feet long or less at 2 points.
 - b. Support individual fixtures over 2 feet long at 3 points.
 - c. Support continuous row fluorescent fixtures at points equal to twice the number of fixtures. Uniformly distribute the points of support.
 - d. An adequately supported outlet box may be utilized as one point of support for fixtures weighing less than 50 pounds.

3.06 CHANNEL SUPPORT SYSTEM SCHEDULE

- A. Use channel support system where specified or indicated on the drawings.

- B. Channel supports may be used, as approved, to accommodate mounting of equipment.
- C. Material and Finish:
 - 1. Dry Locations: Use 12 gage steel channel support system having any one of the specified finishes.
 - 2. Damp Locations: Use 12 gage steel channel support system having any one of the specified finishes except green epoxy/enamel.
 - 3. Wet Locations: Use 12 gage steel channel support system having hot dipped galvanized, or PVC finish.

END OF SECTION 26 0190

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

1.02 SECTION INCLUDES

- A. Nameplates and labels.
- B. Wire and cable markers.
- C. Conduit markers.

1.03 REFERENCES

- A. Refer to Division 1.
- B. NFPA 70 - National Electrical Code.

1.04 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.01 NAMEPLATES AND LABELS

- A. Nameplates: Engraved three-layer laminated plastic, black letters on white background
 - 1. Locations:
 - a. Outside of each electrical panel. Indicate panel name and the upstream panel and breaker number that the panel is serviced from.
 - b. Control equipment enclosure. Indicate equipment name and branch circuit.
 - c. Disconnects Indicate equipment name and branch circuit.
 - d. Distribution panel breakers. Indicate load served.
 - 2. Letter Size: 1/8 -inch letters.
- B. Labels: Circuit designation shall be indicated with clear adhesive tape, 3/16 inch black letters on clear background. Use only for identification of individual wall switches and receptacles and control device stations. Tape label shall be adhered to the faceplate of each device.
- C. Provide flash protection label per NEC 110.16 for equipment furnished under this Contract including switchboards, panelboards, industrial control panels and motor control centers. Seton #M0547; or equal.

2.02 WIRE MARKERS

- A. Description: Tape type wire markers.
- B. Locations: Each conductor at panelboard gutters and each load connection.
- C. Legend: Branch circuit or feeder number indicated.

2.03 UNDERGROUND WARNING TAPE

- A. Location:
 - 1. Along length of each underground conduit buried 12" below finished grade.
 - 2. Yellow with black lettering, 6" wide tape, "CAUTION – Underground Electric".
 - 3. Orange with black lettering, 6" wide detectable tape made of durable plastic encased aluminum, "CAUTION – Fiber Optic Cable".

2.04 PANEL SCHEDULES

- A. Provide complete type written directory for each panelboard listing room number, function, etc., for each circuit breaker.
- B. Panel directory must also include the up-stream panel that services the panel. (i.e. "Fed from MDP Circuits 2,4,6")
- C. Include a Microsoft word or excel file with all panel schedules as part of the close out submittals.

2.05 DEVICES

- A. Provide a tape label on all receptacle and switch cover plates, power poles, etc. listing panel designation and circuit number. Tape shall be attached to outside of receptacle or switch cover plates.
- B. In permanent marker write the panel and circuit number on the wall behind receptacle cover plate or inside receptacle back box.

2.06 JUNCTION AND PULL BOXES

- A. Identify junction and pull boxes for particular service such as power, lighting, fire alarm, telephone, intercom, public address, nurse call, etc. using stencil lettering on cover.

2.07 CONDUIT

- A. Provide adhesive marking labels for raceway and metal-clad cable. The labels shall indicate voltage and service, and be located above ceilings every 75 feet and on wall mounted conduit in mechanical and equipment rooms.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Degrease and clean surfaces to receive nameplates and labels.

3.02 INSTALLATION

- A. Install nameplate and label parallel to equipment lines.
- B. Secure nameplate to equipment front using adhesive.

- C. Secure nameplate to inside surface of door on panelboard that is recessed in finished locations.

END OF SECTION 26 0195

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

1.02 WORK INCLUDED

- A. Conductors.
- B. MC Cable.
- C. Terminations.

1.03 SUBMITTALS

- A. Schedule of all wiring and cable usage.
- B. Product data sheets for all wire and cable types.

PART 2 - PRODUCTS

2.01 CONDUCTORS

- A. Feeder, branch circuit and control wiring:
 - 1. Annealed Copper, 98% conductivity.
 - 2. Minimum wire size:
 - a. #12 AWG for branch circuits
 - b. #14 AWG for control and signal circuits
 - 3. #8 AWG Wire and above shall be stranded.
 - 4. 600-volt insulation for all wiring above 50 volts.
 - 5. 300-volt insulation permitted for all wiring below 50 volts.
 - 6. Thermal plastic with PVC insulation with nylon jacket, suitable for wet or dry locations, THHN/THWN 90 degree Celsius.
 - 7. 90-degree C maximum operating temperature rating.
 - 8. UL 83 Listed
- B. Lighting fixture wire
 - 1. FREP/CPE coated stranded copper,
 - 2. Flame retardant EPR Insulation and CPE jacket.
 - 3. UL 44 listed

C. Flexible cords and cables shall be Type "SO" or "SJO."

D. Color Coding:

1. All circuits shall be color coded according to the following schedule:

Voltage	A PHASE	B PHASE	C PHASE	NEUTRAL
208Y/120V, 3 Phase	Black	Red	Blue	White
480Y/277V, 3 Phase	Brown	Orange	Yellow	Gray
*ALL GROUNDING CONDUCTORS SHALL BE GREEN				

2. #6 AWG and smaller shall have insulation continuously colored as called for above.
3. #4 AWG and larger may be identified using a minimum 3" tape band.
4. Color code all conductors at all pull boxes, enclosures, and terminations.
5. Switched legs shall be identified with the same color insulation as the phase leg.

E. Acceptable manufacturers:

1. Cablec
2. Southwire
3. Okonite
4. Rome Cable
5. Pirelli

2.02 TYPE MC METAL CLAD CABLE

A. Construction:

1. Galvanized Interlocking Steel Strip outer shield
2. Stranded or solid copper conductors, each individually insulated, and enclosed in an armor of flexible metal tape.
3. Suitable for wet or dry locations.
4. Suitable for cable tray installations.
5. Do not install direct buried, in concrete, or in the presence of corrosive vapors.
6. Provide with separate integral grounding conductor.
7. Support every 6 feet.
8. Manufactured and installed in accordance with NEC Article 330
9. Provide red stripe on outer shield where utilized for fire alarm wiring.
10. Make: Acceptable manufacturers:
 - a. AFC
 - b. Southwire
 - c. United Copper Industries

2.03 METAL CLAD COMBINATION LIGHTING POWER AND CONTROL CABLE.

- A. Cable Shall have following construction
 - 1. Armor: Galvanized Interlocking Steel Strip (blue armor) or Interlocking Aluminum Strip
 - 2. Solid or Stranded Copper Conductors
 - 3. Insulated Conductor Type THHN
 - 4. Neutral Conductor: White or Gray
 - 5. Control Cables: 16 AWG Solid TFN Twisted jacketed pair (Purple/Gray)
 - 6. Insulation Permitting conductors of control circuits to be placed in a cable with conductors of electric light, power, or Class 1 circuits
- B. Standards
 - 1. UL 66, 83, 1479, 1569, 1581, 2556, File Reference E80042
 - 2. NEC 250.118, 300.22(C), 392, 396, 330, 501, 502, 503, 530, 504, 505, 518, 520, 530, 645, 725
 - 3. Federal Specification A-A-59544 (formerly J-C-30B)
 - 4. Meets all applicable OSHA and HUD Requirements
 - 5. Cable Tray Rated
 - 6. UL Classified 1, 2, and 3 hour through penetration (Fire Stop) product, R 14141
 - 7. Environmental Air-Handling Space Installation per NEC 300.22(C)
 - 8. Power and/or lighting as well as signal and/or control conductors per NEC Section 725.136(I)(1)
- C. Design Make: AFC MC Tuff Luminary Cable

2.04 LOW VOLTAGE CONNECTORS AND TERMINATIONS

- A. Straight Splices, #26 AWG to #10 AWG:
 - 1. Nylon Insulated compression butt-splices.
 - 2. 600 volt, 90 degree C rated.
 - 3. Make: Burndy "Insulink", T&B "Sta-Kon", or approved equal
- B. Straight Splices, #8 AWG and Larger:
 - 1. Two way, long barrel, compression type, copper
 - 2. Provide heat shrink tubing over splice.
 - 3. 600 volt rated.
 - 4. Make: Burndy "Hylink", T&N 54800 Series, or approved equal.
- C. Pigtail Splices, #26 AWG to #10 AWG:
 - 1. Twist type pressure connector.
 - 2. 600 volt rated, 105 degree C.
 - 3. Size as required for number and size of conductors used.
 - 4. Make: T&B Scotchlock, or approved equal
- D. Three Way Splices, #8 AWG and Larger:
 - 1. Three way, long barrel, compression type, copper.

2. Provide tape or heat shrink tubing over splice.
 3. 600 volt rated.
 4. Make: Burndy "Hylink", T&B 54700 Series, or approved equal.
- E. Lug Terminations for Control and Signal Wiring:
1. Nylon insulated fork with compression termination of #26 AWG to #10 AWG.
 2. Nylon insulated ring with compression termination for #8 AWG and larger.
 3. 300 volt rated.
 4. Make: Burndy "Insulug", T&B "Sta-Kon", or approved equal.
- F. Lug Terminations for Power Wiring:
1. Long barrel, compression type, copper body, on hole for #8 AWG to #2/0 AWG.
 2. Long barrel, compression type, copper body, two hole, for #3/0 AWG and larger.
 3. 600 volt rated.
 4. Make:
 - a. One-hole lug: Burndy "Hylug", T&B 54900 Series, or approved equal.
 - b. Two-hole lug: Burndy "Hylug", T&B 54800 Series, or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Route wire and cable as required to meet Project Conditions.
- B. Install cable in accordance with the NECA "Standard of Installation."
- C. Use stranded conductors for control circuits.
- D. Use conductor not smaller than 12 AWG for power and lighting circuits.
- E. Use conductor not smaller than 16 AWG for control circuits.
- F. Use 10 AWG conductors for 20 amperes, 120 volt branch circuits longer than 100 feet.
- G. Identify and color code wire and cable under provisions of this section. Identify each conductor with its circuit number or other designation indicated.
- H. Install cables for emergency power feeders and circuits in raceway as called for after the entire raceway system has been completed.
- I. Install splices and connections in accessible outlet, pull, and junction boxes.
- J. Insulate all splices and connections with UL Labeled plastic tape, heat shrink tubing, or plastic molded caps.
- K. All wiring systems shall be properly grounded and continuously polarized throughout, following the color coding specified.
- L. Provide a green equipment ground with all feeders and all branch circuits' size per the NEC.

- M. Provide dedicated white insulated neutral conductor for each branch circuit. Shared neutrals are not allowed.
- N. Install a maximum of three phase conductors, three neutral conductors, and one grounding conductor in each home run. (Obtain approval for additional conductor fill where field conditions require. Adhere to NEC de-rating requirements.)
- O. Provide stranded wire to motors, transformers, equipment, and vibrating machinery.
- P. Feeder conductors shall be continuous from point of origin to load termination without splice. If this is not practical, contact the Owner's Representative and receive written approval for splicing prior to installation of feeder(s). Where feeder conductors pass through junction and pull boxes, bind and lace conductors of each feeder together. For parallel sets of conductors, match lengths of conductors.
- Q. Use pulling means including fish tape, cable, and rope and basket type grips which will not damage cables or raceways. Use approved mechanical pullers for feeders and branch circuits as required for #6 AWG cable and larger. Do not use mechanical means to pull conductors No. 8 or smaller.
- R. Branch circuit conductors installed in panelboards, and control conductors installed in control cabinets and panels shall be neatly bound together using "Ty-Raps" or equivalent.
- S. Reconnect branch circuit wiring at panelboards as required to obtain a balanced three phase load on the feeders.
- T. Properly splice and neatly coil extraneous wires in outlet boxes.
- U. Wiring in panelboards and equipment enclosures etc. shall be neatly trained and arranged so as not to preclude access to the space or equipment contained therein. Provide all additional cable supports and ties required to comply.
- V. The system shall be properly grounded and continuously polarized throughout, following the color coding specified.
- W. Wiring within panelboards, control cabinets, pull boxes, wiring troughs and annunciator and/or alarm panels shall be neatly bundled together with ties not requiring tools to install. Two, three and four wire circuits emerging from the bundle shall be trained and tied individually.
- X. Where multiple conductors are installed in a common raceway they shall be pulled simultaneously. Use of pulling compound or lubricant shall be avoided unless absolutely necessary. Where pulling lubricant is required, use UL approved compounds approved for cable type. Lubricant shall meet all OSHA and Toxic Control Act standards.

APPLICATION	CABLE TYPES	DESIGN MAKE
General purpose Construction & Maintenance	Rubber, Neoprene, Nylon, PVC, High Density XLP, Hypalon	Ideal - Yellow 77
High Temperature Construction & Maintenance	Rubber, Neoprene, Nylon, PVC, High Density XLP, Hypalon, Low Density Polyethylene, Semiconducting Jacket	Ideal - Yellow 190

Utility construction & Maintenance	Rubber, Neoprene, Nylon, PVC, High Density XLP, Hypalon, Low Density Polyethylene, Semiconducting Jacket	Aqua-Gel II
Cold Weather Construction & Maintenance	Rubber, Neoprene, Nylon PVC, High Density XLP, Hypalon, Low Density Polyethylene, Semiconducting Jacket	Aqua-Gel CW

3.02 CIRCUITING

- A. The following takes precedence over the drawings:
1. General purpose receptacle and lighting branch circuits may be combined in single conduits in accordance with NEC requirements and restrictions.
 2. Conductors serving individual pieces of equipment or grouped equipment or isolated ground branch circuits shall not be combined.
 3. Provide dedicated Neutrals.

3.03 SPLICES

- A. Dry locations: For conductors #10 AWG and smaller use standard spring type pressure connectors or compression type connectors with insulating jackets.
- B. For conductors #8 AWG and larger use compression type connectors and insulate in accordance with manufacturer's recommendations.
- C. Damp locations: Use same type splices as indicated for dry locations and wrap with moisture sealing tape.
- D. Wire runs shall be continuous. All splicing shall be done only in accessible boxes.

3.04 LOW VOLTAGE CONTROL WIRING

- A. Low voltage control wiring shall not be run in same conduit system as power feeds. All low voltage control wiring in equipment shall be neatly bundled, identified and installed remote from any and all mechanical moving parts. All low voltage control wiring in walls shall be installed in conduit, the same as required for power wiring. All low voltage wiring above inaccessible ceilings shall be installed in conduit. All low voltage wiring exposed in finished spaces shall be installed in wiremold surface raceway. All low voltage wiring exposed in unfinished spaces shall be installed in conduit. All low voltage control wiring above accessible ceilings shall be bundled, neatly run at right angles and/or parallel to building steel, tied to steel as high as possible with no more than 3" sags; wire may not be laid on ceiling framing or supported by ceiling framing. Low voltage wiring shall not be run between decking flutes or above structural members.

3.05 TYPE MC METAL CLAD CABLE

- A. MC Cable shall be permitted for branch circuit wiring only if they 100% concealed above a drop ceiling.
- B. All branch circuit wiring in the call center, IT Server room, and the War Room/Training and the adjoining support rooms must be installed in conduit.
- C. Type MC Cable is not permitted for panelboard feeders.
- D. MC cable shall not be allowed for branch circuit wiring exposed in finished spaces.
- E. Support cable at intervals not exceeding 4 feet.
- F. Bending radius shall comply with Article 330.24 of the NEC.
- G. Provide insulating bushing at all termination points between the metal sheath and outlet or junction box.
- H. Type MC Cable shall not be installed exposed with the exception of fixture drops in mechanical or equipment rooms. Secure the cable to fixture hangers using nylon or plastic ties.

END OF SECTION 26 0519

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

1.02 SECTION INCLUDES

- A. Grounding electrodes materials.
- B. Grounding and bonding conductor materials.
- C. Equipment grounding and bonding requirements.

1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. B3: Soft or Annealed Copper Wire.
 - 2. B8: Concentric-Lay-Stranded Copper Conductors, Hard, Medium Hard, or Soft.
 - 3. B33: Tinned Soft or Annealed Copper Wire for Electrical Purposes.
- B. Institute of Electrical and Electronic Engineers (IEEE):
 - 1. 81: Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System.
 - 2. 1100: Powering and grounding sensitive electronic equipment.
- C. International Electrical Testing Association (NETA).
- D. National Fire Protection Association (NFPA):
 - 1. 70: National Electrical Code (NEC).
 - 2. 780: Lightning Protection Code.
- E. Occupational Safety and Health Administration (OSHA):
 - 1. 29CFR 1910.7 Definitions and requirements for Nationally Recognized Testing Laboratories (NRTL).
- F. Underwriters Laboratories (UL):
 - 1. 486A: Wire Connectors and Soldering Lugs for Use with Copper Conductors.
 - 2. 467: Grounding and Bonding Equipment.

1.04 QUALITY ASSURANCE

- A. Testing Agency Qualifications: A NRTL as defined in OSHA Regulation 1910.7, or a full member company of NETA.
 - 1. Testing Agency Field Supervision: Use persons currently certified by NETA or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in PART 3.
- B. Comply with NFPA 70, National Electrical Code.
- C. Comply with UL 467.
- D. Listing and Labeling: Provide products specified in this Section that are listed and labeled.
 - 1. The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.
 - 2. Listing and Labeling Agency Qualifications: A NRTL as defined in OSHA Regulation 1910.7.

1.05 SUBMITTALS

- A. Product Data for grounding wiring, grounding rods, connectors and connection materials, ground busses or plates, identification materials and grounding fittings.
- B. Field tests showing that the service entrance and generator grounding meets required resistance levels.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Kearney/Cooper Power Systems.
 - 2. Lyncole XIT Grounding.
 - 3. Salisbury: W. H. Salisbury & Co.
 - 4. Thomas & Betts, Electrical.
 - 5. Chance/Hubbell.
 - 6. O-Z/Gedney Co.; a business of the EGS Electrical Group.

2.02 WIRE AND CABLE GROUNDING CONDUCTORS

- A. Conform to NEC Table 8, except as otherwise indicated, for conductor properties, including stranding. The requirements below apply for new cables installed as well as for upgrading of identification of existing cables as indicated on drawings.
 - 1. Material: Copper. Use only copper wire for both insulated and bare grounding conductors in direct contact with earth, concrete, masonry, crushed stone, and similar materials.
- B. Equipment Grounding Conductors: Insulated with green color insulation.
- C. Underground Conductors: Bare, tinned, stranded, except as otherwise indicated.

- D. Bare Copper Conductors: Conform to the following:
 - 1. Solid Conductors: ASTM B3.
 - 2. Assembly of Stranded Conductors: ASTM B8.
 - 3. Tinned Conductors: ASTM B33.
- E. Color coding of ground cables - Where new or existing cables are concealed and not color-coded, any exposed portion of the cable and each end of the cable for a minimum of 2 feet shall be color coded by green tape overlaid with bright tracer color tape to form the tracer. Where routed through raceways, wire ways, cable trays or under raised floors, the color-coding shall be such that by removing or opening any cover, color-coding shall be visible. Where conductors are routed through cable trays, color-coding for a minimum length of 4 inches shall be accomplished at intervals not exceeding three feet between marking.

2.03 MISCELLANEOUS CONDUCTORS

- A. Grounding Plates: Bare or tinned, annealed-copper. Size as per specifications or larger as indicated on drawings.
- B. Braided Bonding Jumpers: Where electrical continuity across shock mounts is necessary, bonding jumpers shall be installed across each shock mount. Jumpers of this application should have a maximum thickness of 0.025 inch, so that the damping efficiency of the mount is not impaired. In severe shock and vibration environments, solid straps may be corrugated, or flexible tinned copper wire braid may be used. Braids are to be terminated with tinned copper ferrules.
- C. Raceway Bonding Jumpers: Copper, minimum size #6 AWG unless otherwise noted.

PART 3 - EXECUTION

3.01 GENERAL

- A. A separate ground conductor (green wire) shall be installed in all raceways for feeders, power and receptacle branch circuits and where called for on drawings.
- B. Switchboards shall have a separate ground bus bonding all cubicles together.
- C. Equipment grounding terminals of normal and essential Panelboards serving common patient areas shall be bonded together.
- D. All distribution and branch circuit panels shall have a separate ground bar
- E. All metallic conduits 1-1/4" or larger shall have grounding bushings.
- F. All type SO cord, or equivalent, shall have a separate ground wire (green) of equal size to circuit conductor.
- G. Equipment ground conductor shall be copper with Type THHN insulation, green only, up to and including #4; larger sizes may be bare conductor, or black and identified with green tape.
- H. Paint, grease or other contaminants shall be cleaned from all surfaces before bonding ground conductor. (Painted surfaces shall be sanded and cleaned.)

- I. Equipment Grounding Conductors: All metallic non-current carrying parts of electrical equipment shall be grounded with equipment grounding conductors whether or not shown on the drawings. Equipment grounding conductors shall be green insulated copper conductors unless otherwise indicated.
 - 1. Install green, equipment grounding conductor with all feeder and branch circuit conductors.
- J. Signal and Communication Systems: For telephone, fire alarm, security, voice, and data systems in the equipment room, provide a #4/0 AWG minimum insulated grounding conductor in raceway from grounding-electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
- K. Service Locations and Wiring Closets: Terminate grounding conductor on a multipoint ground plate.
- L. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.
- M. Enclosures: Ground all enclosures of electrical and electronic wiring and distribution equipment in accordance with requirements of the NEC.
- N. Conduit or cable shields shall not be used as the equipment grounding conductor.
- O. Equipment Enclosure Grounding: Bare wire, wrapped around connecting screws or mounting bolts and screws is not acceptable as a grounding connection. All ground lugs shall be of a noncorrosive material suitable for use as a grounding connection, and must be compatible with the type of metal being grounded. Ground lugs shall be mounted on clean, bare metal surfaces that are free of paint, rust, etc. Wire brush clean each surface to remove paint or oxidation prior to bolting jumper connectors in place. In general use tinned copper connectors for connections of dissimilar metals. Use of bimetal connectors shall only be allowed in special circumstances and only with the prior written approval

3.02 CONNECTIONS

- A. General: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
 - 1. Use electroplated or hot-tin-coated materials to assure high conductivity and to make contact points closer in order of galvanic series.
 - 2. Make connections with clean, bare metal at points of contact.
 - 3. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
- B. Exothermic-Welded Connections: Use for connections to structural steel, for underground connections, and were indicated on drawings. Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable and will be redone at the contractor's expense. Utilize 'smokeless' type weld kits for all exothermic welds performed in interior of structure
- C. Terminate insulated equipment grounding conductors for feeders with pressure-type grounding lugs. Where metallic raceways terminate at non-metallic or non-conductive housings, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to the ground bus in the housing. Bond electrically non-continuous conduits at both entrances and exits with grounding bushings and bare grounding conductors.

- D. Raceway Grounding: Surface metal raceways, wireways, or cable trays or cable rack systems shall be installed in a manner that ensures electrical continuity. Short insulated green copper bonding jumpers shall be installed between adjacent raceway sections, on both sides of each joint, to ensure proper bonding. Unless otherwise indicated, the minimum size for these bonding jumpers shall be No. 6 AWG. Jumpers shall be provided with compression connectors at each end of cable. Surface metal raceways, wireways, cable trays or cable rack systems shall be field drilled to provide bolting point for securing bonding jumper. Wire brush clean each surface to remove paint or oxidation prior to bolting jumper connectors in place. Bolts and hardware shall be as per details or as approved for grounding purposes. All metallic raceway penetrations into a facility structure shall be bonded to the earth electrode system.
- E. Other Grounding Systems: Any additional grounding systems used for electronic equipment shall be connected to the facility main ground plate, structural steel or exterior earth electrode system as shown on drawings.
- F. Tighten grounding and bonding connectors and terminals, including screws and bolts, in accordance with torque tightening values specified in UL 486A.
- G. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Mechanical connections using a Burndy "Hyground Connector", Thomas and Betts Compression Connector or equivalent equipment when operated at the manufacturers recommended pressure to develop a minimum force of 12 tons is acceptable as approved pressure connectors. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on ground conductor. Hydraulically crimped connectors are not acceptable in the lightning protection system.

3.03 RACEWAY SYSTEMS

- A. All metal supports, cable trays, frames, sleeves, brackets, braces, etc. for the raceway system, panelboards, switchboards, switches, enclosures, starters, controls, etc., which are not rigidly secured to and in contact with the raceway system, or which are subject to vibration and loosening, shall be bonded to the raceway system. Size the bonding conductor in accordance with NEC Article 250, Table 250-122.
- B. Terminate rigid conduit at all boxes, cabinets, and enclosures tightly with two locknuts and a bushing.
- C. Conduit which runs to or from all boxes, cabinets, or enclosures having concentric or eccentric knockouts which partially perforate the metal around the conduit and hence impair the continuity of system ground circuits shall be provided with bonding jumpers sized in accordance with NEC Article 250, Table 250-122. Connect the bonding jumper between a grounding type bushing on the conduit and a ground bus or stud inside the box, cabinet, or enclosure.
- D. Provide bonding jumpers sized in accordance with NEC Article 250, Table 250-122 for all conduit expansion joints.
- E. Provide a grounding conductor in all flexible metallic conduit and liquid-tight conduit, sized in accordance with NEC Article 250, Table 250-122.
- F. Provide a grounding conductor in all nonmetallic runs of conduit and raceway, sized in accordance with NEC Article 250, Table 250-122.
- G. Provide isolated ground conductors of systems as called for on the plans.

H. Provide bonding bushings and connections in all of the following:

1. Service equipment enclosures.
2. Openings with eccentric or concentric knockouts.
3. Openings using reducing washers.
4. Hazardous locations.
5. Greater than 250V to ground systems.

3.04 SECONDARY ELECTRICAL SYSTEMS

- A. Solidly ground all transformer neutral conductors and enclosures to building steel, or a cold-water pipe 1" or larger in size as called for in Table 250-122 of the National Electrical Code.
- B. Provide an equipment grounding conductor from the point of termination back to the ground bus of the serving panelboard, switchboard, or transformer. Do not splice equipment grounding conductors.
- C. Provide an equipment grounding conductor from the point of termination back to the ground bus of the serving panelboard, switchboard, transformer, or switchgear.
- D. The grounding conductors contained in the interstices of interlocked armor cable shall be connected to the ground bus at every equipment termination point and to each other and to system ground; ground at every splice location.

3.05 TESTS

- A. Grounds and grounding systems shall have a resistance to solid earth ground not exceeding following values:
 1. For grounding non-current carrying metal parts associated with secondary distribution system: 25 Ohms.
- B. Providing grounding tests to verify the above values. Where these values are not met, add additional ground rods or connections in order to meet these values.

END OF SECTION 26 0526

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

1.02 WORK INCLUDED

- A. Metal conduit.
- B. Liquid tight flexible metal conduit.
- C. Electrical metallic tubing.
- D. Non-metallic conduit.
- E. Flexible metal conduit.
- F. Fittings and conduit bodies.

1.03 SUBMITTALS

- A. Submit for approval a list of each product and the manufacturer.

1.04 REFERENCES

- A. ANSI-C80.2, 1983: Specification for Rigid Steel Conduit, Enameled.
- B. ANSI C80.3: Electrical Metallic Tubing, Zinc Coated.
- C. ANSI/NEMA FB 1: Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
- D. NECA "Standard of Installation."
- E. NEMA TC 2: Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80).
- F. NEMA TC 3: PVC Fittings for Use with Rigid PVC Conduit and Tubing.
- G. NEMA, RN1, 1986: PVC Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
- H. NEMA, TC 6, 1983: PVC and ABS Plastic Utilities Duct for Underground Installations.
- I. NEMA, TC 8, 1983: Extra strength PVC Plastic Utilities Duct for Underground Installations.
- J. NEMA, TC 9, 1983: Fittings for ABS and PVC Plastic Utilities Duct and Fittings for Underground Installation.
- K. NEMA, TC 10, 1983: PVC and ABS Plastic Communications Duct and Fittings for Underground Installation.
- L. The following U.L. Standards:
 - 1. UL 1, 1985: Flexible Metal Electrical Conduit.
 - 2. UL 3, 1984: Flexible Nonmetallic Tubing for Electric Wiring.
 - 3. UL 6, 1981: Rigid Metal Electrical Conduit.
 - 4. UL 360, 1986: Liquid tight Flexible Steel Conduit, Electrical.
 - 5. UL 514B, 1982: Fittings for Conduit and Outlet Boxes.
 - 6. UL 651, 1981: Schedule 40 and 80 PVC Conduit.
 - 7. UL 797, 1983: Electrical Metallic Tubing.
 - 8. UL 870, 1985: Electrical Wireways, Auxiliary Gutters and Associated Fittings.

PART 2 - PRODUCTS

2.01 CONDUIT REQUIREMENTS

- A. Minimum Size: 3/4" unless otherwise specified.
- B. Underground Installations:
 - 1. Use thick wall non-metallic conduit.
 - 2. Under Slab on Grade: Use thick wall non-metallic conduit.
 - 3. Minimum Size: 1".
- C. Outdoor Locations, Above Grade: Use rigid steel conduit.
- D. In Slabs Above Grade:
 - 1. Use rigid steel conduit
- E. Indoor:
 - 1. Concealed: Use electrical metallic tubing.
 - 2. Exposed: Use EMT unless otherwise called for.

2.02 RIGID GALVANIZED STEEL CONDUIT

- A. Steel, hot dipped galvanized on the outside and inside, UL categorized as Rigid Ferrous Metal Conduit identified on UL Listing Mark as Rigid Metal Conduit - Steel or Rigid Steel Conduit.
- B. Acceptable manufacturers:
 - 1. LTV Steel
 - 2. Triangle
 - 3. Allied Tube
 - 4. Steel Duct
 - 5. Wheatland

2.03 ELECTRICAL METALLIC TUBING

- A. Steel, galvanized on the outside and enameled on the inside, UL categorized as Electrical Metallic Tubing (identified on UL Listing Mark as Electrical Metallic Tubing).
- B. Acceptable manufacturers:
 - 1. Triangle
 - 2. Wheatland
 - 3. Allied Tube
 - 4. Steel Duct
 - 5. LTV Steel

2.04 FLEXIBLE METAL CONDUIT

- A. Flexible Metal Conduit shall be constructed of one continuous length of spirally wound, interlocked, zinc coated strip steel. Interior surface shall be free from burrs or sharp edges. UL categorized as Flexible Metal Conduit (identified on UL Listing Mark as Flexible Steel Conduit or Flexible Steel Conduit Type RW).
- B. Acceptable manufacturers:
 - 1. Anaconda
 - 2. American Flexible Conduit Co.
 - 3. O-Z/Gedney
 - 4. Thomas and Betts

2.05 LIQUID TIGHT FLEXIBLE METAL CONDUIT

- A. Flexible Metal Conduit shall be constructed of one continuous length of spirally wound, interlocking zinc coated strip steel. Interior surfaces shall be free from burrs and sharp edges. Provide with a liquid-tight jacket of flexible polyvinyl chloride (PVC). UL categorized as liquid-tight flexible metal conduit (identified on UL Listing Mark as Liquid-Tight Flexible Metal Conduit, also specifically marked with temperature and environment application data).
- B. Acceptable manufacturers:
 - 1. Allied
 - 2. American Flexible Conduit
 - 3. Carlon
 - 4. Thomas and Betts

2.06 RIGID NON-METALLIC PVC CONDUIT

- A. Extra-Heavy wall conduit: Schedule 80, constructed of polyvinyl chloride, rated for use with 90-degree C conductors, and UL listed for direct burial and normal above ground use.
- B. Acceptable manufacturers:
 - 1. Carlon/Div. of Lamson and Sessions
 - 2. Beck Mfg./Picoma Industries
 - 3. Cantex Inc.
 - 4. National Pipe & Plastics Inc.
 - 5. Ipex Inc.

2.07 FITTINGS AND ACCESSORIES

- A. Rigid galvanized steel fittings shall be fully threaded and shall be of the same material as the respective raceway system.
- B. Fittings for electrical metallic tubing shall be single screw indenter fittings for conduits up to 2" and double screw indenter fittings for conduits 2" and larger.
- C. Fittings for flexible metal conduit shall be center stopped, insulated throat, U.L. E-11852 listed.
- D. Fittings for liquidtight flexible metal conduit shall have zinc plated steel ferrule, compression type with sealing ring.

- E. Fittings for rigid non-metallic conduit shall be solvent cemented in accordance with the manufacturer's instructions.
- F. Connectors shall have insulated throat up to and including 1" size. For sizes 1-1/4" and larger, provide plastic insulating bushing.
- G. Die-cast or pressure cast fittings are not permitted.
- H. Provide conduit bodies' types, shapes and sizes as required to suit application and NEC requirements. Provide matching gasketed covers secured with corrosion-resistant screws.
- I. Insulated Bushings:
 - 1. Threaded, malleable iron/zinc electroplate with 105 degrees C minimum plastic insulated throat; Appleton Electric Co.'s BU50I Series, Cooper/Crouse-Hinds' 1031 Series, OZ/Gedney Co.'s IBC-50 Series, Raco Inc.'s 1132 Series, Steel City/T & B Corp.'s BI-901 Series, or Thomas & Betts Corp.'s 1222 Series.
 - 2. Threaded malleable iron with 150 degrees C plastic throat; Appleton Electric Co.'s BU501 Series, Cooper/Crouse-Hinds' H1031 Series, or OZ/Gedney Co.'s IBC-50 Series.
- J. Plastic Bushings for 1/2 and 3/4 Inch Conduit:
 - 1. 105 degrees C minimum temperature rating; Appleton Electric Co.'s BBU50, BBU75, Blackburn (T & B Corp.'s) 50 BB, 75 BB, Cooper/Crouse-Hinds' 931,932, or OZ/Gedney Co.'s IB-50, IB-75, Raco Inc.'s 1402, 1403, Steel City/T & B Corp.'s BU-501, BU-502, or Thomas & Betts Corp.'s 222, 223.
 - 2. 150 degrees C temperature rating; Appleton Electric Co.'s BBU50H, BBU75H, Cooper/Crouse-Hinds' H-931, H-932, or OZ/Gedney Co.'s A-50, A-75.
- K. Insulated Grounding Bushings:
 - 1. Threaded, malleable iron/zinc electroplate with 105 degrees C minimum plastic insulated liner, and ground lug; Appleton Electric Co.'s GIB-50 Series, Cooper/Crouse-Hinds' GLL Series, OZ/Gedney Co.'s IBC-50L Series, Raco Inc.'s 1212 Series, Steel City/T & B Corp.'s BG-801 (1/2 to 2") Series, or Thomas & Betts Corp.'s 3870.
 - 2. Threaded malleable iron/zinc electroplate with 150 degrees C plastic insulated liner, and ground lug; Appleton Electric Co.'s GIB Series, Cooper/Crouse-Hinds' HGLL Series, or OZ/Gedney Co.'s IBC-50L Series, or Thomas & Betts Corp.'s 3870.
- L. Sealant for Raceways Exposed to Different Temperatures: Sealing compounds and accessories to suit installation; Appleton Electric Co.'s DUC, or Kwiko Sealing Compound with fiber filler, Cooper/Crouse-Hinds' Chico A Sealing Compound with Chico X fiber, Electrical Products Division 3M Scotch products, OZ Gedney Co.'s DUX or EYC sealing compound with EYF damming fiber, or Thomas & Betts Corp.'s Blackburn DX.
- M. Vertical Conductor Supports: Kellems/Hubbell Inc.'s Conduit Riser Grips, or OZ/Gedney Co.'s Type M, Type R.
- N. Pulling-In-Line for Installation in Spare and Empty Raceways: Polypropylene monofilament utility line; Greenlee Textron Inc.'s Poly Line 430, 431, or Ideal Industries Powr-Fish Pull-Line 31-340 Series.

- O. Acceptable manufacturers:
 - 1. O.Z. Gedney
 - 2. Steel City
 - 3. Thomas & Betts
 - 4. Cooper Crouse-Hinds
 - 5. Carlon
 - 6. Raco

2.08 EXPANSION FITTINGS

- A. Galvanized steel expansion joints for RGS or EMT conduit, PVC for PVC conduit. Minimum 4" movement in either direction.
- B. Weatherproof for outdoor applications.
- C. At expansion joints in concrete pours, provide Deflection/Expansion fittings capable of movement of 3/4" in all directions from the normal.
- D. Design Make: O.Z./Gedney, Type "AX" (exposed), "DX" (Concrete Pour)
- E. Acceptable manufacturers:
 - 1. O.Z./Gedney
 - 2. Crouse-Hinds
 - 3. Appleton

2.09 EXPANDABLE CONDUIT PLUGS

- A. Seal open underground telecommunications conduits entering the building with expandable conduit plugs with rope ties.
- B. Refer to drawings for underground entrance locations.
- C. Design Make: Osburn Associates or approved equal.

PART 3 - EXECUTION

3.01 GENERAL

- A. Install conduit in accordance with NECA "Standard of Installation".
- B. All conduit penetrations through fire-rated construction must be sealed with UL listed fire stopping. Refer to architectural drawings for locations.
- C. Size raceways as indicated on the drawings. Where sizes are not indicated, raceways shall be sized as required by the National Electrical Code in accordance with the quantity, size, type and insulation of conductors to be installed.
- D. Minimum 1/2" trade size for branch circuit and fire alarm wiring.
- E. Minimum 3/4" trade size for voice/data outlets, television outlets, and branch circuit "Home Runs" to panelboards.

- F. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25% additional conduits.
- G. Provide a code compliant ground path between all outlets and the established electrical system ground.
- H. Coordinate all raceway runs with other trades.
- I. Do not install raceways adjacent to hot surfaces or in wet areas. Maintain 12" clearance between conduit and surfaces with temperatures exceeding 104° F (40° C).
- J. Provide expansion fittings with external grounding straps at building expansion joints.
- K. Arrange neatly to permit access to the raceway, outlet, pull, and junction boxes, and work installed by other trades.
- L. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations.
- M. All exposed conduit mounted to a painted surface shall be painted to match that surface.
- N. No conduit shall be run in or through an Elevator Machine Room, hoistway or pit unless it contains circuitry specifically required for the elevator or elevator related equipment.
- O. No conduit shall be run in or through a Stairwell unless it contains circuitry specifically required for the Stairwell related equipment.
- P. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
- Q. Provide at least one junction or pull box for each 360 degrees of bends.
- R. Provide green ground wire in all EMT, flexible conduit, and non-metallic conduit.

3.02 INSTALLATION

- A. Install raceways parallel or perpendicular to building walls, floors and ceilings.
- B. Cut raceways square, ream ends to remove burrs, and bush where necessary.
- C. Route conduit in and under slab from point to point. Do not cross conduits in slab. Provide U.L. approved rain-tight and concrete tight couplings and connectors. All conduit in concrete floor slabs shall be rigid galvanized steel with concrete tight threaded fittings. Install conduit below the reinforcing mesh. Locate conduits to provide a minimum of 1" of concrete around conduit. Obtain approval from the Owner's Representative prior to installing conduit larger than 1" trade size in concrete slabs.
- D. Install with a minimum of bends and offsets. Bends shall not kink or destroying the interior cross section of the raceway. Factory made bends shall be used for raceways 1" trade size and larger.
- E. Support raceways from building construction. Do not support raceways from ductwork, piping, or equipment hangers. Arrange supports to prevent misalignment during wiring installation. Support conduit using coated steel or malleable iron straps, lay in adjustable hangers, clevis hangers, and split hangers. Do not attach conduit to ceiling support wires. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.

- F. Plug the ends of each roughed-in raceway with an approved cap or disc to prevent the entrance of foreign materials during construction.
- G. Secure conduit within three feet of each outlet box, junction box, cabinet or fitting.
- H. Provide a #14 AWG fish wire in all "Spare" or "Empty" conduit runs to facilitate future installation of conductors.
- I. Provide expansion fittings where conduits cross building expansion joints.
- J. Wherever a cluster of (4) or more conduits rise out of floor exposed, provide neatly formed 4 in. high concrete envelope, with chamfered edges, around raceways.
- K. Provide 4 spare 3/4-in. raceways from each flush mounted panelboard or cabinet to an area above the nearest accessible ceiling space. Make 90° turn above the ceiling, arranged for further continuation of raceway, and cap.
- L. Join non-metallic conduit using cement as recommended by manufacturer. Wipe non-metallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.
- M. Where conduits puncture roof, install pitch pockets as required in order that the roof warranty is maintained.
- N. If it is necessary to burn holes through webs of beams or girders, call such points to the attention of the Owner's Representative and receive written approval both as to location and size of hole before proceeding with work. All holes shall be burned no larger than absolutely necessary.
- O. Core drill, sleeve, and fire stop all penetrations through existing floors.
- P. In exterior or wet locations, provide minimum 1/4" air space between raceway and wall. Secure raceway within 3 ft. of each outlet box, junction box, cabinet or fitting.
- Q. Provide conduit supports based on the following table:

Conduit Trade Size	Type of Run	Horizontal Spacing in Feet	Vertical Spacing in Feet
1/2", 3/4"	Concealed	7	10
1", 1-1/4"	Concealed	8	10
1-1/2" & larger	Concealed	10	10
1/2", 3/4"	Exposed	5	7
1", 1-1/4"	Exposed	7	8
1-1/2" & larger	Exposed	10	10

- R. Conceal conduits in all locations except for mechanical and equipment rooms. Obtain owner's permission to run exposed conduits in other areas if existing conditions warrant exposed conduit.

3.03 REUSE OF EXISTING RACEWAYS

- A. Do not change number of raceways to less than the number indicated on the drawings except when appropriate for advantageous reuse of existing exposed and concealed raceways (the contract documents do not indicate location, number, size or condition of existing raceways).

- B. The existing raceway must be of adequate size for the new conductors to be installed therein (NFPA 70 Chapter 9, Tables 1, 4, & 5; Appendix C, Tables C1-C12a). More circuits may be enclosed by existing raceways than the circuiting shown on the drawings provided conductor sizes are increased to compensate for derating (adjustment factors) and other considerations required by NFPA 70 Article 310-15.
- C. Remove existing conductors.
- D. Demonstrate to the Director's Representative that the existing raceway is clear of obstructions and in good condition.
- E. Check ground continuity. When ground continuity of existing raceway is inadequate install insulated grounding bushings, grounding wedges, bonding straps, grounding jumpers or equipment grounding conductors to establish effective path to ground.
- F. Install insulated bushings to replace damaged or missing bushings. Replace non-insulated bushings with insulated bushings on raceway sizes 1 inch and larger.
- G. Install vertical conductor supports to replace existing or missing vertical conductor supports.
- H. Install extension rings on existing boxes when the number of new conductors installed therein exceeds NFPA 70 requirements.
- I. Furnish the Owners' Representative with marked up drawings showing size and routing of existing raceways with number and size of new conductors installed therein. The drawings will be forwarded to the design engineer for verification of NFPA 70 compliance.

3.04 RACEWAYS FOR FUTURE USE (SPARE RACEWAYS AND EMPTY RACEWAYS)

- A. Draw fish tape through raceways in the presence of the Owners Representative to show that the raceway is clear of obstructions. Leave a pulling-in line in each spare and empty raceway.

3.05 RACEWAY INSTALLATION - SPECIAL AREAS

- A. Raceways Exposed to Different Temperatures: Where portions of an interior raceway system are exposed to widely different temperatures, seal interior and exterior of raceway to prevent circulation of air from a warmer to a colder section through the raceway installation.
- B. Heated Areas to Unheated Areas: After conductors are installed, seal interior of the raceway at the nearest conduit body, outlet or junction box in the heated area adjoining the unheated area.
- C. Conduit in Waterproofed Floors: Install conduit runs in waterproof floors to avoid penetrating the waterproofing. Avoid penetration of waterproofing with conduit risers so far as practicable.
- D. Where it is necessary to puncture the waterproofing for a conduit riser, install a standard weight steel pipe sleeve extending one inch above the finished floor level. Flash the steel pipe sleeve to the waterproofing with 16-ounce copper. Construct the flashing with a copper tube extending the full height of the sleeve, soldered to a copper base extending 6 inches in all directions from the sleeve.
- E. The flashing will be integrated into the waterproofing by the Construction Contractor. Provide solid cast brass floor plates with chromium finish where pipe sleeves are exposed in rooms.
- F. Install sealing fittings in concealed conduit runs in a recessed box with blank face plate to match other face plates in the area.

3.06 RACEWAY SCHEDULE

A. Rigid Ferrous Metal Conduit

1. Exterior above grade
2. Transition elbows from above to below grade.
3. Where specifically called for on plans.

B. Electrical Metallic Tubing:

1. May be installed concealed as branch circuit conduits above suspended ceilings where conduit does not support fixtures or other equipment.
2. May be installed concealed as branch circuit conduits in hollow areas in dry locations, including:
 - a. Hollow concrete masonry units, except where cores are to be filled.
 - b. Drywall construction with sheet metal studs, except where studs are less than 3-1/2 inches deep.
3. May be installed exposed as branch circuit conduits in dry non-hazardous locations at elevations over 10'-0" above finished floor where conduit does not support fixtures or other equipment.

C. Flexible Metal Conduit: Install equipment grounding conductor in the flexible metal conduit and bond at each box or equipment to which conduit is connected:

1. Use for final conduit connection to recessed lighting fixtures in suspended ceilings. Use 4 to 6 feet of flexible metal conduit, minimum size 1/2 inch, between junction box and fixture. Locate junction box at least 1 foot from fixture and accessible if the fixture is removed.
2. Use 1 to 3 feet of flexible metal conduit for final conduit connection to:
 - a. Emergency lighting units.
 - b. Dry type transformers.
 - c. Motors with open, drip-proof or splash-proof housings.
 - d. Equipment subject to vibration (dry locations).
 - e. Equipment requiring flexible connection for adjustment or alignment (dry locations).
3. Use for concealed branch circuit conduits above existing non-removable suspended ceilings where rigid type raceways cannot be installed due to inaccessibility of space above ceiling.
4. May be installed concealed as branch circuit conduits in drywall construction with sheet metal studs, except where studs are less than 3-1/2 inches deep.

D. Liquid-tight Flexible Metal Conduit: Install equipment grounding conductor in liquid-tight flexible metal conduit and bond at each box or equipment to which conduit is connected:

1. Use 1 to 3 feet of liquid-tight flexible metal conduit (UL listed and marked suitable for the installation's temperature and environmental conditions) for final conduit connection to:
 - a. Motors with weather-protected or totally enclosed housings.
 - b. Equipment subject to vibration (damp and wet locations).
 - c. Equipment requiring flexible connection for adjustment or alignment (damp and wet locations).

E. Rigid Nonmetallic PVC Conduit:

1. Schedule 80:
 - a. Exterior underground
 - b. Exterior above ground only when specifically noted on plans.

3.07 FITTINGS AND ACCESSORIES SCHEDULE

A. General:

1. Use fittings and accessories that have a temperature rating equal to, or higher than the temperature rating of the conductors to be installed within the raceway.
2. Use zinc electroplate or hot dipped galvanized steel/malleable iron or cast iron alloy fittings and accessories in conjunction with ferrous raceways in dry and damp locations unless otherwise specified or indicated on the drawings.
3. Use insulated grounding bushings or grounding wedges on ends of conduit for terminating and bonding equipment grounding conductors, when required, if cabinet or boxes are not equipped with grounding/bonding screws or lugs.
4. Use caps or plugs to seal ends of conduits until wiring is installed to exclude foreign material.
5. Use insulated grounding bushings on the ends of conduits that are not directly connected to the enclosure, such as stub-ups under equipment, etc., and bond between bushings and enclosure with equipment grounding conductor.
6. Use expansion fittings where raceways cross expansion joints (exposed, concealed, buried).
7. Use deflection fittings where raceways cross expansion joints that move in more than one plane.
8. Use 2 locknuts and an insulated bushing on end of each conduit entering sheet metal cabinet or box in dry or damp locations.
9. Plastic bushing may be used on 1/2 and 3/4-inch conduit in lieu of insulated bushing.
10. Terminate conduit ends within cabinet/box at the same level.

B. For Rigid and Intermediate Metal Conduit: Use threaded fittings and accessories. Use 3-piece conduit coupling where neither piece of conduit can be rotated.

C. For Electrical Metallic Tubing: Use compression type connectors and couplings.

D. For Flexible Metal Conduit: Use flexible metal conduit connectors.

E. For Liquid-tight Flexible Metal Conduit: Use liquid-tight connectors.

F. For Rigid Nonmetallic PVC Conduit: Use conduit manufacturer's standard fittings and accessories.

END OF SECTION 26 0533

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

1.02 SECTION INCLUDES

- A. Surface metal raceways.
- B. Wireways.

1.03 REFERENCES

- A. NECA (National Electrical Contractors Association) Standard of Installation.
- B. NEMA WD 6 - Wiring Device Configurations.

1.04 QUALITY ASSURANCE

- A. Perform Work in accordance with NECA Standard of Installation.

1.05 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum (3) years' experience.

PART 2 - PRODUCTS

2.01 SURFACE METALLIC RACEWAY

- A. Multiple Communications or Branch Circuits (Medium Capacity):
 - 1. 0.82" H x 1.9"W.
 - 2. Metallic two piece raceway with single compartment.
 - 3. Color shall be Ivory color durable finish scratch-resistant surface that can be painted.
 - 4. Provide the following fittings as required for installation:
 - a. Entrance End Fitting: nominal maximum dimensions of 2.75"W x 2.75"H x 4"L and 1.5" or 1.25" conduit opening
 - b. Back Entrance End Fitting: same as entrance end fitting with internal radius.
 - c. T fittings.
 - d. Bridge fitting with radius for spanning existing raceways in varying widths from 1/2" to 4.
 - e. Flat internal and external elbows UL verified for a 2" bend radius and exceeding the recommendations of EIA/TIA 569A.
 - 5. Design Make: Mono-Systems SMS2400 series raceway, SMS2457 series bridge fittings, SMS2410 series entrance end fittings, SMS 2442 and 2430 T fittings.

6. Acceptable Manufacturers:
 - a. Mono-Systems SMS2400 Series.
 - b. Wiremold 2400 Series.
- B. Combination Power and Data Cables:
1. 1.75" H x 4.75"W.
 2. Metallic two piece raceway with single or split compartment as called for on plans.
 3. Color shall be Ivory color durable finish scratch-resistant surface that can be painted.
 4. Provide the following fittings:
 - a. Entrance End Fitting: nominal maximum dimensions of 4.75"W x 3"H x 4"L and 2.5" or 2" conduit openings
 - b. Back Entrance End Fitting: same as entrance end fitting with internal radius.
 - c. T fittings.
 - d. Flat internal and external elbows with fiber optic radius.
 5. Design Make: Mono-Systems SMS4200 series raceway, with SMS4205 SMS4214FO, SMS4211FO and SMS4209FO fittings
 6. Acceptable Manufacturers:
 - a. Mono-Systems SMS4200 Series.
 - b. Wiremold 4000 Series.
- C. Single Branch Circuit or Data Cable
1. One-piece raceway
 2. Color shall be Ivory
 3. Utilized for wall mounted phones and miscellaneous branch circuit power only.
 4. Provide internal and external 90 degree fittings with radius.
 5. Design Make: Mono Systems SMS700
 6. Acceptable Manufacturers:
 - a. Mono-Systems SMS700 Series.
 - b. Wiremold 700 Series.
- D. Provide miscellaneous boxes, extension rings, fittings and supports designed and manufactured by the raceway manufacturer as required making a complete job.

2.02 MULTI-OUTLET ASSEMBLY

- A. Sheet metal channel with fitted cover, with pre-wired receptacles, suitable for use as multi-outlet assembly.
- B. Size: 1.28" x 0.75".
- C. Receptacles: NEMA WD 6, type 5-15R, single receptacle.
- D. Receptacle Spacing: As indicated on the drawings.
- E. Receptacle Color: Ivory.
- F. Channel Color: Ivory enamel.
- G. Fittings: Furnish manufacturer's standard couplings, elbows, and connectors.
- H. Design Make: Wiremold 2000.

2.03 WIREWAY

- A. Manufacturers:
 - 1. Square D.
 - 2. Substitutions: Refer to Division 1.
- B. Description: General purpose, Oil-tight, dust-tight, and Rain-tight type wireway.
- C. Knockouts: Manufacturer's standard.
- D. Size: As indicated on Drawings.
- E. Cover: Hinged cover.
- F. Connector: Flanged.
- G. Fittings: Lay-in type with removable top, bottom, and side; captive screws.
- H. Finish: Rust inhibiting primer coating with gray enamel finish.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Support with expansion anchors, concrete inserts, masonry inserts or toggle bolts as field conditions require. Provide supports at five foot centers.
- B. Install a separate green ground conductor in raceway from the junction box where surface raceway begins to the ground terminal of the device, fixture or equipment being supplied.
- C. Provide all fittings, connectors, elbows, tees, boxes etc. as required for the installation.
- D. Raceway shall be factory painted. Touch up raceway and outlet boxes as required upon completion of installation.
- E. Provide new covers and device brackets in areas where existing raceway is called for reuse. Paint raceway to match existing upon completion.
- F. Provide all required conduit entrance end fittings and elbows required for a complete installation.
- G. Raceway shown on plans is diagrammatical only. Route raceway around existing room features as required.
- H. Where existing conduits, pipes and other obstacles interfere with the installation of new raceway at 90 degree angles, provide bridge fittings to traverse the obstacle without rerouting. If this is not possible reroute the surface raceway or the existing raceway as directed by owners' representative.
- I. Install Products in accordance with manufacturer's instructions.
- J. Use flat-head screws, clips, and straps to fasten raceway channel to surfaces. Mount plumb and level. This shall be done for WM400BAC as well, even though raceway comes with adhesive.
- K. Use suitable insulating bushings and inserts at connections to outlets and corner fittings.
- L. Wireway Supports: Provide steel channel as specified in section 260190.
- M. Close ends of wireway and unused conduit openings.
- N. Ground and bond under provisions of section 260526.

END OF SECTION 26 0534

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

1.02 SECTION INCLUDES

- A. Electrical connections to equipment.

1.03 REFERENCES

- A. NEMA WD 1 - General Purpose Wiring Devices.
- B. NEMA WD 6 - Wiring Devices - Dimensional Requirements.
- C. NFPA 70 - National Electrical Code.

1.04 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

1.05 COORDINATION

- A. Refer to Division 1.
- B. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.
- C. Determine connection locations and requirements.
- D. Sequence rough-in of electrical connections to coordinate with installation of equipment.
- E. Sequence electrical connections to coordinate with start-up of equipment.

PART 2 - PRODUCTS

2.01 ELECTRIC CORDS

- A. Provide multi-conductor SO cords, comprised of 2 or more conductors. Type SJEOOW or Type SEOOW flexible cords manufactured using bare flexible stranded Class K copper conductors, and heat, moisture and oil resistant thermoplastic-elastomer (TPE) insulation. The insulated conductors shall be cabled with non-wicking polypropylene fillers, with a tissue-paper separator wrapped around the assembly for easier removal. A heat, moisture and oil resistant flexible TPE jacket is extruded over the assembly.
- B. Type SJEOOW 300 Volt and type SEOOW 600 Volt flexible cords are permitted for use as specified by Article 400 and related articles of the National Electrical Code.

- C. Typical applications include:
1. Industrial Machinery.
 2. Large Appliances.
 3. Motors.
 4. Temporary power.
- D. Suitable for use in:
1. Dry locations not to exceed minimum -50°C (-58°F) or maximum 105°C (221°F).
 2. Wet locations or other applicable locations.
 3. S type cords may be completely immersed in water, or exposed to oil or coolant at temperatures not to exceed 60°C (140°F).
- E. Acceptable Manufacturers:
1. Allied Wire.
 2. WesBell.
 3. Consolidated electronic wire and cable.

2.02 PLUG CAPS, CONNECTORS AND SWITCHES

- A. Provide twist lock type plugs and receptacles when used for connecting equipment with fabricated SO cord connection.
- B. Provide the following as project conditions require.
1. Standard 20 and 30 Amp Plugs and Connectors:
 - a. Two-part cord grip tightens with two screws for maximum retention force. Broad gripping area to accommodate wide range of cable diameters.
 - b. Tough ribbed nylon housing for secure gripping.
 - c. Insulated nylon construction to keep non-current carrying parts from becoming energized.
 - d. Self-threading screws specially designed for secure assembly.
 - e. Wiring chambers separate and positively insulate conductors and promote easy inspection.
 - f. Integral dust shield protects wiring chamber from dust or contaminants. Single-piece shield/housing eliminates need for separate step at installation.
 - g. Design Make: Hubbell HBL2311 plug and HBL2313 receptacle.
 2. Standard Receptacle:
 - a. High-impact, abuse-resistant nylon face.
 - b. All-brass mounting and grounding system provides a lower resistance ground path and greater resistance to corrosion than steel mounting systems.
 - c. Glass-Reinforced thermoplastic polyester base (RTP) has the desirable characteristics of a thermoset material, including heat, flame resistance and dimensional stability.
 - d. One-piece contact with long spring arm (low stress) and oxide cutting nibs: prevents stress and overheating associated with riveted contact and short spring arms.
 - e. #10 silicon bronze terminal screw provides greater strength and resistance to corrosion and stripping. Anti-rotational clamp has a stop to limit the amount of cocking when only one side is used. Accommodates both back and side wiring.
 - f. Wire restraint recess for both back and side wiring, greatly reduces the possibility of loosening the terminal connection.

- g. Design Make: Hubbell HBL2310.
- 3. Mechanical Interlock Switched Safety Enclosures:
 - a. Lockable handle provides lockout protection for greater safety and complies with OSHA lockout requirements.
 - b. Horsepower rated switch.
 - c. Angled 20 or 30 amp water tight Twist-Lock receptacle.
 - d. Heavy-duty interlock linkage prevents make and break under load.
 - e. Moveable feet may be used in horizontal or vertical position or may be removed and pre-marked holes drilled for Type 1 or 3R installations.
 - f. Heavy-duty internal frame bonds conduit and all grounds and has a DIN rail to accommodate the switch.
 - g. Pre-molded conduit entry hole is offset to prevent water condensation from falling directly on interior electrical components.
 - h. Design Make: Hubbell HBLMITL.
- 4. 50 Ampere Plugs and Connector Bodies:
 - a. Stainless steel shroud restricts mis-mating with the wrong device.
 - b. Thermoplastic polyester interior provides heat resistance and impact strength.
 - c. Housing assembly latch slotted to fit standard flat-blade screwdriver.
 - d. Padlock capable shroud allows compliance to OSHA lockout tag out regulation 29 CFR 1910.147.
 - e. Three-piece thermoplastic clamp assembly with stainless steel fast lead screws provides a more consistent, durable grip. Sealed cable entry keeps out moisture and dust.
 - f. 6/6 nylon nose - thermoplastic polyester terminal cover provides heat resistance in terminal area and impact strength of nose piece.
 - g. One-piece grounding contact on 4-wire devices provides a more reliable grounding system.

C. Acceptable Manufacturers:

- 1. Hubbell
- 2. Legrand
- 3. Leviton

2.03 DISCONNECT SWITCHES, MOTOR CONTROLS AND ENCLOSED CIRCUIT BREAKERS

- A. Provide fused or Non-fused disconnects as called for on drawings.
- B. Where motor controls are furnished by others and not located within sight of the equipment provide a non fused disconnect at the equipment.
- C. Provide motor controls as called for on the electric equipment control schedule.
- D. Provide KAIC ratings equivalent to the panel or switchboard feeding the electrical equipment.
- E. Refer to Specification Section 262400 for technical specifications.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that equipment is ready for electrical connection, wiring, and energization.

3.02 BREAKERS FOR EQUIPMENT FURNISHED BY OTHERS

- A. Where equipment or motors are furnished by others field verify the exact breaker and wiring requirements prior to installation. Upsize breakers and wiring within the same breaker frame at no additional cost to the contract if required.
- B. Provide breakers with KAIC rating equivalent to the panel or switch board.

3.03 DISCONNECTS

- A. Unless a disconnect is specifically called out on mechanical/HVAC drawings provide a lockable disconnect for all rooftop equipment. Disconnect shall be located within sight of the equipment. Provide fused disconnects where called for.
- B. Provide disconnects for ahead of VFDs furnished by the mechanical contractor.
- C. Provide mounting hardware and unistrut for installation of disconnects.
- D. Provide all power wiring from disconnect to motors.

3.04 MOTOR CONTROLS

- A. Install motor controls furnished by mechanical contractor or provide motor controls as called for in the electric equipment control schedule.
- B. For indoor equipment mount controls within sight of equipment.
- C. Where controls are not packaged with equipment locate as approved by the engineer and construction manager.
- D. For rooftop equipment install controls indoors in electrical, mechanical or storage room.
- E. Provide all wiring and raceways from the control equipment to the motor.
- F. Gang controls for multiple motors where practical.

3.05 ELECTRICAL CONNECTIONS

- A. Provide complete power connections to all electrical equipment. Provide control connections to equipment where indicated on the drawings. Provide disconnect ahead of each piece of equipment. Ground all equipment in accordance with the latest version of the National Electrical Code.
- B. Provide all power wiring, electric equipment, control wiring, switches, lights, receptacles, and connections as required for proper equipment operation of Owner-Furnished Equipment and Equipment furnished by other contracts.
- C. Refer to Manufacturer's drawings/specifications for requirements of special equipment. Verify connection requirements prior to roughing.
- D. Make electrical connections in accordance with equipment manufacturer's instructions.
- E. Make conduit connections to equipment using flexible conduit. Use liquid-tight flexible conduit with watertight connectors in damp or wet locations.

- F. Connect heat-producing equipment using wire and cable with insulation suitable for temperatures encountered.
- G. Provide receptacle outlet to accommodate connection with attachment plug.
- H. Provide cord and cap where field-supplied attachment plug is required.
- I. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- J. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.
- K. Install terminal block jumpers to complete equipment wiring requirements.
- L. Install control devices furnished by others.
- M. Provide control devices as called for on electric equipment control schedule.
- N. Coordinate all work with other contractors and the manufacturers who are furnishing equipment and controls.
- O. Where drawings call for controllers to be mounted remote from the equipment provide non-fused disconnect switch at the unit.
- P. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

END OF SECTION 26 0536

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

1.02 WORK INCLUDES

- A. Wall and ceiling outlet boxes.
- B. Pull and junction boxes.
- C. Floor boxes.
- D. Poke through boxes.

1.03 REFERENCES

- A. NECA - Standard of Installation.
- B. NEMA FB 1 - Fittings and Supports for Conduit and Cable Assemblies.
- C. NEMA OS 1 - Sheet-steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
- D. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports.
- E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- F. NFPA 70 - National Electrical Code.

1.04 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Provide Products listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

1.05 SUBMITTALS FOR REVIEW

- A. Provide Product Data for the following:
 - 1. Floor Boxes

PART 2 - PRODUCTS

2.01 OUTLET BOXES

- A. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel. Not less than 1-1/2" deep, 4" square or octagonal, with knockouts. Outlet boxes exposed to moisture, exterior, wet or damp locations shall be cadmium cast alloy complete with threaded hubs and gasketed screw fastened covers. Minimum box size shall be as indicated in Article 314 of the National Electrical Code for the conductors and devices installed. Boxes shall be approved for the environmental condition of the location where they will be installed.
- B. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 1/2" male fixture studs where required.

C. Acceptable manufacturers:

1. Steel City
2. Raco
3. Appleton
4. Crouse Hinds

2.02 PULL AND JUNCTION BOXES

- A. Sheet Metal Boxes: NEMA OS 1, galvanized steel. Shall be constructed of not less than 14 gauge galvanized steel with trim for flush or surface mounting in accordance with the location to be installed. Provide screw-on type covers. Boxes installed in damp or wet locations shall be of raintight construction with gasketed cover and threaded conduit hubs. In no case shall boxes be sized smaller than as indicated in Article 314 of the National Electrical Code for conduit and conductor sizes installed. Boxes shall be approved for the environmental condition of the location where they will be installed.

2.03 TERMINAL AND EQUIPMENT CABINETS IN NON HAZERDOUS LOCATIONS

- A. Steel Equipment Cabinets shall be code gauge galvanized steel with removable end walls. Fronts shall be of code gauge steel, flush or surface type (as indicated) with concealed trim clamps, concealed hinges, flush lock, and grey baked enamel finish. Boxes and front shall be U.L. listed and shall be minimum 24"H x 24"W x 6"D or as called for on plans. Provide provisions for terminal board mounted on inside back wall of cabinet as required.
- B. Fiber glass equipment cabinets shall be Compression-molded fiberglass for chemical and temperature-resistance. Gasketed for water-tight and dust-tight seal. Polyester mounting brackets and stainless steel attachment screws, molded-in-place threaded brass inserts and plated steel screws for mounting optional panels and terminal block kits. Removable hinged cover attached to body with Type 316 stainless steel hinge pin or Screw-cover enclosure secured with two captivated Type 316 stainless steel slotted cover screws.
- C. Stainless Steel terminal and equipment cabinets shall have continuous hinge, seamless foam-in-place gasket and stainless steel screw-down clamps for a reliable seal that protects components from corrosive environments. 14-gauge Type 304 stainless steel with seams continuously welded and ground smooth, seamless foam-in-place gasket. Weld nuts for mounting optional panels and terminal block kits. Provide bonding provision on door and body.
- D. Poly carbonate boxes shall be non-glass-filled polyester material offers superior UV resistance. Chemical resistance to a broad range of solvents, alkalis and acids. Crack and impact resistant. Shall be recyclable.
- E. Provide following accessories and options where called for.
1. Continuous hinged door (unless otherwise noted provide screw type covers).
 2. Scratch-resistant polycarbonate windows permanently bonded in place.
 3. Quick-release latches and corrosion-resistant polyester latches located in corners that provide unobstructed access to enclosure.
 4. Padlock provisions in latch.

F. Provide the NEMA type listed below as required for the environment and use:

1. Type 1: for indoor use to provide a degree of protection to personnel against access to hazardous parts and to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt).
2. Type 3R: for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow); and that will be undamaged by the external formation of ice on the enclosure.
3. Type 4X: for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (windblown dust); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow, splashing water, and hose directed water); that provides an additional level of protection against corrosion; and that will be undamaged by the external formation of ice on the enclosure.
4. Type 12: for indoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt and circulating dust, lint, fibers, and flyings); and to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (dripping and light splashing).

G. Acceptable Manufacturers:

1. Hoffman
2. Thomas & Betts
3. Wiegmann
4. Appleton

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify locations of boxes and outlets prior to rough in. Thoroughly examine the architectural elevations and millwork shop drawings.
- B. If outlets are not specifically shown on elevations and there is millwork or equipment associated with the outlets issue an RFI prior to rough in.

3.02 ENCLOSURE RATINGS AND LOCATIONS

- A. Provide NEMA Ratings as required for specific application. Submit specific NEAM Ratings proposed with electrical equipment, panelboard, device and motor control submittals.

NEMA RATING	LOCATIONS
1	General-purpose indoors and under normal atmospheric conditions.
2	Drip-tight. Similar to Type 1 but with addition of drip shields; used where condensation may be severe such as in cooling and laundry rooms
3	Weather-resistant. Protects against falling dirt and windblown dust, against weather hazards such as rain, sleet and snow, and is undamaged by the formation of ice. Used outdoors on ship docks, in construction work, and in tunnels and subways.
3R	As 3, but <i>omits</i> protection against windblown dust. Utilize for exterior and rooftop locations
3S	As 3, but also operable when laden with ice. Utilize for motor controls located of rooftops or exterior walls subject to snow cover.
4 and 4X	Watertight. Must exclude at least 65 GPM of water from a 1 in nozzle delivered from a distance not less than 10 ft for 5 min. Use outdoors on ship docks, in dairies, in wastewater treatment plants and breweries. X indicates additional corrosion resistance. Provide 4X where specifically called for on plans.
5	Dust-tight. Provided with gaskets or equivalent to exclude dust; use in steel mills and cement plants.
6 and 6P	Submersible. Design depends on specified conditions of pressure and time; submersible in water or oil; used in quarries, mines, and manholes. 6 is temporarily submersible, 6P withstands occasional prolonged submersion. Neither are intended for continuous submersion.
7	Certified and labelled for use in areas with specific hazardous conditions: for indoor use in Class I, Groups A, B, C, and D environments as defined in NFPA standards such as the NEC.
8	Certified and labeled for use in areas with specific hazardous conditions: for indoor and outdoor use in locations classified as Class I, Groups A, B, C, and D as defined in NFPA standards such as the NFPA 70.
9	Certified and labelled for use in areas with specific hazardous conditions: for indoor and outdoor use in locations classified as Class II, Groups E, F, or G as defined in NFPA standards such as the NEC.
10	MSHA. Meets the requirements of the Mine Safety and Health Administration, 30 CFR Part 18 (1978).
11	General-purpose. Protects against the corrosive effects of liquids and gases. Meets drip and corrosion-resistance tests.
12 and 12K	General-purpose. Intended for indoor use, provides some protection against dust, falling dirt, and dripping non-corrosive liquids. Meets drip, dust, and rust resistance tests.
13	General-purpose. Primarily used to provide protection against dust, spraying of water and non-corrosive coolants. Meets oil exclusion and rust resistance design tests

3.03 INSTALLATION

- A. Install boxes in accordance with NECA "Standard of Installation."
- B. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements. Install junction and pull boxes in readily accessible locations. Access to boxes shall not be blocked by equipment, piping, ducts and the like. Provide all necessary junction or pull boxes required due to field conditions and size as required by the National Electrical Code.

- C. Consider location of outlets shown on drawings as approximate only. Study architectural, process piping, mechanical, plumbing, structural, roughing-in, etc., drawings and note surrounding areas in which each outlet is to be located. Locate outlet so that when fixtures, motors, cabinets, equipment, etc., are placed in position, outlet will serve its desired purpose. Where conflicts are noted between drawings, contact Owner's Representative for decision prior to installation. Comply with Article 314 of National Electrical Code relative to position of outlet boxes in finished ceilings and walls. Adjust box location up to 10 feet if required to accommodate intended purpose.
- D. Orient boxes to accommodate wiring devices oriented as specified in Section 262726
- E. Maintain headroom and present neat mechanical appearance.
- F. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- G. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Division 1.
- H. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
- I. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.
- J. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.
- K. Do not install flush mounting box back to back in walls; provide minimum 6" separation.
- L. Do not fasten boxes to ceiling support wires.
- M. Support boxes independently of conduit.
- N. Outlet boxes installed in plaster, gypsum board or wood paneled walls shall be installed with raised plaster covers or raised tile covers. Use gang box where more than one device is mounted together. Do not use sectional box.
- O. Use gang box with plaster ring for single device outlets.
- P. Use cast outlet box in exterior locations exposed to the weather and wet locations.
- Q. Outlet boxes shall be sized to accommodate the wiring device(s) to be installed.
- R. Outlet boxes installed in tile, brick or concrete block walls shall be installed with extra-deep type raised tile covers or shall be 3-1/2" deep boxes with square corners and dimensions to accommodate conductors installed.
- S. Surface ceiling mounted outlet boxes shall be minimum 4" square, 1-1/2" deep, galvanized sheet metal.
- T. Surface wall mounted outlet boxes shall be cast type boxes having threaded or compression type threadless hubs. Exterior boxes shall be cast type with threaded hubs and gasketed cover plates secured by non-ferrous screws.

- U. Floor outlet boxes shall be installed flush with finished floor, adjust level and tilt as required. Where finished floor is terrazzo, provide boxes specifically designed for installation in terrazzo. Where floors are to receive carpet, provide floor outlet with carpet flange.
- V. Unless otherwise noted, mount devices and equipment at heights measured from finished floor to device/equipment centerline as follows:

1. Toggle switches	46"
2. Receptacle outlets (outside resident rooms)	18"
3. Receptacles and communication outlets in resident rooms	24"
4. Do not install receptacle outlets above electric baseboard heaters.	30"
5. Receptacle outlets, hazardous areas	48"
6. Receptacle outlets, weatherproof, above-grade	24"
7. Clock outlets	90"
8. Telephone outlets	18"
9. Telephone outlets, wall mounted	46"
10. T.V. outlet	78"
11. Fire alarm manual station	46"
12. Fire alarm audio/visual	80"
13. Branch circuit panelboards, to top of backbox	72"
14. Distribution panelboards, to top of backbox	72"
15. Terminal cabinets, control cabinets	72"
16. Disconnect switches, motor starters, enclosed circuit breakers	48"
17. Where structural or other interferences prevent compliance with mounting heights listed above, consult Owner's Representative for approval to change location before installation.	

3.04 INTERFACE WITH OTHER PRODUCTS

- A. Coordinate installation and location of outlet box for equipment with equipment supplier and other trades as applicable.
- B. Cut boxes in millwork using methods approve by manufacturer and architect.

3.05 ADJUSTING

- A. Adjust flush mounting outlets to make front flush with finished wall material.
- B. Adjust vertical and horizontal alignment of boxes as required.
- C. Install knockout closures in unused box openings.

3.06 CLEANING

- A. Clean interior of boxes to remove dust, debris, and other material.
- B. Clean exposed surfaces and restore finish.

END OF SECTION 26 0540

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

1.02 SECTION INCLUDES

- A. Circuit Breakers.
- B. Switchboards.
- C. Distribution Panelboards.
- D. Branch Circuit Panelboards.
- E. Retrofit Panelboards.
- F. Transient Voltage Surge Suppression.
- G. Power Monitor.
- H. Disconnect Switches.
- I. Enclosed Circuit Breakers.
- J. Low Voltage Fuses.
- K. Sub-Metering Hardware and Software

1.03 REFERENCES

- A. The equipment referenced herein are designed and manufactured according to the following appropriate specifications.
 - 1. ANSI/NFPA70 - National Electric Code (NEC).
 - 2. ANSI/IEEE C12.1 - Code for Electricity Metering.
 - 3. ANSI C39.1 - Electrical Analog Indicating Instruments.
 - 4. ANSI C57.13 - Instrument Transformers.
 - 5. NEMA AB 1 - Molded Case Circuit Breakers and Molded Case Switches.
 - 6. NEMA KS 1 - Enclosed Switches.
 - 7. NEMA PB 2 - Deadfront Distribution Switchboards, File E8681.
 - 8. NEMA PB 2.1 - Proper Handling, Installation, Operation & Maintenance of Deadfront Switchboards Rated 600V or Less.
 - 9. NEMA PB 2.2 - Application Guide for Ground Fault Protective Devices for Equipment.
 - 10. UL 50 - Cabinets and Boxes.
 - 11. UL 98 - Enclosed and Dead front Switches.
 - 12. UL 489 - Molded Case Circuit Breakers.
 - 13. UL 891 - Dead Front Switchboards.
 - 14. UL 943 - Ground Fault Circuit Interrupters.
 - 15. UL 1053 - Ground Fault Sensing and Relaying Equipment.
 - 16. UL 977 - Fused Power Circuit Devices.
 - 17. CSA 22.2 No. 5 - M1986 Molded Case Circuit Breakers.
 - 18. Federal Specification W-C-375B/Gen - Circuit Breakers, Molded Case, Branch Circuit and Service.
 - 19. Federal Specification W-C-870 - Fuse holders (for plug and enclosed cartridge fuses).
 - 20. Federal Specification W-S-865 - Enclosed Knife Switch.
 - 21. NECA Standard of Installation (published by the National Electrical Contractors Association).
 - 22. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment (published by the International Electrical Testing Association).

23. NFPA 70 - National Electrical Code.

1.04 SUBMITTAL FOR REVIEW

- A. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker arrangement and sizes.
- B. Prior to releasing the service switchgear equipment verify the tenant service requirements with the construction manager and owner. Do not release the switch gear for fabrication until receiving written permission from the owner.

1.05 SUBMITTALS FOR CLOSEOUT

- A. Maintenance Data: Include spare parts listing; source of replacement parts and supplies; and recommended maintenance procedures and intervals.

1.06 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum (10) years' experience.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, protect and handle products in conformance with manufacturer's recommended practices as outline in applicable Installation and Maintenance Manuals.
- B. Each switchboard section shall be delivered in individual shipping splits for ease of handling. They shall be individually wrapped for protection and mounted on shipping skids.
- C. Inspect and report concealed damage to carrier within their required time period.
- D. Store in a clean, dry space. Maintain factory protection and/or provide an additional heavy canvas or heavy plastic cover to protect structure from dirt, water, construction debris, and traffic. Where applicable, provide adequate heating within enclosures to prevent condensation.
- E. Handle in accordance with NEMA PB 2.1 and manufacturer's written instructions. Lift only by lifting means provided for this express purpose. Handle carefully to avoid damage to switchboard internal components, enclosure, and finish.

PART 2 - PRODUCTS

2.01 CIRCUIT BREAKERS

- A. General:
 - 1. Molded case circuit breakers shall be constructed of a glass reinforced insulating material. All current carrying components shall be completely insulated and isolated from the outside of the circuit breaker.
 - 2. Provide an over-center, trip-free handle to provide quick-make, quick-break contact action.
 - 3. Provide multi-pole breakers with common trip.

4. When the circuit breaker has tripped, the handle shall move to a position between the "on" and "off" positions. Provide a visual indication that the circuit breaker has tripped.
 5. The ampere rating shall be clearly marked on the face of the circuit breaker.
 6. Any series rated fuse/circuit breaker installations shall be UL listed as recognized component combinations. Provide a label at the Series rated device reading "Caution - Series Rated System. _____A available". Provide identical replacement of equipment".
 7. Make provisions to add circuit breaker handle locks.
 8. Circuit breakers shall have voltage, ampere, and interrupting ratings as called for on the Panelboard Schedule.
- B. Thermal Magnetic Molded Case Branch Circuit Breakers:
1. Permanent trip unit containing individual thermal and magnetic trip elements.
 2. Thermal trip unit shall be long time, non-adjustable, thermal overload trip.
 3. Magnetic trip unit shall be instantaneous, electro-magnetic trip. Magnetic trip unit shall be adjustable for all frame sizes 225 amperes and larger.
 4. Interchangeable rating plugs shall be provided for all frame sizes 400 amperes and larger.
 5. 60°C terminal temperature rating for circuit breakers rated 125 amperes or below.
 6. 75°C terminal temperature rating for circuit breakers rated above 125 amperes.
 7. All 20 and 30 ampere, single pole circuit breakers shall be UL listed for switching duty.
 8. Circuit breakers shall be plug-on [bolt-on]. I-Line type distribution circuit breakers are acceptable.
 9. Circuit breakers rated 250 amperes and below shall be UL listed HACR type.
 10. Where ground fault circuit breakers are required, provide a shunt trip circuit breaker with a zero sequence sensing ground fault module.
 11. Acceptable Manufacturers:
 - a. Eaton
 - b. Square D.
 - c. General Electric.
 - d. Siemens ITE.

2.10 DISCONNECT SWITCHES

- A. Three pole, single throw, or as called for on the drawings.
- B. Quick-make, quick-break switch operating mechanism.
- C. Heavy-duty, current rating as called for on the drawings, voltage rating as required by the equipment served.
- D. All current carrying parts shall be plated to resist corrosion.

- E. Lugs shall be removable and rated for 75°C temperature rating.
- F. Switch blades shall be visible when the switch is in the open position and the door is open
- G. Switch shall be padlockable in the OFF and ON positions.
- H. Provide fusible switches with rejection type fuse holders and fuses as indicated on the plans or as per fed equipment requirements.
- I. Provisions for a field installable electrical interlock.
- J. Provide external override mechanism to open the disconnect switch door without opening the disconnect switch.
- K. Enclosure shall be steel with gray baked enamel paint.
- L. Provide NEMA type enclosures as called for on the drawings.
- M. NEMA type 1 enclosures shall be equipped with knockouts.
- N. Acceptable Manufacturers:
 - 1. Eaton
 - 2. Square D.
 - 3. General Electric.
 - 4. Siemens ITE.

2.11 LOW VOLTAGE FUSES

- A. All fuses rated 600 volts and below shall be rejection type dual-element, time-delay type. Provide (1) complete set(s) of fuses for all fusible disconnect switches, plus (3) spare fuses of each size. Deliver spare fuses to the Owner and obtain receipt.
- B. Acceptable manufacturers: Fuses 600 amperes and below: Bussman Type FRN-R (300 volts), Type FRS-R (600 volts) or equivalent.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install equipment to coordinate with installation details of other equipment associated with the power distribution system.
- B. Provide miscellaneous bolts, washers, nuts, clips, lock washers, small hardware, etc., of durium or equal rust resistant material, to make a complete installation.
- C. Provide complete installation in strict accordance with the equipment manufacturer's instructions, drawings and recommendations and as called for.
- D. In the event of conflict, discrepancy or difference between manufacturer's instructions and Contract Documents, the more stringent requirements shall apply.
- E. Unload, move, handle, set in place, install, erect, assemble, connect, test, and operate, etc. all items of electrical equipment as required.
- F. Provide rigging to unload, move, transport, set in place, erect, etc. the switchboards.
- G. Provide grounding as called for.
- H. Provide minimum working clearance as described in NEC Article 110-26 and 110-34 for all electric equipment.

- I. Provide additional working or aisle clearance as called for.
- J. Verify cable/lug sizes for terminations. Where a feeder is sized larger than the lug, provide in-line splice to reduce conductor size to match equipment or breaker terminations.
- K. Provide conduit lengths and types, equipment information and breaker information to the engineer after rough in is complete. The engineer will provide a coordination study and proper breaker settings,

3.02 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Perform inspections and tests listed in NETA ATS, Section 7.4 for switches, and Section 7.5 for circuit breakers.

3.03 ADJUSTING

- A. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads to within 20% of each other. Maintain proper phasing for multi-wire branch circuits.

END OF SECTION 26 2400

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

1.02 SECTION INCLUDES

- A. Wall switches.
- B. Receptacles.
- C. Cover plates.
- D. Occupancy Sensors.

1.03 REFERENCES

- A. NECA - Standard of Installation.
- B. NEMA WD 1 - General Requirements for Wiring Devices.
- C. NEMA WD 6 - Wiring Device - Dimensional Requirements.
- D. NFPA 70 - National Electrical Code.

1.04 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum (3) years' experience.

1.05 COORDINATION

- A. The contractor and lighting fixture manufacturer are responsible for coordinating and guaranteeing that the driver/ballast dimmer combination will dim the driver or ballast to 1% or 10% as applicable. Utilize design make or acceptable manufacturers where possible. Provide equivalent devices from alternate manufacturers where required.

1.06 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Provide Products listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Color of devices shall be as selected by the Architect.
- B. Receptacles connected to emergency circuits must be Red
- C. Where devices are added to existing facilities the color shall match other existing devices in the room or vicinity.
- D. All devices must be specification grade at a minimum.
- E. Where devices are ganged together provide multi-device cover plates configured as required.
- F. Design Makes are from Pass & Seymour. Equivalent products from the following manufacturers are acceptable.
 - 1. Hubbell.
 - 2. Leviton.
 - 3. Lutron.

2.02 SPECIFICATION GRADE SWITCHES

- A. Specification Grade one-piece brass alloy contact arm for reliable electrical performance.
- B. One-piece steel strap with integral ground is plated for corrosion resistance.
- C. High strength thermoplastic polycarbonate toggle resists breaking and chipping under heavy abuse.
- D. Heavy-duty toggle bumpers for smooth and quiet operation.
- E. Back body made of glass-reinforced nylon.
- F. Locking support provides resistance to face and back body separation.
- G. Available with side wire or external screw-pressure-plate back and side wire models capable of accepting #14 - #10 AWG copper or copper-clad wire.
- H. Cam designed for fast make with positive break action to minimize arcing and prolong switch life.
- I. Oversized silver alloy contacts for longer dependable switch life.
- J. Provide double pole, single pole, three way or four way as called for or required.
- K. 120/277V, 20 Ampere rated.
- L. Design Make: Pass and Seymour CSB series.

2.03 KEY SWITCHES

- A. 120-277 VAC, 20 ampere rated.
- B. Locking type. Provide (1) key per switch, all keyed alike.
- C. Side or back wired.
- D. Quiet operation with key removable in both positions.
- E. Single pole, three-way, and four way as called for on the plans.
- F. Design Make: Pass & Seymour PS20AC series.

2.04 MOMENTARY SWITCHES

- A. 120-277 VAC, 20 ampere rated.
- B. Momentary contact.
- C. 2 circuit, 3 position, "center off".
- D. Side wired.
- E. Quiet operation.
- F. Color as selected by the architect.
- G. Design Make: Pass & Seymour TM811DTMO.

2.05 DIMMERS

- A. Two Wire Fluorescent or LED:
 - 1. For use with 2 wire 120V and 277V dimming ballasts and drivers.
 - 2. Field configurable wall plate system.
 - 3. Labeling system.
 - 4. Adjustable low end output voltage.
 - 5. Minimum of de-rating when ganged.
 - 6. Single pole slide-to-OFF or single pole/3-way as required.
 - 7. 1200 Watt rating.
 - 8. Design Make: CDFB10 Series.
- B. Four Wire Fluorescent and LED:
 - 1. For use with 0-10V, 4 wire, 120V and 277V dimming ballasts and drivers.
 - 2. Field configurable wall plate system.
 - 3. Labeling system.
 - 4. Adjustable low end output voltage.
 - 5. Rugged construction.
 - 6. Minimum of de-rating when ganged.
 - 7. Provide with power pack.
 - 8. Single pole slide-to-OFF and single pole/3-way as required.
 - 9. Design Make: Pass & Seymour CD4FB Series.
- C. Three Wire Fluorescent and LED:
 - 1. For use with 3 wire 120V and 277V dimming ballasts and drivers.
 - 2. Field configurable wall plate system.
 - 3. Labeling system.
 - 4. Adjustable low end output voltage.
 - 5. Rugged construction.
 - 6. Minimum of de-rating when ganged.
 - 7. Single pole slide-to-OFF and single pole/3-way preset models.
 - 8. Design Make: Pass & Seymour CD3FB10 series.

2.06 OCCUPANCY SENSORS

- A. Ceiling Mounted Sensors:
 - 1. Advanced signal processing circuitry helps to eliminate false ONs.
 - 2. Utilizes advanced, omni-directional (360 degrees), Doppler technology for reliable occupancy detection.

3. Angled transmitter and receiver pairs help optimize sensitivity while eliminating unwanted detection from ceiling air movement.
4. Digital DIP switch time delay (15 seconds to 30 minutes).
5. LED indicates occupancy detection.
6. Reliable solid-state construction.
7. Temperature and humidity resistant 32 kHz receivers.
8. Mounts to ceiling tiles or box.
9. Units per power pack: up to 4.
10. UL listed.
11. 5-year warranty.
12. Design Make: Pass & Seymour;
 - a. CSU600 (rooms less 500 square feet).
 - b. CSU1100 (rooms 500-1000 square feet).
 - c. CSU2200 (rooms 1000-2000sqare feet).

B. Vacancy Sensor:

1. Manual-ON operation. Auto adjustable time delays: automatic, fixed (5, 10, 15, 20, 25 or 30 minutes), walk-through, test-mode.
2. Selectable time delay automatically adjusts. Selectable walk-through mode turns lights off three minutes after the room is initially occupied if no motion is detected after the first 30 seconds. Selectable test mode allows quick and easy adjustments.
3. Selectable audible alert for impending shutoff.
4. LED indicating occupancy detection.
5. Built-in light level sensing with simple, one-step setup.
6. Override mode allows sensor to operate as a service switch in the event of a failure. NEMA WD 7 guideline utilized for coverage testing. Sensitivity adjustment: PIR (high/low).
7. Coverage: 180 degrees, up to 1050 sq. ft.; major motion 35' x 30'; minor motion 20' x 15'.
8. 5-year warranty.
9. Loads: Incandescent, fluorescent, compact fluorescent (CFL), magnetic low-voltage (MLV) and electronic low-voltage (ELV), 1/6 hp.
10. Design Make: Pass & Seymour OS300SW.

C. Dual Technology Wall Switch Sensor:

1. Dual Technology Passive Infrared & Ultrasonic.
2. PIR Adjustment Two Settings – Maximum (100%) and Minimum (50%).
3. Ultrasonic Adjustment Ultrasonic sensitivity can be adjusted using a trimpot.
4. Output frequency of transmitter is fixed at 40kHz.
5. Time Delay Adjustable 5 min. to 30 min.
6. Light Level Adjustment Yes, 8fc to 180+fc.
7. Spectral Response 6 to 14 μ m.
8. Field of View 88°;110° Vertical, 360° Horizontal.
9. Frequency 50-60 Hz.

10. Coverage 1050 square feet, 180°.
11. Indicator Light(s) Red & Green LEDs.
12. Sensor Type Multi-directional transmitter/receiver with quartz oscillator.
13. Alerts Selectable, Audible.
14. Pass & Seymour WDT Series.

D. Dimmable wall switch Occupancy/Vacancy Sensor

1. For use with 0-10V, 4 wire, 120V and 277V dimming ballasts and drivers.
2. Pressing and holding the UP button will ramp the lights up to the maximum value as determined by the high trim setting. Pressing and holding the DOWN button will dim the lights down to the minimum value as determined by the low trim setting. By default, the values are set at 100% (10v) for high trim and OFF (0v) for low trim.
3. Automatic-ON (Occupancy) or Manual-ON (Vacancy) operation. Refer to plans for Occupancy and Vacancy Sensor requirements and adjust dip switches accordingly to either Automatic-ON (Occupancy) or Manual-ON (Vacancy).
4. Adjustable time delay from 3, 5, 15 and 30 minutes.
5. Multi-way wiring available up to 4 sensors. All switches can sense each other's dimming events and respond accordingly.
6. 180 degree field of view for use in spaces no larger than 12' x 15'.
7. Design Make: Pass & Seymour PW-311.

E. Power Packs:

1. Provide power packs for low voltage control devices.
2. Universal Voltage Pack with 24 VDC operating voltage to low-voltage occupancy sensors and similar controls.
3. High-efficiency power supply and a high-current relay. Transformer with a primary high voltage input, and a secondary low-voltage output (24 VDC, 114 mA, with relay connected)
4. Secondary output will turn the connected load on and off automatically based on device input.
5. Secondary output will control 24V dampers where called for. Coordinate the exact requirements and location of power pack with the mechanical contractor. Provide raceways as required by the mechanical contractor.
6. When the lighting system detects motion or inadequate ambient light, sensor shall electrically close an internal circuit which sends 24 VDC back to the Power Pack.
7. Design Make Pass & Seymour PWP series.

2.07 SPECIFICATION GRADE DUPLEX RECEPTACLES

- A. Corrosion-resistant, plated steel strap locked in to face and back body to resist pulling away from face/body assembly.
- B. 0.032 inch thick, brass, triple-wipe power contacts for lasting retention.
- C. Easily accessed break-off, line-contact connecting tab for fast, easy split-circuit wiring.
- D. Impact-resistant nylon face and thermoplastic back body.
- E. Accepts #14 - #10 AWG solid or stranded copper or copper-clad wire.
- F. Terminal compartments isolated from each other for positive conductor containment.
- G. Tri-drive terminal and mounting screws.
- H. Auto-ground clip assures positive ground.
- I. Design Make: Pass & Seymour CR20 Series.

2.08 TAMPER RESISTANT SPECIFICATION GRADE DUPLEX RECEPTACLES

- A. Dual mechanical shutter system to help prevent insertions of foreign objects.
- B. Two drive screws anchor strap to back body and face where abrupt removal torque is greatest.
- C. 0.032 inch thick brass triple-wipe power contacts for lasting retention.
- D. Corrosion-resistant plated steel strap is locked in to the face and back body to resist pulling away from the face/body assembly.
- E. Auto-ground clip for positive ground.
- F. Easily accessed break-off line-contact connecting tab for fast and easy split-circuit wiring.
- G. Backed-out tri-drive steel terminal screws.
- H. Side wire capability.
- I. Design Make: Pass & Seymour TR20 series.

2.10 GFCI RECEPTACLES

- A. 20 ampere rated.
- B. No exposed terminals to a finger safe application before, during, and after installation.
- C. Built-in connector features large brass terminal blades to ensure consistent, reliable electrical connections to Plug Connector.
- D. Protection: if critical components are damaged and ground fault protection is lost, power to receptacle is disconnected.
- E. Prevents line-load reversal miswire: no power to the face or downstream receptacles if wired incorrectly.
- F. FSUL Listed (Federal Specification WC596).
- G. Exceeds UL943 voltage surge requirements; survives 100x the required UL 3kA/6kV voltage surge test cycles.

- H. Trip indicator light (red LED).
- I. Mounting screws are shipped captive in the device and wall plate for easier installation.
- J. High-impact-resistant thermoplastic construction.
- K. Zinc-plated steel mounting strap.
- L. Button colors matching the device face.
- M. Dual-direction test and reset buttons.
- N. Class A rated GFCI.
- O. Provide LED type where indicated for healthcare applications.
- P. Design Make: Pass & Seymour PT2095 & Pass & Seymour PT2095HG series

2.11 COVER PLATES

- A. Nylon Cover Plates:
 - 1. Smooth unbreakable nylon construction. (thermoplastic type are not acceptable)
 - 2. Color shall be ivory
 - 3. Flush mounting plates shall be beveled with smooth rolled outer edge.
 - 4. Surface mounting plates shall be beveled and pressure formed for smooth edge to fit box.
 - 5. Where two-gang boxes are required for single gang devices. Provide special plates with device opening in one gang and second gang blank.
- B. Weatherproof Cover Plates:
 - 1. Weatherproof plastic in-use cover
 - 2. Horizontal/vertical cover in clear MM410C that safely covers any electrical outlet
 - 3. Universal Fit to enable same product for all types of receptacles.
 - 4. Attached gasket and mounting hardware
 - 5. Meet or exceeds OSHA and NEC (article 406.8[b][1] wet location requirements with the cord plugged into the receptacle.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to installation verify that outlet boxes are cut in at proper height; that wall openings are neatly cut and will be completely covered by wall plates.
- B. If wall openings were made by general trades notify that contractor and owners representative and direct the cutting and patching requirements. If the openings were made by electrical contractor cut and patch opening using a qualified trades person.
- C. Prior to installation of backbox verify height with architectural elevations. If the device is not shown confirm the height with the architect and engineer. If conflicts arrive and the architect has not been consulted the box shall be relocated at no cost to the owner.
- D. Exact locations and heights of devices in resident rooms will be determined as part of the typical room mock requirement described in 260010.

3.02 OUTLET REQUIREMENTS

- A. Specific outlet types are not called out on the floor plans. Provide outlets as called for as follows:
- B.

<u>Location</u>	<u>Type</u>
C. Common Spaces	Tamper Proof
D. Visitor and Staff Common Spaces	Specification Grade
E. Maintenance and Administrative	Specification Grade
F. Corridors	
G. Mechanical Spaces	Specification Grade
H. Storage Rooms	Specification Grade
I. Offices	Specification Grade with USB Charger
J. Exterior	Specification Grade

3.03 INSTALLATION

- A. Install in accordance with NECA "Standard of Installation."
- B. Install devices plumb and level.
- C. Do not install devices back-to-back
- D. Provide fire proof putty around all device back boxes in resident rooms and other rated walls.
- E. Install switches with OFF position down.
- F. Install wall dimmers to achieve full rating specified and indicated after de-rating for ganging as instructed by manufacturer.
- G. Do not share neutral conductor on load side of dimmers.
- H. Install receptacles with grounding pole on top.
- I. Connect wiring device grounding terminal to outlet box with bonding jumper and to branch circuit equipment grounding conductor.

- J. Install decorative plates on switch, receptacle, and blank outlets in finished areas.
- K. Connect wiring devices by wrapping conductor around screw terminal.
- L. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas and above accessible ceilings.
- M. Install protective rings on active flush cover service fittings.
- N. When receptacle is mounted horizontally, neutral pole shall be on top.
- O. Provide extension rings to bring outlet boxes flush with finished surface.
- P. Provide receptacles at locations indicated and where required by special equipment with plug connection. Mount at height 18" AFF; unless noted otherwise on drawings.
- Q. Receptacles shall not be installed back to back unless otherwise noted.
- R. Mount receptacles in offices, corridors, common spaces and utility spaces at 18" AFF to center.
- S. Mount receptacles in patient rooms at 24" AFF to center.
- T. Where "AC" is noted on plans adjacent to a wiring device refer to the architectural elevations and install so outlet is above backsplash. If it is not clear on the elevation issue a request for information prior to roughing.

3.04 FIELD QUALITY CONTROL

- A. Inspect each wiring device for defects.
- B. Operate each wall switch with circuit energized and verify proper operation.
- C. Verify that each receptacle device is energized.
- D. Test all receptacles for proper voltage, grounding and polarity.
- E. Test all GFCI receptacles for proper voltage, polarity, grounding, and verify the receptacle trips at 6 milliamperes or less.
- F. Test all receptacles for polarity, ground continuity and ground blade retention force per NFPA 99 Chapter 3-3 Section 3-3.3.3.
- G. Rewire receptacles as required until receptacles test properly.
- H. Clean exposed surfaces to remove splatters and restore finish.

3.05 FUNCTIONAL TESTING

- A. Where Dimmers, Occupancy Sensors, time switches, programmable schedule controls, photo sensors are installed, the following procedures shall be performed:
 - 1. Confirm that the placement, sensitivity and time-out adjustments for occupant sensors yield acceptable performance.
 - 2. Confirm that the time switches and programmable schedule controls are programmable to turn the lights off.
 - 3. Confirm that the placement and sensitivity adjustments for the photo sensor controls reduce electric light based on the amount of usable daylight in the space as specified.
- B. Contractor shall submit a written report to Architect, copy to Engineer, on results of each functional test on equipment installed. Report shall contain owner's representative's signature.

3.06 SWITCHES

- A. Provide switches to control outlets, appliances, lighting, etc. as indicated. Mount 48" above finished floor unless noted otherwise.
- B. Do not feed thru local switches unless specifically noted.
- C. Where more than one switch is indicated at one location on 120 volt circuits mount in gangs under common plate.
- D. Locate switches on strike side of door. If switch is indicated at location which would be concealed (behind equipment, etc.) or not on strike side of door, obtain approval of Architect before installation.
- E. Switches shall not be installed back to back unless otherwise noted.

3.07 WALL PLATES

- A. Provide at locations indicated with size openings required for devices indicated.
- B. Multi-gang switches, receptacles, etc. shall be in a common one-piece plate.
- C. Coordinate the configuration of multi-gang switches of four or more with the architect or construction manager prior to rough in

END OF SECTION 26 2726

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

1.02 SECTION INCLUDES

- A. Interior luminaires and accessories.
- B. Exit signs.
- C. Emergency lights
- D. LED drivers and light engines.
- E. Power extenders.
- F. Generator transfer devices.

1.03 STANDARDS REFERENCES

- A. Design Lighting Consortium (DLC).
- B. Energy Star.
- C. NEMA Compliance: Comply with applicable requirements of NEMA Standards Pub. No. LE-1 and LE-2 pertaining to lighting equipment.
- D. ECCC of NYS Compliance: Comply with applicable requirements of the Energy Conservation Construction Code of NYS, Section 805.
- E. ANSI 132.1.
- F. ANSI C78.379: Electric Lamps Incandescent and High Intensity Discharge Reflector Lamps Classification of Beam Patterns.
- G. ANSI C82.1: Ballasts for Fluorescent Lamps Specifications.
- H. ANSI C82.4: Ballasts for High Intensity Discharge and Low Pressure Sodium Lamps (Multiple Supply Type).
- I. ANSI/UL Compliance: Comply with ANSI/UL standards pertaining to lighting fixtures for hazardous locations.
- J. UL Compliance: Provide lighting fixtures which have been UL listed and labeled.
- K. CBM Labels: Provide fluorescent lamp ballasts which comply with Certified Ballast Manufacturer's Association standards and carry the CBM label.
- L. FCC Part 15
- M. IEEE C62.41: Guide for Surge Voltages in Low-Voltage AC Power Circuits.
- N. NFPA 70: National Electrical Code.

- O. NFPA 101: Life Safety Code.
- P. Testing Standards: IESLM79- 08.
- Q. UL1449 3rd Edition Type 4-Surge Protective Devices.
- R. RoHS Compliant (Restriction of Use of Hazardous Substances).

1.04 SUBMITTALS FOR REVIEW

- A. Provide light fixtures and controls for mocking up each of three typical rooms. Fixtures for these areas will not obtain a final approval until these mock ups receive final approval.
- B. Product Data: Provide dimensions, ratings, and performance data. Information on each fixture shall include:
 - 1. Manufacturer and Catalog Number.
 - 2. Dimensioned Construction Drawing(s).
 - 3. Standard Catalog "Cut" Sheet with options highlighted.
 - 4. Photometric Data.
 - 5. Ballast or Driver specifications.
 - 6. Socket Type.
 - 7. Lamp Type.
 - 8. Energy star compliance.
 - 9. CEE compliance.
- C. Provide cut sheets and wiring schematics for low voltage controls.

1.05 QUALITY ASSURANCE

- A. Lighting fixtures shall be standard products of manufacturers regularly engaged in the manufacture of the specific type lighting fixtures specified and shall be the manufacturer's latest standard design that complies with specification requirements. Firms installing the fixtures shall have a minimum of (5) years of successful installation experience on projects with interior lighting work similar to the requirements of this project.
- B. Verify the availability of all fixtures proposed to be used in the execution of the work prior to submitting for approval. The discontinuance of production of any fixture after such approval has been granted shall not relieve the Contractor from furnishing an approved fixture of comparable quality and design at no additional cost
- C. Lighting fixtures shall be as specified in the "Luminaire Schedule." Fixture types, characteristics, photometrics, finishes, etc., correspond to the first manufacturer, and associated catalog number, listed in the "Luminaire Schedule." Provide a sample fixture from the factory for any products not listed as acceptable for approval. The Owner's Representative reserves the right to disapprove any fixture type submitted which is not equal in quality, appearance or performance to the fixture specified.
- D. Drivers and LED boards: The manufacturer shall provide written warranty against defects in material or workmanship, including replacement, for five years from date of manufacture. Drivers and LED boards shall be manufactured in an ISO 9002 Certified Facility.

1.06 SPARE ATTIC STOCK

- A. Provide (5) LED drivers. For each type of fixture with over 30 fixtures

1.07 CONTROLS AND DRIVERS

- A. The drawings indicate 0-10V LED dimming drivers with power extenders and three wire dimmers (hot, neutral, load) in classrooms, assembly spaces and offices. The contractor may provide variations such as 2 or 3 wire dimming drivers without extenders or 0-10V dimmers without power extenders.
- B. The contractor shall provide all branch/switch circuit and control wiring the approved dimming controls.
- C. Where alternate arrangements are proposed the contractor and his lighting representative shall be responsible for selecting and providing proper driver and dimming combinations subject to the following physical and performance criteria:
 - 1. All fixtures must dim smoothly to a minimum of 10% of total lumen output with no visible flicker.
 - 2. Dimmers must fit in existing back boxes for 1995 renovation areas. This includes two dimmers side by side in two gang box for classrooms and assembly spaces.

PART 2 - PRODUCTS

2.01 LUMINAIRES

- A. Furnish Products from acceptable manufacturers listed in the light fixture schedule.
- B. Wattages for LED fixtures are maximum allowed. Where recently released products have decreased wattage for same lumen output, provide the decreased wattage version.
- C. Lenses as called for on schedule meeting the following applicable requirements:
 - 1. Extruded 100 percent virgin acrylic material with a minimum weight of ten ounces per square foot.
 - 2. Type 12: Clear material with 0.125 inch overall thickness with .080 Inch penetration comprised of 3/16 inch square based female cones aligned 45 degrees to the length and width of the panel.
 - 3. Type 19: Clear material with 0.156 inch overall thickness with 0.080 inch penetration comprised of 3/16 inch square based male cones aligned parallel and perpendicular to the length and width of the panel.
 - 4. White Matte: White material with 0.125 inch overall thickness.
 - 5. While Overlay: White material with 0.040 inch overall thickness.
 - 6. The maximum deflection at the center of a 2 foot x 4 foot lens shall be no greater than 0.250 inch. Arched or warped lenses will not be accepted.
- E. Housings:
 - 1. Provide steel, extruded aluminum or spun aluminum as called for on the fixture schedule.

2.02 EXIT SIGNS

- A. Manufacturers:
 - 1. Refer to lighting fixture schedule on the drawings for manufacturer and specifications.
 - 2. Unless otherwise noted on drawings or panel schedules, circuit fixture to nearest un-switched power source. Update panel directory in cover of panel.
- B. Electrical Characteristics:
 - 1. LED electroluminescent type for 120/277 volt supply.
 - 2. Use two LED strips for indirect illumination of the face electroluminescent lamp for direct illumination of the face. Meet or exceed illumination requirements of NFPA-101, and all of the requirements of UL924.

2.03 EMERGENCY LIGHTS

- A. Manufacturers: Refer to lighting fixture schedule on the drawings for manufacturer and specifications.
- B. Unless otherwise noted on drawings or panel schedules, circuit fixture to nearest un-switched power source. Update panel directory in cover of panel.
- C. Premium sealed maintenance free, 6V lithium ion batteries with sufficient capacity to operate the lamps for 1-1/2 hours to an end voltage of 87-1/2% of nominal battery voltage. Three stage charger (constant current, equalize and float charge), relay, low voltage battery disconnect and brownout protection circuits.

2.04 LED DRIVERS AND LIGHT ENGINES

- A. Acceptable Manufacturers:
 - 1. Philips.
 - 2. Lutron.
 - 3. Microsemi.
 - 4. Approved Equal.
- B. General Requirements:
 - 1. The LED driver and board shall have a (5) year warranty.
 - 2. LED lamps shall have a minimum rated life 50,000 hours.
 - 3. LED driver board combinations shall deliver a minimum of 90 lumens/watt.
 - 4. Shall be rated dual voltage 120/277V.
 - 5. Must have surge suppression protection suitable for use in permanently connected products meeting UL1449 3rd Edition Type 4.
 - 6. Must meet ANSI C62.41 Category A surge protection standards up to and including 4 kV.

7. Light engine shall provide 4,000K color temperature.
- C. General LED Driver Requirements:
1. LED Driver shall be installed inside an electrical enclosure.
 2. Wiring inside electrical enclosure shall have a 600V/105°C rating or higher.
 3. Must tolerate sustained open circuit and short circuit output conditions without damage.
 4. Maximum allowable case temperature of 70°C.
 5. Must comply with the requirements of UL, FCC, ENEC, CE, CQC.
 6. The input and output connections shall be factory wiring only. Connection to supply mains shall be determined in the end product.
 7. Temperature tested in a 55°C ambient, with the maximum temperatures on the enclosure of 73.1°C.
 8. Suitable for use in dry and damp locations.
 9. Installed as a built-in component of the end product. The unit shall be installed in compliance with the enclosure, mounting, spacing, casualty, temperature, and segregation requirements of the end product application.
 10. The transformer shall employ a Class 130(B) insulation system.
 11. Spacing in accordance with the requirements of the Standard for Light Emitting Diode (LED) Equipment for Use in Lighting Products, UL 8750, First Edition, Clause 7.8.3 and Table 7.4.
- D. 0-10V Dimming Drivers:
1. Physical Characteristics:
 - a. LED Driver shall be installed inside an electrical enclosure.
 - b. Wiring inside electrical enclosure shall comply with 600V/105°C rating or higher.
 2. Performance:
 - a. Certified by UL Class2 for use in a dry or damp location.
 - b. Class A sound rating.
 - c. Minimum operating ambient temperature of -40°C.
 - d. Life expectancy of 50,000 hours at Tcase of $\leq 70^{\circ}\text{C}$.
 - e. Life expectancy of 100,000 hours at Tcase of $\leq 62^{\circ}\text{C}$.
 - f. Maximum self rise of 25°C in open air without heat sink.
 - g. Maximum allowable case temperature is 75°C.
 - h. Failure rate $\leq 0.01\%$ per 1,000 hours at Tcase $\leq 70^{\circ}\text{C}$.
 - i. Failure rate of 0.01% - 0.02% per 1,000 hours at Tcase of 70°C - 80°C.
 - j. Must tolerate sustained open circuit and short circuit output conditions without damage.
 - k. Comply with FCC rules and regulations, as per Title 47 CFR Part 15 Non-Consumer (Class A).
 - l. Minimum Dimming range 100-10% or 100-1% as called for.

E. Three (3) Wire Dimming Drivers:

1. Minimum Dimming Range: 100% to 10%.
2. Operating Voltage: 120 – 277 V~ at 50/60 Hz.
3. Rated lifetime of 50,000 hours @ $t_c = 65^\circ\text{C}$.
4. LEDs turn on to any dimmed level without going to full brightness.
5. Nonvolatile memory to restore all driver settings after power failure.
6. Power Factor: > 0.90 at 40 W.
7. Standby Power Consumption: < 1.0 W.
8. Total Harmonic Distortion (THD): $< 20\%$ at 40 W.
9. Inrush Current: < 2 A.
10. Inrush current limiting circuitry to eliminate circuit breaker tripping, switch arcing and relay failure.
11. Turn-on Time: ≤ 1 second.
12. PWM Dimming Frequency: 550 Hz.

F. Two (2) Wire Dimming Drivers:

1. Dimming Range: 100% to 1%.
2. Operating Voltage: 120 V~ at 50/60 Hz (2-Wire Forward Phase Control).
3. Rated lifetime of 50,000 hours @ $t_c = 65^\circ\text{C}$.
4. LEDs turn on to any dimmed level without going to full brightness.
5. Nonvolatile memory restores all driver settings after power failure.
6. Power Factor: > 0.90 at 40 W.
7. Total Harmonic Distortion (THD): $< 20\%$ at 40 W.
8. Inrush Current: < 2 A
9. Inrush current limiting circuitry to eliminate circuit breaker tripping, switch arcing and relay failure.
10. Turn-on time: ≤ 1 second.
11. PWM Dimming Frequency: 550 Hz.

2.05 GENERATOR TRANSFER DEVICE

- A. Compliance with Underwriters Laboratories in accordance with the standards set forth in UL 924, "Emergency Lighting and Power Equipment," and UL Listed for factory or field installation.
- B. Able to convert and control up to (20) regular light fixtures to approved emergency lights.
- C. Automatic Diagnostic Feature that tests fixtures regularly.
- D. Electrical Characteristics:
1. 120/277
 2. 120V or 277V Sensing Input.
 3. 120V or 277V Load.
 4. 20 Amp Ballast Load Rating.
 5. 1800W Load Rating at 120V.
 6. 1500W Load Rating at 277V.
 7. N.C. Contact.
 8. 0-10V Dimming compatibility

E. Mechanical Characteristics:

1. Mounts in 4-11/16" Junction Box with single gang plaster ring.
2. UL94-5VA Rated
3. Temperature: 32°F - 140°F.
4. Color - White.

F. Design Make: LVS Controls EPC-1-D Series

G. Acceptable Manufacturers:

1. LVS Controls.
2. Bodine.
3. DualLite.

2.06 POWER EXTENDER

A. Provide with low-voltage 0-10V dimmable LED drivers and electronic ballasts, to emulate the characteristics of the dimmer that it is connected to in terms of dimming range and resolution.

B. Electric Characteristics:

1. Input Voltage: 108VAC to 305VAC, 60Hz.
2. Load Rating: 20A-2400VA @120VAC, 5500VA @277VAC fluorescent.
3. Power Consumption: 6W @120VAC max, 18W @277VAC max.
4. Dimmer Input: 120V 60Hz.
5. Output Ballast Control: 0-10VDC.
6. Testing/Code Compliance: UL Listed, CSA Certified and FCC Part 15.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Locate recessed ceiling luminaires as indicated on reflected ceiling plan.
- B. Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other. Secure to prevent movement.
- C. Exposed Grid Ceilings: Fasten surface mounted luminaires to ceiling grid members using existing hardware.
- D. Install recessed luminaires to permit removal from below.
- E. Install recessed luminaires using accessories and fire stopping materials to meet regulatory requirements for fire rating.
- F. Install clips to secure recessed grid-supported luminaires in place.
- G. Install accessories furnished with each luminaire.
- H. Connect luminaires, emergency lighting units, and exit signs to branch circuit outlets provided under section 260519 using flexible conduit.
- I. Bond products and metal accessories to branch circuit equipment grounding conductor.

- J. Install specified lamps in each exit sign, and luminaire.
- K. General:
1. Install interior lighting fixtures at locations and heights as indicated, in accordance with fixture manufacturer's written instructions, applicable requirements of NEC, NECA's 'Standard of Installation', NEMA standards, and with recognized industry practices.
 2. Provide fixtures and/or fixture outlet boxes with hangers to properly support fixture weight. Submit design of hangers, method of fastening, other than indicated or specified herein, for review by Engineer.
 3. Make installation such that the fixture is free of finger marks, flaws, scratches, dents or other imperfections.
 4. Arrangement:
 - a. Align edges of fixtures with walls or other building elements. Where indicated by dimensions or indicated on drawings, maintain indicated arrangement.
 - b. For wall to wall installed light fixtures, field measure length required after completion of the wall construction and prior to ordering the light fixtures. Fabricate in largest lengths allowable.
 5. Recessed Mounting:
 - a. Verify ceiling construction and material prior to ordering light fixtures. Provide plaster frames for plaster ceilings and flanged frames for drywall ceiling. Provide necessary mounting hardware and accessories to adapt fixture to ceiling construction. Provide gaskets, trims, flanges, etc. as required to prevent light leaks around trim. Where installing 'lay-in' type fixtures, provide galvanized supports to the building structure, independent of the ceiling system, at all four corners of the fixture. Each support shall be capable of supporting 100 pounds and each wire shall be a minimum of 12 AWG mild steel. Provide saddle hangers or tie bars attached to runners or between crossbars of ceiling systems as a safety measure. Provide mounting splines or other positive means of maintaining alignment and rigidity. Use a minimum of (2) supports independent of the ceiling for each point source type fixture.
 6. Stem Mounting:
 - a. Use self-aligning hangers in canopies for hanging fixtures true to vertical. Do not deface ceiling or walls. Locate hangers at intersections of joints or at centers of blocks in rooms with patterned type ceiling materials such as acoustic tile. Use hangers capable of supporting four times fixture weight. Align continuous rows of fixtures maintaining fixtures level without rotation about the longitudinal axis. Rigidly support outlet box independent of ceiling system from building structure. Where obstructions prevent direct support of outlet, provide offset or trapeze hangers of outlet box. Stem shall be supported directly from building structure on centers as called for by the manufacturer. There shall be a minimum of (2) stems per individual four-foot light fixture, and (3) stems per individual eight foot light fixture for steel fixtures. Extruded aluminum fixtures shall have hangers as called for by the manufacturer.

7. Surface Ceiling Mounting:
 - a. Mount surface fixtures tight to surface without distorting surface. Space fixtures in continuous rows to correspond to ceiling joint intersections. Continuous row fixtures may be fed by a single outlet where fixtures contain approved wireways and suitable wiring is used. Provide hangers for each fixture, each rated to support four times the fixture weight. Provide offset or trapeze hangers where required. Supports shall be provided on a maximum of 4 foot centers with a minimum of (2) hangers per individual four foot light fixture and (3) hangers per individual eight foot light fixture. Hangers shall be supported from the building structure and independently from ceiling system or other building services.
 - b. Fasten fixtures securely to structural supports.

3.02 FIELD QUALITY CONTROL

- A. Operate each luminaire after installation and connection. Inspect for proper connection and operation.
- B. Examine areas and conditions, under which lighting fixtures are to be installed, and substrate for supporting lighting fixtures. Notify Architect in writing of conditions detrimental to proper completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected.
- C. Refer to respective reflected ceiling plan for each area. Reflected ceiling plans indicate proper light fixture location only. Coordinate the proper arrangement with all other ceiling mounted devices. Contract Documents indicate light fixture characteristics (type), quality, quantity, etc. Verify with the ceiling supplier design of actual ceiling installed in each area and coordinate compatible fixture flange.

3.03 ADJUSTING

- A. Aim and adjust luminaires.
- B. Position exit sign directional arrows as indicated.

3.04 CLEANING

- A. Clean electrical parts to remove conductive and deleterious materials.
- B. Remove dirt and debris from enclosures.
- C. Clean photometric control surfaces as recommended by manufacturer.
- D. Clean finishes and touch up damage.

3.05 REMOVAL OF BALLAST IN EXISTING LIGHT FIXTURES

- A. Assume ballast contains PCB or DEHP materials unless labeled otherwise, or test samples to show materials are not PCB or DEHP; submit test report. Remove all ballast from existing light fixtures indicated on contract documents. Dispose of all ballast which do not have non-PCB or DEHP labels in approved containers and pay all costs to have containers taken to EPA approved incinerators and disposed of per all EPA and OSHA regulations. Follow all EPA and OSHA regulations for transporting containers and materials. If ballast has leaked in existing fixture, remove material deposited in fixture and dispose of those material as listed above. Provide Certificate of Disposal and all associated paperwork to Owner's representative.

3.06 REMOVAL OF LAMPS IN EXISTING LIGHT FIXTURES

- A. Assume all fluorescent lamps contain Mercury materials unless labeled otherwise, or test samples to show materials do not contain Mercury and submit test report. Remove all lamps from existing light fixtures indicated on contract documents. Dispose of all lamps which do not have non-Mercury labels in compliance with the requirements of the New York State Department of Environmental Conservation and all applicable Federal Laws. Follow all regulations for transporting materials. Provide Certificate of Disposal and all associated paperwork to Owner's representative.

END OF SECTION 26 5010

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including all General Conditions, Supplementary Conditions, Division 1 specification sections as well as Information to Bidders requirements that are included in the project documents, apply to the work of this Contract.

1.02 SCOPE OF WORK

- A. Provide the following Horizontal cabling as called for on the E500 series drawings. Cables shall be multi colored as called for on the drawings. Terminate specific colored cables on dedicated patch panels.
- B. Prior to releasing the cable order obtain approval in writing from the owner's IT director for all cable colors.
- C. Prior to installing any cable meet with the owner's IT director in the field and review each rack lay out with respect to switch, patch panel and wire management placement. Provide a shop drawing showing the agreed upon layout signed off by the owner's IT director.
- D. This section shall include the following
 - 1. Category 6 cable
 - 2. Category 6 Patch Panels
 - 3. Communications Faceplates
 - 4. Termination Jacks

1.03 REFERENCES

- A. The products and work herein specified shall comply with the current additions of the following publications and standards.
 - 1. UL - Underwriter Laboratory
 - 2. NEC – National Electric Code
 - a. Article 725
 - b. Article 770
 - c. Article 800
 - 3. NFPA – National Fire Protection Association
 - 4. NECA - Standard of Installation
 - 5. ANSI – American National Standards Institute
 - 6. NEMA – National Electrical Manufactures Association Article 250

7. EIA – Electronic Industries Alliance
 - a. ANSI/TIA/EIA-568-C.2.
 - b. ANSI/EIA/TIA 569B
 - c. ANSI/EIA/TIA 606A
 - d. ANSI-J-STD-607-A
 - e. ANSI/TIA/EIA-606-A
 8. TIA – Telecommunications Industry Association
 9. IEEE C2 National Electrical Safety Code
 10. FCC - Federal Communications Commission
 - a. CFR 68
 11. BICSI – Building Industry Consulting Services International
 - a. Distribution Methods Manual
 - b. ANSK/NECA/BICSI 568
 12. ISO/IEC 11801
- B. If this document and any of the documents listed above are in conflict, then the more stringent requirement shall apply. All documents listed are believed to be the most current releases of the documents. The Contractor has the responsibility to determine and adhere to the most recent release when developing the proposal for installation.

1.04 QUALITY ASSURANCE

- A. All work shall be provided in a neat and workmanlike manner. All methods of construction that are not specifically described or indicated in the contract documents, shall be provided in accordance with industry standards and shall be subject to the control and approval of the Owners representative.
- B. Equipment and materials shall be of the quality and manufactures indicated. The equipment specified is based on the acceptable manufacturers listed. Where "approved equal" is stated, equipment shall be equivalent in every way to that of the equipment specified, and subject to the approval of the Engineer.
- C. Strictly adhere to all Category 6 (BICSI and TIA) and manufacturer recommended installation practices when installing high performance cabling.
- D. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.
- E. The contractor shall furnish a list of (3) installations of equivalent or larger systems that have been installed within the past (2) years and have been operating satisfactorily for a minimum of one year. (Include names and phone numbers of references) with bid.

1.05 SUBMITTALS

- A. Provide manufactures cutsheets, specifications, and installation instructions for the products herein specified.
 - 1. Category 6 Cable.
 - 2. Patch Panels.
 - 3. Communications Faceplates.
 - 4. Termination Jacks.

PART 2 – PRODUCTS

2.01 CATEGORY 6 100 OHM UNSHIELDED TWISTED PAIR CABLE

- A. Category 6/Class E Unshielded Twisted-Pair (UTP) Cable.
- B. All Cables shall be of round construction.
- C. Each cable shall contain 4 color coded pairs.
- D. Cable shall be listed for the environment where it will be installed (Plenum, Riser, LSZH, etc.)
- E. Category 6 horizontal cabling shall meet or exceed the following specifications:
 - 1. Construction Materials
 - a. Jacket Material PVC
 - b. Conductor Material Bare copper
 - c. Insulation Material Polyolefin
 - d. Separator Material Polyolefin
 - e. Dimensions
 - f. Cable Length 305m | 1000 ft
 - g. Cable Weight 24.62 lb/kft
 - h. Diameter Over Jacket 5.842 mm | 0.230 in
 - i. Jacket Thickness 0.508 mm | 0.020 in
 - 2. Electrical Specifications
 - a. ANSI/TIA Category 6
 - b. Characteristic Impedance 100 ohm
 - c. Dc Resistance Unbalance, maximum 5%
 - d. Delay Skew, maximum 45 ns
 - e. Mutual Capacitance 5.4 nF/100 m @ 1kHz
 - f. Nominal Velocity of Propagation (NVP) 69%
 - g. Operating Frequency, maximum 400 MHz
 - h. Transmission Standards ANSI/TIA-568-C.2 | CENELEC EN 50288-6-1 | ISO/IEC 11801 Class E
 - i. Safety Voltage Rating 300 V
 - j. Dielectric Strength, minimum 1500 Vac | 2500 Vdc
 - k. Note: All electrical transmission tests include swept frequency measurements.

3. Environmental Specifications
 - a. Environmental Space Non-plenum/Plenum
 - b. Flame Test Method CMR/CMP
 - c. Installation Temperature 0 C to +60 C (+32 F to +140 F)
 - d. Operating Temperature -20 C to +60 C (-4 F to +140 F)
 - e. UL Temperature Rating 75 C | 167 F
4. General Specifications:
 - a. Cable Type U/UTP (unshielded).
 - b. Pairs, quantity 4.
 - c. Cable Component Type Horizontal.
 - d. Packaging Type box.
 - e. Conductor Gauge, singles 23 AWG
 - f. Conductor Type, singles Solid

F. Category 6 horizontal cabling shall meet or exceed the performance specifications listed in the following table.

Freq. MHz	IL			NEXT			ACR			PSNEXT			PSACR			ACRF			PSACRF			RL			TCL		ELTCTL	
	CS	Std	Typ	CS	Std	Typ	CS	Std	Typ	CS	Std	Typ	CS	Std	Typ	CS	Std	Typ	CS	Std	Typ	CS	Std	Typ	CS	Std	CS	Std
1	2.0	2.0	2.1	77.3	74.3	92.6	75.3	72.3	90.5	75.3	72.3	90.7	73.3	70.3	88.6	68.8	67.8	85.1	65.8	64.8	83.8	20.0	20.0	34.5	40.0	40.0	35.0	35.0
4	3.8	3.8	3.9	68.3	65.3	85.0	64.5	61.5	81.1	66.3	63.3	82.9	62.5	59.5	79.0	56.8	55.8	73.3	53.8	52.8	72.1	23.6	23.0	33.1	40.0	40.0	23.0	23.0
8	5.3	5.3	5.3	63.8	60.8	80.8	58.5	55.4	75.5	61.8	58.8	78.7	56.5	53.4	73.3	50.7	49.7	67.5	47.7	46.7	66.3	25.4	24.5	34.4	40.0	40.0	16.9	16.9
10	5.9	6.0	6.0	62.3	59.3	79.2	56.4	53.3	73.2	60.3	57.3	77.1	54.4	51.3	71.1	48.8	47.8	65.5	45.8	44.8	64.3	26.0	25.0	35.7	40.0	40.0	15.0	15.0
16	7.5	7.6	7.5	59.2	56.2	76.3	51.7	48.7	68.8	57.2	54.2	74.0	49.7	46.7	66.5	44.7	43.7	61.5	41.7	40.7	60.2	26.0	25.0	35.7	38.0	38.0	10.9	10.9
20	8.4	8.5	8.4	57.8	54.8	74.6	49.4	46.3	66.2	55.8	52.8	72.4	47.4	44.3	64.1	42.8	41.8	59.6	39.8	38.8	58.3	26.0	25.0	37.0	37.0	37.0	9.0	9.0
25	9.4	9.5	9.4	56.3	53.3	73.0	46.9	43.8	63.7	54.3	51.3	70.9	44.9	41.8	61.5	40.8	39.8	57.6	37.8	36.8	56.3	25.3	24.3	38.1	36.0	36.0	7.0	7.0
31.25	10.6	10.7	10.5	54.9	51.9	71.7	44.3	41.2	61.2	52.9	49.9	69.6	42.3	39.2	59.1	38.9	37.9	55.6	35.9	34.9	54.3	24.6	23.6	38.2	35.1	35.1		
62.5	15.3	15.4	14.9	50.4	47.4	66.2	35.1	32.0	51.3	48.4	45.4	64.1	33.1	30.0	49.2	32.9	31.9	49.3	29.9	28.9	48.1	22.5	21.5	36.6	32.0	32.0		
100	19.7	19.8	19.0	47.3	44.3	63.5	27.6	24.5	44.5	45.3	42.3	61.3	25.6	22.5	42.4	28.8	27.8	44.9	25.8	24.8	43.8	21.1	20.1	33.6	30.0	30.0		
155	25.0	25.2	23.9	44.4	41.4	61.3	19.5	16.3	37.4	42.4	39.4	58.8	17.5	14.3	35.0	25.0	24.0	40.8	22.0	21.0	39.7	19.8	18.8	32.0	28.1	28.1		
200	28.8	29.0	27.3	42.8	39.8	58.9	14.0	10.8	31.6	40.8	37.8	56.9	12.0	8.8	29.6	22.8	21.8	38.6	19.8	18.8	37.5	19.0	18.0	31.1	27.0	27.0		
250	32.6	32.8	30.7	41.3	38.3	56.8	8.7	5.5	26.1	39.3	36.3	54.8	6.7	3.5	24.1	20.8	19.8	36.6	17.8	16.8	35.5	18.3	17.3	30.6	26.0	26.0		
300	36.2		33.9	40.1		55.4	4.0		21.5	38.1		53.5	2.0		19.6	19.3		34.8	16.3		33.7	17.8		30.7				
350	39.5		36.8	39.1		54.3	-0.4		17.5	37.1		52.3	-2.4		15.5	17.9		33.4	14.9		32.1	17.3		31.1				
400	42.7		39.4	38.3		53.0	-4.4		13.5	36.3		51.1	-6.4		11.6	16.8		32.1	13.8		30.8	16.9		32.5				
500			44.7			50.7			6.0			48.7			4.0			28.9			27.6			33.8				
550			44.9			50.9			6.0			48.8			3.9			28.7			27.3			33.6				
650			51.5			47.0			4.4			45.0			16.4			24.4			21.9			26.2				

5. The table provides reference values only. All parameters comply with the governing equations over the entire frequency range.

6. All values and equations apply to worst-case channels utilizing four-pair cables with full cross-connects, consolidation points and work area outlets (4 connectors in a channel) for any channel lengths up to 100 meters.

G. Design Make: Belden Data Twist 4800 non-bonded

H. Acceptable Manufacturers:

1. Commscope
2. Berktek
3. Amp

2.02 CATEGORY 6 CONNECTING HARDWARE

- A. Category 6 compliant modular jacks
- B. Performance terminated on a 100M length of cable shall match requirements listed for Category 6 cable
- C. Physical Characteristics
 - 1. Jacks shall be 8 position un-keyed
 - 2. Each jack shall be an individually constructed unit and shall snap mount in an industry standard keystone opening (.760" x .580")
 - 3. Jack housings shall be high impact 94 V-0 rated thermoplastic
 - 4. Jacks shall have a temperature rating of -10 °C (14°F) to 60°C (140 °F) in conformance with ANSI/TIA/EIA-568-A
 - 5. Jacks shall utilize a 2-layer printed circuit board to control NEXT
 - 6. Jack housings shall fully encase and protect printed circuit boards and IDC fields.
 - 7. Housing shall be ultrasonically welded for tamper resistance.
 - 8. Modular jack contacts shall accept a minimum of 2500 mating cycles without degradation of electrical or mechanical performance.
 - 9. Contacts will maintain a minimum vertical deflection force of 100 grams over deflection window.
 - 10. Modular jack contact wires shall be formed flat for increased surface contact with mated plugs.
 - 11. Contacts shall be arranged on the PC board in 2 staggered arrays, one array has 6 contacts and the other array has 2 contacts.
 - 12. Modular jack contacts shall be constructed of Beryllium copper for maximum spring force and resilience.
 - 13. Contact Plating shall be a minimum of 50 micro inches of hard gold in the contact area over 50 micro-inch of nickel.
 - 14. Jack termination shall follow the industry standard 110 IDC.
 - 15. IDC contact termination towers shall be paired and angled at 29.5 degrees.
 - 16. IDC contacts shall be laid out in staggered arrays of 4 sets of 2 contacts.
 - 17. Jacks shall have a designation indicating Category 6 on the nose which can be plainly seen from the front of the faceplate. Bottom of jack shall have date code and an abbreviated catalog number.

18. Jacks shall utilize a paired punch down sequence. Cable pair twists shall be maintained up to the IDC, terminating all conductors adjacent to its pair mate to better maintain pair characteristics designed by the cable manufacturer.
19. 110 IDC shall utilize 100 micro-inch tin lead plated (60% tin/40%lead) over phosphor bronze over nickel.
20. Jacks shall terminate 22-26 AWG stranded or solid conductors.
21. Jacks shall terminate insulated conductors with outside diameters up to .050"
22. Jacks shall be compatible with single conductor 110 impact termination tools.
23. Jacks shall include translucent wire retention stuffer cap, that hold terminated wires in place and allow the conductors to be visually inspected in the IDC housing.
24. Stuffer cap shall have a positive locking latch to provide conductor strain relief.
25. Stuffer cap used for wire termination with channel lock style pliers.
26. Jacks shall be compatible with TIA/EIA 606 color code labeling
27. Jacks shall accept snap on icons for identification or designation of applications.
28. Jacks shall be available in 6 colors for identification or designation of applications at the workstation or telecommunication room.
29. Jacks shall have universal wiring designation.
30. Jacks shall be marked with the T-568A wiring scheme.
31. Jacks shall have an attached color coded wiring instruction label housed between the IDC termination towers.
32. Jacks shall be manufactured in the USA
33. Jacks shall be designed for 100 Ohm UTP cable termination
34. Jacks shall be UL LISTED 1863 and CSA certified.
35. Jacks shall be made by an ISO 9002 Certified Manufacturer.

D. Design Make: Belden Cat6+

2.06 UTP PATCH PANELS

A. Physical Characteristics

1. Panels shall be made of 16ga cold rolled steel with a black powder coat finish in 48 port configurations.
2. Panels shall be manufactured with a rolled-edge at the top and bottom for stiffness.
3. Panels shall have 48 modular openings

4. Panels shall have Flame retardant UL 94 V-0 modular jacks with high performance copper alloy contacts and precious metal plating.
5. Panels shall be equipped with 110-style termination made of fire retardant UL 94V0 rated thermoplastic and tin lead solder plated IDC.
6. Panels shall have port identification numbers on both the front and rear of the panel. Front port identification on the 48 port panels shall be located between the rows of jacks.
7. Panels shall have rear cable support bar for strain relief. Cable support bar shall attach to the rear of the patch panel itself without the use of additional fasteners or screws.
8. Panels shall feature vertical panel ID label holders. Provide laser printed adhesive labels.

B. Design Make: Belden Cat6+

PART 3 – INSTALLATION

3.01 COORDINATION

- A. Prior to terminating horizontal cables in rack mounted patch panels meet with the owner's IT staff and service providers to determine exact rack layout.

3.02 GENERAL

- A. Firestop conduit openings after the cable installation is complete.

- B. Separation from Electromagnetic Interference

Condition	Minimum Separation Distance
Unshielded power lines or electrical equipment in proximity to open or nonmetal pathways.	610 mm (24 in)
Unshielded power lines or electrical equipment in proximity to a grounded metal conduit pathway.	305 mm (12 in)
Power lines enclosed in a grounded metal conduit (or equivalent shielding) in proximity to a grounded metal pathway.	152 mm (6 in)
Electrical motors and transformers.	1194 mm (47 in)

- C. Installing cables above suspended ceilings

1. Pull or place cables into the zone pathway.
2. Leave sufficient slack in the ceiling to reach any telecommunications outlet/connector within the zone.

3. Where zone pathways are not provided, divide the floor area into direct-run telecommunications zones.
 4. Run all the cables to the center point of their zones.
 5. From the center point of each zone, distribute the cables to work areas within that zone.
 6. At the center point of each telecommunications zone, support all cables with a cable tie or similar device. Tightly cinched cable ties may have a detrimental effect on transmission performance and should be avoided.
 7. Coil in a figure eight any cable that is not in service back to the end of the zone pathway. When required, cable-tie these coiled cables.
 8. Label the cables and pathways for easy recognition and establish a working database for ongoing identification and maintenance of horizontal cables and pathways.
 9. If a J-hook or trapeze system is used to support cable bundles all horizontal cables shall be supported at a maximum of 48 inch intervals. At no point shall cable(s) rest on acoustic ceiling grids or panels.
- D. Cable raceways shall not be filled greater than the ANSI/TIA/EIA-569-B maximum fill for the particular raceway type.
 - E. Riser rated cable shall be installed in metallic conduit when installed in a plenum space.
 - F. Cables shall be dressed and terminated in accordance with the recommendations made in the ANSI/TIA/EIA-568-C.2 document, manufacturer's recommendations and best industry practices.

3.03 UTP CABLE

- A. Cables shall be dressed and terminated in accordance with the recommendations made in the ANSI/TIA/EIA-568-C.2 document, manufacturer's recommendations and best industry practices.
- B. All wiring concealed in new walls or soffits shall be installed in metal conduits.
- C. Wiring in existing walls with hollow cavities may be installed loose.
- D. All exposed wiring shall be installed in surface metal raceway.
- E. All wiring above ceilings shall be installed in cable tray or open top cable hangers and brackets.
- F. Cable hangers above accessible ceilings shall be installed 4' on center attached to building structure. If cables have more than 12" of sag, install more hangers.
- G. Do not untwist cable pairs more than 0.5 in. when terminating.
- H. The Contractor shall be responsible for replacing all cables that do not pass required bandwidth and throughput tests.
- I. Maximum length shall be 90 meters. (295 ft)
- J. Maximum patch cable shall be 5 meters (16 ft)

- K. Provide 10 ft service loop in the communications equipment room. Provide 3-foot service loop in ceiling above outlet. Slack should not be stored in bundled loops. Cable loops have had a degrading effect on cabling performance. Cable slack should be stored in an extended loop or in a figure-eight configuration to alleviate stress.
- L. Cable shall have no physical defects such as cuts, tears or bulges in the outer jacket. Cables with defects shall be replaced.
- M. Install cable in neat and workmanlike manner. Neatly bundle and tie all cable in closets. Leave sufficient cable for 90o sweeps at all vertical drops.
- N. Do not tie-rap cable to a perpendicular support. Tie-raps shall be used to secure cables to other like cables or to an approved tie mount. Do not over tighten cable ties.
- O. Install category 6 cable in a separate open cable hanger segment. Do not install with coaxial, optical fiber cable or any other cable type. If cables have more than 12" of sag, install more hangers.
- P. Do not install UTP cable with more than 110N (25 lbs) pull force, as specified in EIA/TIA and BICSI TDDM practices. Utilize appropriate cable lubricant in sufficient quantity to reduce pulling friction to acceptable levels on: long pulls inside conduit, pulls of multiple cables into a single small bore conduit, on conduit runs greater than 100 lineal feet with bends of opposing directions, and in conduit runs that exceed 180 degrees of accumulated bends. Use of tensile rated cords (i.e. fishing line) should be used for difficult or questionable pulls - to judge to go/no-go condition of the conduit and pulling setup.
- Q. Care must be taken so that the cable does not bend at any location to a radius less than ten times the diameter of the cable. A cable feeder guide of suitable dimensions should be used between the cable reel and the face of the duct to protect the cable and guide it into the duct as it is payed off the reel.
- R. As the cable is payed off the reel, it should be carefully watched and inspected for sheath defects. If defects are noticed, the pulling operation should be stopped immediately and the Engineer promptly notified of the defect. Kinks and/or other irregularities in the cable sheath should be removed or corrected as directed by the engineer.
- S. A plastic or nylon pull cord with a minimum test rating of 90 Kg (200 lb.) shall be co-installed with all cable installed in any conduit.
- T. Horizontal distribution cables shall be bundled in groups of no more than 50 cables. Cable bundle quantities in excess of 50 cables may cause deformation of the bottom cables within the bundle and degrade cable performance.
- U. Cable shall be installed above fire-sprinkler systems and shall not be attached to the system or any ancillary equipment or hardware. The cable system and support hardware shall be installed so that it does not obscure any valves, fire alarm conduit, boxes, or other control devices.
- V. Cables shall not be attached to ceiling grid or lighting fixture wires. Where support for horizontal cable is required, the Contractor shall install appropriate carriers to support the cabling.
- W. Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the Contractor prior to final acceptance at no cost to the Owner.
- X. Leave a minimum of 12" of slack for twisted pair cables at the outlet. Cables shall be coiled in the in-wall box, surface-mount box or modular furniture raceway if adequate space is present to house the cable coil without exceeding the manufacturers bend radius. In hollow-wall installations where box-

eliminators are used, excess wire can be stored in the wall. Excess slack shall be loosely coiled and stored in the ceiling above each drop location when there is not enough space present in the outlet box to store slack cable.

- Y. Cables shall be neatly bundled and dressed to their respective termination device. Each terminating device shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame.
- Z. Each cable shall be clearly labeled on the cable jacket behind the termination device at a location that can be viewed without removing the bundle support ties. Cables labeled within the bundle, where the label is obscured from view shall not be acceptable.

3.04 UTP MODULAR JACKS

- A. All cables shall be terminated with modular jacks that snap into a faceplate mounted on a wall outlet box, surface raceways or power pole.
- B. Outlet boxes shall be secured to building with mechanical fasteners. Adhesive fasteners are not allowed.
- C. Jacks shall be installed to provide minimal signal impairment by preserving wire pair twists as close as possible to the point of mechanical termination. The amount of untwisted in a pair as a result of termination to the jack shall be no greater than 0.5 inches (13mm).
- D. Jacks shall be installed according to manufacturer's instructions and properly mounted in plates, frames, housings or other appropriate mounting device.
- E. Jacks shall be installed such that cables terminated to the jacks maintain minimum bend radius of at least 4 times the cable diameter into the IDC contacts. Cables shall be terminated on jacks such that there is no tension on the conductors in the termination contacts.
- F. All extra openings to be filled with blank inserts.
- G. Terminate cable per EIA/TIA T-568B standard pin assignments.
- H. Remove only as much cable jacket as is required for termination and trimming. Follow the manufacturer's instructions for mounting, termination, and cable management. Minimize the amount of untwisting in a pair as a result of termination to connecting hardware. For untwisting cabling, maintain pair twists as close as possible to the termination point. The amount of untwisting must not exceed 12.7 mm (0.5 in) for category 5e and higher cables.

3.05 TESTING

- A. Refer to Section 271600.

3.06 COMPLETION AND ACCEPTANCE

- A. In all spaces that have had floor or wall penetrations, hammer drilling, or core boring activities - a through brooming, vacuuming, and wet mopping/sponging shall be preformed. Cleaning shall include floors, walls, ladder trays, tops of cabinets/racks, existing/new passive and active components, per manufacturer recommendations.

- B. Submit copies of the following:
 - 1. Cable Test Reports (at substantial completion).
 - 2. Cable tension reports for optical fiber pulls backbone pulls over 200'.

3.07 PATCH PANELS.

- A. Panels shall be installed to provide minimal signal impairment by preserving wire pair twists as closely as possible to the point of mechanical termination. The amount of untwisting in a pair as a result of termination to the patch panel shall be no greater than 0.5 inches (13 mm)
- B. Panels shall be installed according to manufacturer's instructions and properly mounted to a rack, cabinet, bracket or other appropriate mounting device.
- C. Panels shall be installed such that cables terminated to the panel can maintain minimum bend radius of at least 4 times the cable diameter into the IDC contacts.
- D. Cables shall be terminated on the panels such that there is no tension on the conductors in the termination contacts. Panels shall be properly labeled on front and back with the cable number and port connections for each port, as per cable schedule drawings.
- E. All cables shall be neatly "dressed out" in equipment rooms. Cables to be neatly bundled and dressed to their respective panels or blocks. Each panel or block shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame.
- F. Each cable shall be clearly labeled on the cable jacket behind the patch panel at a location that can be viewed without removing the bundle support ties. Cables labeled within a bundle, where the label is obscured from view shall not be acceptable.
- G. Install factory supplied patch panel labels, in the corresponding T568B configuration, in all UTP patch panels, BEFORE beginning to terminate cables. Cables terminated onto a patch panel without said port label strip shall not be acceptable.
- H. The cable jacket shall be maintained as close as possible to the termination point.

3.08 CEILING TILES

- A. The contractor shall replace all ceiling tiles that are damaged due to cable installation. Tiles shall match the existing.
- B. Prior to beginning work walk the proposed cable routes and document any existing damage with the construction manager.

END OF SECTION 27 1500

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including all General Conditions, Supplementary Conditions, Division 1 specification sections as well as Information to Bidders requirements that are included in the project documents, apply to the work of this Contract

1.02 SCOPE OF WORK

- A. Provide labor, materials, equipment, and services to perform the work required for a complete installation as required in the Contract Documents.
- B. This section includes the minimum requirements for the testing, certification administration and identification of backbone and horizontal cabling, including;
 - 1. Tester Calibrations / Factory Requirements.
 - 2. UTP testing and testers.
 - 3. Fiber Optic testing and Testers
 - 4. Labels and labeling.
 - 5. Reports.
 - 6. Documentation.
 - 7. Record Copy and As-Built.
 - 8. Test Acceptance.
 - 9. Warranty.

1.03 REFERENCES

- A. The products and work herein specified shall comply with the current additions of the following publications and standards.
 - 1. UL - Underwriter Laboratory
 - 2. NEC – National Electric Code
 - a. Article 725
 - b. Article 770
 - c. Article 800
 - 3. NFPA – National Fire Protection Association
 - 4. NECA - Standard of Installation
 - 5. ANSI – American National Standards Institute
 - 6. NEMA – National Electrical Manufactures Association
 - a. Article 250
 - 7. EIA – Electronic Industries Alliance
 - a. ANSI/EIA/TIA 568B.X
 - b. ANSI/EIA/TIA 569A
 - c. ANSI/EIA/TIA 606A
 - d. TIA/EIA-J-STD-037

8. TIA – Telecommunications Industry Association
 9. IEEE C2 National Electrical Safety Code
 10. FCC - Federal Communications Commission
 - a. CFR 68
 11. BICSI – Building Industry Consulting Services International
 - a. Distribution Methods Manual
 - b. ANSK/NECA/BICSI 568
 12. ISO/IEC 11801
- B. If this document and any of the documents listed above are in conflict, then the more stringent requirement shall apply. All documents listed are believed to be the most current releases of the documents. The Contractor has the responsibility to determine and adhere to the most recent release when developing the proposal for installation.

1.04 QUALITY ASSURANCE

- A. All work shall be provided in a neat and workmanlike manner. All methods of construction that are not specifically described or indicated in the contract documents, shall be provided in accordance with industry standards and shall be subject to the control and approval of the Owners representative.
- B. Equipment and materials shall be of the quality and manufactures indicated. The equipment specified is based on the acceptable manufacturers listed. Where "approved equal" is stated, equipment shall be equivalent in everyway to that of the equipment specified, and subject to the approval of the Engineer.
- C. Strictly adhere to all Category 6 (BICSI and TIA) and manufacturer recommended installation practices when installing high performance cabling.
- D. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.
- E. The contractor shall furnish a list of three (3) installations of equivalent or larger systems that have been installed within the past two (2) years and have been operating satisfactorily for a minimum of one year. (Include names and phone numbers of references) with bid.

1.05 SUBMITTALS

- A. Provide manufactures cut sheets, specifications, and installation instructions for the products herein specified.
- B. Cable testers.
- C. Test heads.
- D. Adapter cords.
- E. Latest version of software applicable for each tester planned for use.

- F. Provide written factory calibration recommendation letter and factory recommended field calibration intervals with bid.
- G. Provide signed manufacturer factory calibration certification for each copper and fiber tester owned at time of bid response as a submittal. Certification shall have serial number, date and version of software of each tester.
- H. For each tester planned for use on this project, provide a letter from the tester manufacturer indicating the correct interface adapters and test cords, and set-up procedures required to test perform the Category 6 permanent link and the Category 6, channel tests with the products identified for use on this project and the warranty requirements called for.
- I. Sample documentation from previous job for administration, test results and as-built drawings.
- J. At time of testing, provide a factory calibration certificate for each tester used and include these in each test report binder at the completion of the project.
- K. Test reports (submit prior to substantial completion punch list is performed)
- L. Two copies in binder format and 4 copies on compact disks containing all summary reports, full plot data test results, tester software tools required to view and inspect and print any selection of the test reports, spreadsheets, end to end reports and as built drawings called for at the completion of job.. The database for the completed job shall be stored and delivered on CD including the software tools required to view, inspect, and print any selection of test reports.
- M. Technician certificates for successful completion of training for each of the field testers proposed to be used in this project.
- N. One copy of a binder and two copies on compact disks containing all digital photographs called for at the completion of the job.

PART 2 – PRODUCTS

2.01 UTP TEST EQUIPMENT

- A. Field test instruments shall meet the requirements of ANSI/TIA/EIA-568-C.2.1.
- B. Test equipment used under this contract shall be from manufacturers that have a minimum of 5 years experience in producing field test equipment.
- C. Manufacturers must be ISO 9001 certified.
- D. All test tools of a given type shall be from the same manufacturer, and have compatible electronic results output.
- E. Test adapter cables/test heads must be approved by the manufacturer of the test equipment, for the specific cable and connectivity product used on this project. Adapters from other sources are not acceptable. Obtain written confirmation that the test heads and adapter planned for use are proper and also obtain a written confirmation from the wire and connectivity manufacturers that they also agree with the test heads and adapter selection chosen by the tester manufacturer.
- F. Baseline accuracy of the test equipment must exceed TIA Level III, as indicated by independent laboratory testing.

- G. A level III test unit is required to verify category 6 performance for both Category 6 permanent link and channel performance.
- H. Test equipment must be capable of certifying Category 5, 5e, and 6 links.
- I. Test equipment must have a dynamic range of at least 100 dB to minimize measurement uncertainty.
- J. Test equipment must be capable of storing full frequency sweep data for all tests and printing color graphical reports for all swept measurements.
- K. Test equipment must include S-Band time domain diagnostics for NEXT and return loss (TDNXT and TDRL) for accurate and efficient troubleshooting.
- L. Test equipment must be capable of running individual NEXT, return loss, etc measurements in addition to autotests. Individual tests increase productivity when diagnosing faults.
- M. Test equipment must include a library of cable types by major manufacturer.
- N. Test equipment must store at least 1000 Category 6 or 6 autotests in internal memory.
- O. Test equipment must be able to internally group autotests and cables in project folders for good records management.
- P. Test equipment must include technology for support of advanced measurements.
- Q. Test equipment must make swept frequency measurements in compliance with TIA standards.
- R. The measurement reference plane of the test equipment shall start immediately at the output of the test equipment interface connector. There shall not be a time domain dead zone of any distance that excludes any part of the link from the measurement.
- S. The basic tests required are:
 - 1. Wire Map
 - 2. Length
 - 3. Attenuation
 - 4. NEXT (Near end crosstalk)
 - 5. Return Loss
 - 6. ELFEXT Loss
 - 7. Propagation Delay
 - 8. Delay skew
 - 9. PSNEXT (Power sum near-end crosstalk loss)
 - 10. PSELFEXT (Power sum equal level far-end crosstalk loss)
- T. Shall test cable for compliance with the following applicable standards:
 - 1. TIA Category 6: Permanent Link and Channel
 - 2. TIA Category 3 and 5 per TIA TSB-67: Basic Link or Channel
 - 3. ISO/IEC 11801 and EN 50173 Class C and D: Link
 - 4. ISO/IEC 11801 and EN 50173 Class C and D (new): Permanent Link or Channel
 - 5. Aus/NZ Class C and D: Basic Link or Channel
 - 6. STP cabling, (IBM Type 1, 150 Ω)
 - 7. ANSI TP-PMD IEEE 802.3 10BASE5, 10BASE2: Ethernet with coaxial cabling

8. IEEE 802.3 10BASE-T, 100BASE-TX, 1000BASE-T: Ethernet with twisted pair cabling IEEE 802.5: Token Ring, 4 Mbps or 16 Mbps
- U. Shall perform the following tests as a minimum:
1. NEXT, NEXT @ Remote
 2. Wire Map
 3. Characteristic Impedance
 4. Length
 5. DC Loop Resistance
 6. Propagation Delay Return Loss (RL), RL @ Remote
 7. Delay Skew
 8. Attenuation
 9. Attenuation-to-Crosstalk Ratio (ACR), ACR @ Remote
 10. Power Sum ACR, PSACR @ Remote
 11. ELFEXT, ELFEXT @ Remote
 12. Power Sum ELFEXT, PSELFEXT @ Remote
 13. Power Sum NEXT, PSNEXT @ Remote
- V. Shall use injector for complete wire mapping and TDR for determining cable length.
- W. Shall measure NEXT for all six pair combinations and Attenuation on all four pairs from 1.0 to 350 MHz.
- X. Design Make: Fluke "DSP 4000 or 4300 series"
- Y. Acceptable Manufacturers:
1. Agilent
 2. WaveTek
 3. Lantek
 4. Wirescope

2.02 FIBER OPTIC CABLE

- A. Field test instruments for multimode fiber cabling shall meet the requirements of ANSI/TIA/EIA-526-14-A.
- B. Field test instruments for multimode fiber cabling shall meet the requirements of ANSI/TIA/EIA-526-7.
- C. Multimode optical fiber light source
 1. Provide 850nm and 1300nm +/- 20 nm wavelength LED light sources
 2. Spectral width of sources shall be <= 50nm for 850nm wavelengths and <= 140nm for 1300nm wavelengths.
 3. The output of the light source shall be 8 MW for 62.5um core optical fiber
 4. Output Stability +/- 0.40 dB from 0 to 50 degrees C
 5. Long Term output stability +/- 0.10dB at 25 degrees C
 6. Power shall be from rechargeable Ni-Cad batteries
 7. Connector types shall include: SMA, FC, ST and SC
 8. Design make: Siecor Light source

9. Acceptable Manufacturers:
 - a. Fluke
 - b. Wavetek
 - c. Lantek
 - d. Amp

- D. Single mode optical fiber light source
 1. Provide 1300nm and 1500nm +/- 20 nm wavelength Laser light sources
 2. Output Stability +/- 0.40 dB from 0 to 50 degrees C
 3. Long Term output stability +/- 0.10dB at 25 degrees C
 4. Power shall be from rechargeable Ni-Cad batteries
 5. Connector types shall include: SMA, FC, ST and SC
 6. Design make: Siecor OS-200D
 7. Acceptable Manufacturers:
 - a. Fluke
 - b. Meson
 - c. Amp

- E. Optical Power Meter
 1. Calibrates against the National Institute of Standards and Technology (NIST) standard.
 2. Provide 850nm, 1300nm and 1500nm +/- 20 nm wavelength test capability
 3. Measurement range shall be from 10 to -60 dBm
 4. Accuracy shall be +/- 5% at 0 to -50dBm and +/- 10% 10 to 0dBm and -50 to -60 dBm.
 5. Resolution shall be 0.1 dB
 6. Connector types shall include: SMA, FC, ST and SC
 7. Acceptable Manufacturers:
 - a. Fluke
 - b. Meson
 - c. Amp

- F. Optical Time Domain Reflectometer (OTDR) Only if required troubleshooting existing or newly installed cable.
 1. Dual selectable wavelength: 850/1300 nm for multimode
 2. Dual selectable wavelength: 1310/1550 nm for singlemode
 3. Selectable cable index of refraction.
 4. Visual fault locator for continuity checks and dead zone fault protection.
 5. Display and printer connection for hard-copy documentation
 6. Equipped with launch jumper cable of sufficient length to offset entry "deadzone".
 7. Design make: Siecor
 8. Acceptable Manufacturers:
 - a. Fluke
 - b. Meson
 - c. Amp

2.03 LABELS

- A. Shall meet the legibility, defacement, exposure and adhesion requirements of UL 969.
- B. Shall be preprinted or laser printed type. Handwritten labels are not acceptable.

- C. Where used for cable marking provide vinyl substrate with a white printing area and a clear “tail” that self laminates the printed area when wrapped around the cable. If cable jacket is white, provide cable label with printing area that is any other color than white, preferably orange or yellow – so that the labels are easily distinguishable.
- D. Where insert type labels are used provide clear plastic cover over label.
- E. Provide plastic tape 6 inches wide continuously printed and bright colored 18” above all direct buried services.
- F. Provide engraved plastic laminated labels, signs and instruction plates. Labels shall be made of engraving stock melamine plastic laminate. Use 1/16” minimum for signs up to 20 square inches or 8 inches in length. Use 1/8” thick for larger sizes. All labels shall be punched for mechanical fastening.
- G. Acceptable Manufacturers:
 - 1. W.H. Brady
 - 2. Panduit
 - 3. Ideal

PART 3 – EXECUTION

3.01 GENERAL

- A. Upon completion of the installation, the telecommunications contractor should provide three (3) full documentation sets to the Engineer for approval.
- B. Documentation should be submitted within ten (10) working days of the completion of each testing phase (e.g. subsystem, cable type, area, floor, etc.). This is inclusive of all test results and draft as-built drawings. Draft drawings may include annotations done by hand. Machine-generated (final) copies of all drawings should be submitted within 30 working days of the completion of each testing phase. At the request of the Engineer, the telecommunications contractor should provide copies of the original test results.
- C. The Engineer may request that a 10% random field re-test be conducted on the cable system, at no additional cost, to verify documented findings. Tests should be a repeat of those defined above. If findings contradict the documentation submitted by the telecommunications contractor, additional testing can be requested to the extent determined necessary by the Engineer, including a 100% re-test. This re-test should be at no additional cost to the Owner
- D. Test documentation should be provided on disk within three (3) weeks after the completion of the project. The disk should be clearly marked on the outside front cover with the words “Project Test Documentation”, the project name, and the date of completion (month and year). The results should include a record of test frequencies, cable type, conductor pair and cable (or outlet) I.D., measurement direction, reference setup, and crew member name(s). The test equipment name, manufacturer, model number, serial number, software version and last calibration date will also be provided at the end of the document. Unless the manufacturer specifies a more frequent calibration cycle, an annual calibration cycle is anticipated on all test equipment used for this installation. The test document should detail the test method used and the specific settings of the equipment during the test as well as the software version being used in the field test equipment

3.02 COPPER CABLE TEST

- A. A level III test unit is required to verify category 6 performance, shall be updated with the latest version of tester software at time of testing and shall be factory tested/calibrated within one of time of testing. At time of testing, provide a factory calibration certificate for tester used and include these in each test report binder at the completion of the project.
- B. Visually inspect all cables, cable reels, and shipping cartons to detect possible cable damage incurred during shipping and transport. Visibly damaged goods are to be returned to the supplier and replaced at no additional cost to the Owner.
- C. If post-manufacture performance data has been supplied by the manufacturer of cables or connecting hardware, copies of such data are to be kept for inclusion in the Documentation for final Record Copy deliverables and made available to the Owner upon request
- D. Test 100% of installed backbone copper cabling for
 - 1. Wire Map
 - 2. Length

3.03 100 OHM UTP CABLE TESTING

- A. All cables and termination hardware shall be 100% tested for defects in installation and to verify cabling system performance under installed conditions according to the requirements of ANSI/TIA/EIA-568-B.
- B. All pairs of each installed cable shall be verified prior to system acceptance. Any defect in the cabling system installation including but not limited to cable, connectors, feed through couplers, patch panels, and connector blocks shall be repaired or replaced in order to ensure 100% useable conductors in all cables installed.
- C. The testing parameters called for in this section shall apply for up to 90 meters of horizontal cable, a work area equipment cord, an RJ45 outlet and 2 cross connect connections in the closet.
- D. Wire Map
 - 1. The wire map test shall verify pair to pin termination at each end and check for connectivity errors. The wire map shall indicate the following for each of the eight conductors:
 - a. Continuity to the remote end
 - b. Shorts between any two or more conductors
 - c. Crossed pairs or Reversed Pairs
 - d. Split Pairs
 - e. Any other miswiring
- E. Performance
 - 1. Cables shall be tested for conformance called for in Section 271500.

F. Data reporting and accuracy

1. General: a Pass or Fail result for each parameter shall be determined by the allowable limits for each parameter. If the test result of a parameter is closer to the test limit than the accuracy of the tester it shall be marked with an asterisk. Data at all measured points shall be uploaded to a P.C. and printed on a laser printer.
2. Wire Map: Wire map tests shall be marked "Pass" if wiring is determined correct.
3. Length: Test results shall be provided in meters and marked "Pass or Fail" based on the length vs. allowable length.
4. Attenuation: Report the attenuation value and the frequency at point of failure or the highest frequency passed. Measured attenuation values lower than 3dB used for a pass/fail determination. Report the attenuation per unit length for links longer than 15 meters. Attenuation shall be measured from 1 MHz to 16 Mhz (Category 3) or 100 Mhz (Category 5) in 1 MHz steps.
5. NEXT: Report the NEXT value and "pass or fail" for samples based on the following

Frequency Range (MHz)	Maximum Step Size (MHz)
1-31.35	0.15
>31.25-100	0.25
6. Submit copies in binder format and 4 copies on compact disks containing all summary reports, full plot data test results, tester software tools required to view and inspect and print any selection of the test reports, spreadsheets, end to end reports and as built drawings called for at the completion of job.

3.04 OPTICAL FIBER CABLE TESTING

- A. All fiber testing shall be performed on all fibers in the completed end to end system.
- B. Comply with Tier-two testing as defined in TSB-140. which included loss and length testing with an optical loss test set (OLTS) and also an OTDR trace of the installed cable plant. By incorporating the proposed two-tier testing method, installers have the most complete picture of the fiber installation and network owners have proof of a quality installation
- C. Testing shall consist of an end to end power meter test performed per EIA/TIA-455-53A. The system loss measurements shall be provided at 850 and/or 1300 nanometers for multimode fibers and 1310 and/or 1550 nanometers for single mode fibers. These tests also include continuity checking of each fiber.
- D. There shall be no splices unless clearly called for.
- E. Test all fibers with launch and far end cable of sufficient length for the OTDR to be able to see through all installed connectors.
- F. Localized attenuation shall not exceed 0.5 dB at any point.
- G. Backbone multimode fiber shall be tested in both directions at both 850nm and 1300 nm in accordance with ANSI/EIA/TIA-526-14A method B.

- H. Backbone single mode fiber shall be tested in both directions at both 1310nm and 1550.
- I. Backbone multimode fiber cabling shall be tested at both 850 nm and 1300 nm (or 1310 and 1550 nm for single mode) in both directions.
- J. Test set-up and performance shall be conducted in accordance with ANSI/EIA/TIA-526-14 Standard, Method B.
- K. Where links are combined to complete a circuit between devices, the Contractor shall test each link from end to end to ensure the performance of the system. ONLY BASIC LINK TEST IS REQUIRED. The contractor can optionally install patch cords to complete the circuit and then test the entire channel. The test method shall be the same used for the test described above. The values for calculating loss shall be those defined in the ANSI/TIA/EIA Standard.
- L. Attenuation testing shall be performed with a stable launch condition using two-meter jumpers to attach the test equipment to the cable plant. The light source shall be left in place after calibration and the power meter moved to the far end to take measurements.
- M. Backbone Cable
 - 1. Test the cable on the reel for continuity before installing it, to insure no damage was done in shipment from the manufacturer to the job site.
 - 2. After installation and termination, test each segment of the cable plant individually as it is installed, to insure each connector and cable is good.
 - 3. Link attenuation is the only required field test except for the patched runs in the campus backbone system where an OTDR test will be required. Use launch cables at each end and provide print outs showing all connectors. OTDR will also be required to determine bad connections or damage when the link attenuation test fails.
 - 4. Maximum localized attenuation allowed is 2dB.
 - 5. Backbone multimode fiber shall be tested in both directions at both 850nm and 1300 nm in accordance with ANSI/EIA/TIA-526-14A method B.
 - 6. Backbone single mode fiber shall be tested in both directions at both 1310nm and 1550 nm in accordance with ANSI/EIA/TIA-526-14A method A.1.

7. Multimode fiber shall conform to the following:

850 nm:

Length (meters)	Attenuation (dB)
500	3.5
1000	5.5
1500	7.5
2000	9.0

1300 nm:

Length (meters)	Attenuation (dB)
500	2.2
1000	3.0
1500	3.8
2000	4.5

8. Single Mode Fiber shall conform to the following (note: taken at

Length (meters)	Attenuation (dB)
500	2.0
1000	2.5
1500	3.0
2000	3.5
2500	4.0
3000	4.5

Outside:

Length (meters)	Attenuation (dB)
500	1.8
1000	2.0
1500	2.2
2000	2.5
2500	2.8
3000	3.0

- N. Provide attenuation and cable length test results for all installed cable pairs.

3.05 TEST DOCUMENTATION

- A. Test report documentation shall be provided in a three ring binder(s) and CD's within 1 week after the completion of the project. The binder and disks shall be clearly marked on the outside front cover and spine with the words "Test Results", the project name, and the date of completion (month and year).
- B. The binder and electronic folder/files shall be divided by major heading tabs (or in the case of electronic files, be placed into a folders structure similar to the hardcopy tests of this section).
- C. Major heading tabs (folders) shall be divided into Horizontal and Backbone. Each shall be further sectioned by test type and by CER and rack. Additional tabs for summary reports by CER shall also be provided.

3.06 IDENTIFICATION & RECORDS

A. Pathways

1. Cable hanger runs – provide an as built drawing indicating cable hanger routing throughout the facility.

B. Cables

1. Cables shall be marked at each endpoint and at all intermediate pull or junction boxes. Label cables as called for on drawings.
2. Provide written records in computer generated, table format for all cables, with the as-built drawings. The table shall include the following information:
 - a. Cable Identifier
 - b. Cable type
 - c. Length
 - d. Room number

C. Station Outlets

1. Provide 606 insert with clear plastic label cover on faceplates.
2. Provide a laser printed label in the insert.
3. Provide laser printed adhesive labels on station outlets in surface metal raceway.
4. Label shall have the following designation: IDF-Patch Panel- Port Number eg. 1B24
5. Write the cable identifier of each cable in permanent marker on the inside of each faceplate.

D. Patch Panels

1. Label patch panels with laser printed adhesive markers
2. Each panel shall be labeled using a Letter designation Access Point A, B etc.
3. Each patch panel port shall be identified with the room number that the station outlet is located in.

3.07 AS-BUILT DRAWINGS

- A. Provide as-built drawings showing all pathways, Station outlets, equipment rooms and entrance facilities on 1/8 scale floor plans.
- B. AutoCAD plans with original cable locations will be furnished for use with as built drawings.

END OF SECTION 27 1600

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.
- B. The work covered by this section is to be coordinated with related work as specified elsewhere in the specifications. Requirements of the following sections apply:
 - 1. 26.00 Electrical
 - 2. 26.05 Common Work Results for Electrical
 - 3. 21.10 Water-Based Fire-Suppression System
 - 4. 21.22 Clean Agent Fire Extinguishing Systems
 - 5. 23.00 Heating, Ventilating, and Air-Conditioning (HVAC)
 - 6. 25.00 Integrated Automation
- C. The system and all associated operations shall be in accordance with the following:
 - 1. 2020 New York State Building and Fire Codes
 - 2. NFPA 72, National Fire Alarm Code
 - 3. NFPA 70, National Electrical Code
 - 4. NFPA 101, Life Safety Code,
 - 5. NFPA 90A, Standard for the Installation of Air Conditioning and Ventilating Systems
 - 6. ANSI/ASME A17.1 / CSA B44, Safety Code for Elevators and Escalators
 - 7. ICC/ANSI A117.1 Accessible and Useable Buildings and Facilities,
 - 8. Local Jurisdictional Adopted Codes and Standards
 - 9. ADA Accessibility Guidelines

1.02 SUMMARY

- A. This Section covers fire alarm systems, including initiating devices, notification appliances, controls, and supervisory devices.
- B. All equipment must be from JCI/Simplex and integrated into the existing Simplex 9100ES fire alarm system. Contact Mr. Karl Bach 1399 Vischer Ferry Rd, Clifton Park, NY 12065 USA; Tel: 518-952-6040 | Direct: 518-952-6043
- C. Work covered by this section includes the furnishing of labor, equipment, and materials for modification of the fire alarm system as indicated on the drawings and specifications.

1.03 DEFINITIONS

- A. ADA: Americans with Disabilities Act
- B. AHJ: Authority Having Jurisdiction
- C. ANSI: American National Standards Institute
- D. ASME: American Society of Mechanical Engineers
- E. FACP: Fire Alarm Control Unit
- F. FM: Factory Mutual
- G. IBC: International Building Code

- H. ICC: International Code Council
- I. IDC: Initiating Device Circuit
- J. IEEE: Institute of Electrical and Electronic Engineers
- K. IFC: International Fire Code
- L. IMC: International Mechanical Code
- M. IRI: Industrial Risk Insurers
- N. LED: Light-emitting diode.
- O. NAC: Notification Appliance Circuit
- P. NFPA: National Fire Protection Association
- Q. NICET: National Institute for Certification in Engineering Technologies.
- R. RAC: Releasing Appliance Circuit
- S. SLC: Signaling Line Circuit
- T. UL: Underwriters Laboratories
- U. ULC: Underwriters Laboratories, Canada

1.04 SCOPE OF WORK

- A. Provide modifications to the existing Simplex 4100ES fire alarm system per the electrical drawings.

1.05 SYSTEM DESCRIPTION

- A. General: Provide initiating devices, notification appliances, and monitoring and control devices as indicated on the drawings and as specified herein.
- B. Wiring/Signal Transmission:
 - 1. Transmission shall be hard-wired using separate individual circuits for each zone of alarm operation, as required or addressable signal transmission, dedicated to fire alarm service only.
 - 2. System connections for initiating device circuits shall be B, Style D, signaling line circuits shall be Class B, Style 4 and notification appliance circuits shall be Class B, Style Y.

1.06 SUBMITTALS

- A. General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.
- B. Product data sheets for system components highlighted to indicate the specific products, features, or functions required to meet this specification. Alternate or as-equal products submitted under this contract must provide a detailed line-by-line comparison of how the submitted product meets, exceeds, or does not comply with this specification.
- C. Wiring diagrams from manufacturer.
- D. Shop drawings showing system details including location of FACP, all devices, circuiting and details of graphic annunciator.
- E. System operation description including method of operation and supervision of each type of circuit and sequence of operations for all manually and automatically initiated system inputs and outputs. A list of all input and output points in the system shall be provided with a label indicating location or use of IDC, SLC, NAC, relay, sensor, and auxiliary control circuits.

- F. Operation and maintenance data for inclusion in Operating and Maintenance Manual. Include data for each type product, including all features and operating sequences, both automatic and manual. Provide the names, addresses, and telephone numbers of service organizations.
- G. Product certification signed by a certified representative of the manufacturer of the fire alarm system components certifying that their products comply with indicated requirements.
- H. Record of field tests of system.

1.07 QUALITY ASSURANCE

- A. Installer Qualifications: A factory authorized installer is to perform the work of this section.
- B. Each and every item of the Fire Alarm System shall be listed under the appropriate category by a Nationally Recognized Testing Laboratory and shall bear the respective "NRTL" label.

1.08 PROJECT CONDITIONS

- A. Interruption of Existing Fire-Alarm Service: Do not interrupt fire-alarm service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary guard service according to requirements indicated:
- B. Notify Architect no fewer than two days in advance of proposed interruption of fire-alarm service.
- C. Do not proceed with interruption of fire-alarm service without Architect's written permission.

1.09 SEQUENCING AND SCHEDULING

- A. Existing Fire-Alarm Equipment: Maintain existing equipment fully operational until new equipment has been tested and accepted. As new equipment is installed, label it "NOT IN SERVICE" until it is accepted. Remove labels from new equipment when put into service and label existing fire-alarm equipment "NOT IN SERVICE" until removed from the building.
- B. Equipment Removal: After acceptance of new fire-alarm system, remove existing disconnected fire-alarm equipment and wiring.

PART 2 - PRODUCTS

2.01 ACCEPTABLE EQUIPMENT AND SERVICE PROVIDERS

- A. Manufacturers: The equipment and service described in this specification are those supplied and supported by Johnson Controls and represent the base bid for the equipment.
- B. Subject to compliance with the requirements of this specification, provide products by one of the following:
 - 1. Simplex, a Johnson Controls Company

2.02

SYSTEMS OPERATIONAL DESCRIPTION

- A. Fire-alarm signal initiation shall be by one or more of the following devices and systems:
1. Manual stations.
 2. Heat detectors.
 3. Smoke detectors.
 4. Duct smoke detectors.
 5. Verified automatic alarm operation of smoke detectors.
 6. Automatic sprinkler system water flow.
 7. Fire-extinguishing system operation.
- B. Fire-alarm signal shall initiate the following actions as required:
1. Continuously operate alarm notification appliances.
 2. Identify alarm at fire-alarm control unit and remote annunciators.
 3. Transmit an alarm signal to the remote alarm receiving station.
 4. Unlock electric door locks in designated egress paths.
 5. Release fire and smoke doors held open by magnetic door holders.
 6. Activate voice/alarm communication system.
 7. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
 8. Activate smoke-control system (smoke management) at firefighter smoke-control system panel.
 9. Close smoke dampers in air ducts of designated air-conditioning duct systems.
 10. Recall elevators to primary or alternate recall floors.
 11. Activate emergency lighting control.
 12. Activate emergency shutoffs for gas and fuel supplies.
 13. Record events in the system memory.
 14. Record events by the system printer.
- C. Supervisory signal initiation shall be by one or more of the following devices and actions:
1. Valve supervisory switch.
 2. Low-air-pressure switch of a dry-pipe sprinkler system.
- D. System trouble signal initiation shall be by one or more of the following devices and actions:
1. Open circuits, shorts, and grounds in designated circuits.
 2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
 3. Loss of primary power at fire-alarm control unit.
 4. Ground or a single break in fire-alarm control unit internal circuits.
 5. Abnormal AC voltage at fire-alarm control unit.
 6. Break in standby battery circuitry.
 7. Failure of battery charging.
 8. Abnormal position of any switch at fire-alarm control unit or annunciator.
 9. Fire-pump power failure, including a dead-phase or phase-reversal condition.
- E. System Trouble and Supervisory Signal Actions: Initiate notification appliance and annunciate at fire-alarm control unit and remote annunciators. Record the event on system printer where provided.

2.03 ADDRESSABLE INITIATING

A. ADDRESSABLE MANUAL PULL STATIONS

1. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.
2. Description: Addressable single action type, red LEXAN. Station shall mechanically latch upon operation and remain so until manually reset by opening with a key common with the control units. Station shall be pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit. Where double-action stations are provided, the mechanism shall require two actions push top activation door to initiate an alarm.
3. Provide with a front showing red LED showing that will flash each time it is scanned by the Control Unit (once every 4 seconds). In alarm condition, the station LED shall be on steady.
4. Indoor Protective Shield: Where required, or as indicated on the drawings, provide a factory-fabricated, tamperproof, clear LEXAN enclosure shield and red frame that easily fits over manual pull stations which shall be hinged at the top to permit lifting for access to initiate a local alarm. Unit shall be NRTL listed.

B. ADDRESSABLE ANALOG SMOKE SENSORS

1. General Requirements for System Smoke Detectors:
 - a. Comply with UL 268, "Smoke Detectors for Fire Protective Signaling Systems." Include the following features:
 - b. Factory Nameplate: Serial number and type identification.
 - c. Operating Voltage: 24 VDC, nominal and shall be two-wire type.
 - d. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore normal operation.
 - e. Each sensor base shall contain a magnetically actuated test switch to provide for easy pre-certification alarm testing at the sensor location.
 - f. Each sensor shall be scanned by the Control Unit for its type identification to prevent inadvertent substitution of another sensor type. Upon detection of a "wrong device", the control unit shall operate with the installed device at the default alarm settings for that sensor; 2.5% obscuration for photoelectric sensor, 135-deg F and 15-deg F rate-of-rise for the heat sensor, but shall indicate a "Wrong Device" trouble condition.
 - g. Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at fire-alarm control unit for calibration, sensitivity, and alarm condition and individually adjustable for sensitivity by fire-alarm control unit. Provide multiple levels of detection sensitivity for each sensor.
 - h. Environmental compensation, programmable sensitivity settings, status testing, and monitoring of sensor dirt accumulation for the duct smoke sensor shall be provided by the FACP.
 - i. The sensor's electronics shall be immune from nuisance alarms caused by EMI and RFI. Removal of the sensor head for cleaning shall not require the setting of addresses.
 - j. Bases: CO Sensor, relay output, sounder and isolator bases shall be supported alternatives to the standard base.

2. Addressable Sensor Bases
 - a. Standard base - Twist lock addressable base with address selection DIP switch accessible from front with sensor removed. Integral red LED for power-on (pulsing), or alarm or trouble (steady on). Locking anti-tamper design mounts on standard outlet box.
 - b. Sensor Base with remote device connection - All standard base features with wired connection for either a Remote LED alarm indicator or remote relay (relay is unsupervised and requires separate 24VDC)
 - c. Supervised Relay Bases - All standard base features and shall be available in either a 4-Wire Sensor Base to use with remote or locally mounted relay; requires separate 24 VDC, or as a 2-Wire Sensor Base to use with remote or locally mounted relay; no separate power required. Supervised relay operation shall be programmable and shall be manually operated from control panel.
 - d. Sensor base with built-in electronic alarm sounder - All standard base features and piezoelectric sounder shall provide high output (88 dBA) with low current requirements (20 mA). Sounder shall be synchronized via SLC communications or by the NAC if NAC powered, sounder shall operation shall be programmable and shall be manually operated from control panel.
 - e. 520 Hz Sensor base with built-in electronic low frequency sounder - All standard base features and piezoelectric sounder shall provide a low frequency 520 Hz Square Wave (85 dBA) with nominal current requirements (115 mA). Sounder shall be synchronized via SLC communications or by the NAC if NAC powered, sounder operation shall be programmable and shall be manually operated from control panel.
 1. Emitted tone shall be a 520Hz Square Wave signal in compliance with the requirements of the 2010 edition of NFPA 72 for sleeping areas.
 2. The 520Hz Sounder base shall be listed to UL 268 and UL464, Audible Signal Appliances.

C. ADDRESSABLE DUCT SMOKE SENSOR

1. Standard Addressable Duct Smoke Sensor Unit. Photoelectric type, with sampling tube of design and dimensions as recommended by the manufacturer for the specific duct size and installation conditions where applied. Duct housing shall include relay or relay driver as required for fan shutdown.
 - a. Environmental compensation, programmable sensitivity settings, status testing, and monitoring of sensor dirt accumulation for the duct smoke sensor shall be provided by the FACP.
 - b. The Duct Housing shall provide a supervised relay driver circuit for driving up to 15 relays with a single "Form C" contact rated at 7A@ 28VDC or 10A@ 120VAC. This auxiliary relay output shall be fully programmable independent of the sensor head for activation by other alarm initiating devices within the fire alarm system. Relay shall be mounted within 3 feet of HVAC control circuit.
 - c. Duct Housing shall provide a magnetic test area and Red sensor status LED and Duct Housing shall provide a relay control Yellow LED trouble indicator.
 - d. Duct Housing shall have a transparent cover to monitor for the presence of smoke. Cover shall secure to housing by means of four (4) captive fastening screws.
 - e. Duct Housing shall provide two (2) Test Ports for measuring airflow and for testing. These ports will allow aerosol injection in order to test the activation of the duct smoke sensor.
 - f. For maintenance purposes, it shall be possible to clean the duct housing sampling tubes by accessing them through the duct housing front cover.

- g. Each duct smoke sensor shall be provided with a Remote Test Station with an alarm LED and test switch.
 - h. Where indicated provide a NEMA 4X weatherproof duct housing enclosure that shall provide for the circulation of conditioned air around the internally mounted addressable duct sensor housing to maintain the sensor housing at its rated temperature range. The housing shall be UL Listed to Standard 268A.
2. Addressable In-Duct Mounted Smoke Sensors. Photoelectric type, for applications with controlled dust and humidity providing HVAC duct smoke sensing where sampling tube designs are not appropriate. In-Duct housing shall include relay or relay driver as required for fan shutdown.
- a. Shall accommodate duct airflow from 0 to 4000 ft/min (0 to 1220 m/min), and provide environmental compensation, programmable sensitivity settings, status testing, and monitoring of sensor dirt accumulation for the duct smoke sensor by the FACP.
 - b. The In-Duct Housing shall provide a supervised relay driver circuit for driving up to 15 relays with a single "Form C" contact rated at 7A@ 28VDC or 10A@ 120VAC. This auxiliary relay output shall be fully programmable independent of the sensor head for activation by other alarm initiating devices within the fire alarm system. Relay shall be mounted within 3 feet of HVAC control circuit.
 - c. Standard models shall be for rectangular ducts from 6" (152 mm) square to 36" (914 mm) square with optional adapters available to allow use with round ducts of 6", 8" (203 mm), 10" (254 mm) or 12" (305 mm) in diameter.
 - d. In-Duct Housing shall provide a magnetic test area and Red sensor status LED and In-Duct Housing shall provide a relay control Yellow LED trouble indicator.
 - e. Duct Housing shall have a transparent cover to monitor for the presence of smoke. Cover shall secure to housing by means of four (4) captive fastening screws.
 - f. Each duct smoke sensor shall be provided with a Remote Test Station with an alarm LED and test switch.
3. Addressable Air Aspirating Duct Smoke Sensors. Photoelectric type smoke detection with an aspirating system shall provide remote sensor location for ducts with difficult service access. Detectors shall support remote housing up to 82ft with 1.05" OD rigid pipe; detectors shall support remote housing up to 50ft with 3/4" OD flexible tubing. Sampling tubes shall be provided per design and dimensions as recommended by the manufacturer for the specific duct size and installation conditions where applied. Duct Detection system shall be UL listed to Standards 268A, and ULC listed to Standard S529.
- a. Environmental compensation, programmable sensitivity settings, status testing and monitoring of sensor dirt accumulation for the duct smoke sensor shall be provided by the FACP.
 - b. The Air Aspirating duct detection system shall supervise air flow through the duct housing and shall communicate trouble to the fire alarm control unit on a high or low air flow condition.
 - c. The Air Aspirating Duct Housing shall provide a supervised relay driver circuit for driving up to 15 relays with a single Form C contact rated at 7A@ 28VDC and 120VAC. This auxiliary relay output shall be fully programmable. Relay shall be mounted within 3 feet of HVAC control circuit.
 - d. Air Aspirating Duct Housing shall provide a magnetic test area and Red sensor status LED.
 - e. Each duct smoke sensor shall have a Remote Test Station with an alarm LED and test switch.
 - f. Each duct housing shall have remote functional smoke testing capability.
 - g. Each duct housing shall be supplied with a replacement air inlet filter.

- h. Each duct housing shall have an optional water trap with a ball valve for draining to eliminate moisture buildup.
- i. The Air Aspirating Detection system shall have an operating air velocity range of 0 to 4000 linear ft/minute) 0 to 1220 meters/minute.
- j. The Addressable Air Aspirating Detection system shall be capable of use in other areas as open area detection where point type detectors are not practical, such as; prison cells in correctional facilities, transformer vaults, cable tunnels and MRI rooms.

D. ADDRESSABLE HEAT SENSORS

1. General Requirements for Heat Detectors: Comply with UL 521.
2. Thermal Sensor Combination type: Fixed-temperature and rate-of-rise unit with plug-in base and alarm indication lamp; Actuated by either a selected fixed temperature or a rate of rise that exceeds a preset amount per minute unless otherwise indicated.
3. Thermal sensor shall be of the epoxy encapsulated electronic design. It shall be thermistor-based, rate-compensated, self-restoring and shall not be affected by thermal lag. Selectable rate compensated, fixed temperature sensing with or without rate-of-rise operation.
4. Mounting: Twist-lock base interchangeable with smoke-sensor heads.
5. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
6. Sensor fixed temperature sensing shall be independent of rate-of-rise sensing and programmable to operate at 135-deg F or 155-deg F Sensor rate-of-rise temperature detection shall be selectable at the FACP for either 15-deg F or 20-deg F per minute.
7. Sensor shall have the capability to be programmed as a utility monitoring device to monitor for temperature extremes in the range from 32-deg F to 155-deg F.
8. Unless otherwise indicated, sensors shall be analog-addressable type, individually monitored at fire-alarm control unit for calibration, sensitivity, and alarm condition and individually adjustable for temperature by fire-alarm control unit.
 - a. Rate-of-rise temperature characteristic shall be selectable at fire-alarm control unit for 15 or 20 deg F (8 or 11 deg C) per minute.
 - b. Fixed-temperature sensing shall be independent of rate-of-rise sensing and shall be settable at fire-alarm control unit
 - c. The CO Sensor shall be an addressable carbon monoxide (CO) sensing module providing both CO toxic gas detection and enhanced fire detection, and shall be listed to UL 268, Smoke Detectors for Fire Alarm Signaling Systems and UL 2075, Gas and Vapor Detectors and Sensors; allowing systems to be listed to UL 2034, Single and Multiple Station Carbon Monoxide Alarms.
 - d. The CO Sensor shall include CO sensor element mounted in the sensor base which can be easily replaced without replacing the complete sensor base assembly.
 - e. The CO Sensor base shall provide address selection in the base allowing the address to remain with its location when the sensor is removed for service or type change.
 - f. The CO Sensor base shall include an integral red LED to indicate the power-on, trouble, test mode or alarm status.

- g. CO sensor shall provide enhanced fire detection with the addition of two selectable modes of operation: Nuisance Alarm Reduction Mode and Faster Fire Detection.
 - h. The CO Sensor shall provide a 10-year life expectancy before replacement is necessary or required.
 - i. The CO Sensor base shall report the following CO Sensor troubles: Communication loss, Disabled, Almost Expired 12 Months, Almost Expired 6 Months, Expired (End of Life), and Sensor Missing/Failed.
9. Addressable CO Sensor Sounder Base
- a. The CO Sensing element shall support operation with a Sounder base; the CO Sensor Sounder base shall provide temporal code 3 (TC3) for fire, or temporal code 4 (TC4) for toxic carbon monoxide alarms.
 - b. The CO Sensor Sounder base shall be listed to UL464, Audible Signal Appliances.
 - c. CO sensor shall provide enhanced fire detection with the addition of two selectable modes of operation: Nuisance Alarm Reduction Mode and Faster Fire Detection.
 - d. The CO Sensor Sounder Base shall include CO sensor element mounted in the sounder base which can be easily replaced without replacing the complete sensor base assembly.
 - e. The CO Sensor Sounder base shall provide address selection in the base allowing the address to remain with its location when the sensor is removed for service or type change.
 - f. The CO Sensor Sounder Sensor base shall include an integral red LED to indicate the power-on, trouble, test mode or alarm status.
 - g. The CO Sensor Sounder base shall report the following CO Sensor troubles: Communication loss, Disabled, Almost Expired 12 Months, Almost Expired 6 Months, Expired (End of Life), and Sensor Missing/Failed.
 - h. The CO Sensor Sounder Base shall be interchangeable with the CO Sensor 520 Hz Sounder Base.
10. Addressable CO Sensor 520 Hz Sounder Base
- a. The CO Sensing element shall support operation with a 520 Hz Sounder base; the 520 Hz CO Sounder base shall provide temporal code 3 (TC3) for fire, or temporal code 4 (TC4) for toxic carbon monoxide alarms.
 - b. Emitted tone shall be a 520Hz Square Wave signal in compliance with the requirements of the 2010 edition of NFPA 72 for sleeping areas.
 - c. The CO Sensor 520Hz Sounder base shall be listed to UL 268 and UL464, Audible Signal Appliances.
 - d. CO sensor shall provide enhanced fire detection with the addition of two selectable modes of operation: Nuisance Alarm Reduction Mode and Faster Fire Detection.
 - e. The CO Sensor 520 Hz Sounder Base shall include CO sensor element mounted in the sounder base which can be easily replaced without replacing the complete sensor base assembly.
 - f. The CO Sensor 520 Hz Sounder base shall provide address selection in the base allowing the address to remain with its location when the sensor is removed for service or type change.
 - g. The CO Sensor 520 Hz Sounder base shall include an integral red LED to indicate the power-on, trouble, test mode or alarm status.
 - h. The CO Sensor 520 Hz Sounder base shall report the following CO Sensor troubles: Communication loss, Disabled, Almost Expired 12 Months, Almost Expired 6 Months, Expired (End of Life), and Sensor Missing/Failed.
 - i. The CO Sensor 520 Hz Sounder Base shall be interchangeable with the standard CO Sensor Sounder Base.

E. ADDRESSABLE MULTI-POINT/MULTI-SENSOR/MULTI-CRITERIA SENSOR

1. Smoke and heat sensing shall be available to be combined in a single housing to provide smoke activity accurately monitored by photoelectric sensing technology and thermal activity accurately monitored by thermistor sensing technology.
2. A correlation algorithm of smoke activity and thermal activity shall be provided for intelligent fire detection earlier than with either technology activity alone but shall provide software and programming capabilities to help reduce nuisance alarms.
3. Individual sensor information shall be processed by the host fire alarm control unit to determine sensor status and to determine whether conditions are normal, off-normal, or alarm.
4. Analog information from each sensor type shall be digitally communicated to the control panel where it is to be analyzed. Photoelectric sensor input is to be stored and tracked as an average value with an alarm or abnormal condition being determined by comparing the sensor's present value against its average value. Thermal data is to be processed to look for absolute or rate-of-rise temperature as desired.
5. Monitoring each photoelectric sensor's average value shall provide a software filtering process that compensates for environmental factors (dust, dirt, etc.) and component aging, which shall provide an accurate reference for evaluating new activity. The intent of this process is to be a significant reduction in the probability of false or nuisance alarms caused by shifts in sensitivity, either up or down. Status indications of dirty and excessively dirty shall be automatically generated allowing maintenance to be performed on a per device basis.
6. Peak activity per sensor shall be stored by the host fire alarm control unit to assist in evaluating specific locations where the alarm set point for each sensor shall be capable of being determined at the control panel, and selectable as more or less sensitive as the individual application requires.
7. Alarm set points shall be programmed for timed automatic sensitivity selection (such as more sensitive at night, less sensitive during day). Control panel programming shall also provide multi-stage operation per sensor, for example a 0.2% level may cause a warning to prompt investigation while a 2.5% level may initiate an alarm.
8. Combination smoke and heat sensors Rate-of-rise temperature characteristic shall be selectable at fire-alarm control unit for 15 or 20 deg F (8 or 11 deg C) per minute. The fixed-temperature sensing shall be independent of rate-of-rise sensing and shall be settable at fire-alarm control unit to operate at 135 or 155 deg F (57 or 68 deg C).
9. Bases: CO Sensor, relay output, sounder, 520 Hz Sounder, and isolator bases shall be supported alternatives to the standard base.
 - a. Air Sampling Pipe Network: Shall consist of a ¾ inch nominal inside diameter pipe arranged to provide optimal efficiency and air transport times which shall not exceed 60 seconds from the furthest point on the network. Sampling points shall be separated at intervals specified in NFPA 72; not more than 30 feet and typically in the range of 13 to 26-foot intervals along the path of the piping network. Air sampling calculations shall be provided from a registered VESDA sampling pipe aspiration modeling program ASPIRE rev.2.04 or later.

10. High Level Interface: Where VESDAnet is used, provide compatible fire alarm control unit interface module integral to the Fire Alarm Control Unit with connection to the High-Level Interface Module and installed in the VESDAnet equipment rack assembly.

2.04 NOTIFICATION

- A. Strobe lights shall meet the requirements of the ADA, UL Standard 1971, be fully synchronized, and shall meet the following criteria:
 1. The maximum pulse duration shall be 2/10 of one second.
 2. Strobe intensity shall meet the requirements of UL 1971.
 3. The flash rate shall meet the requirements of UL 1971.
- B. Horn/Strobes:
 1. Operate on 24 VDC.
 2. Have (2) selectable tone options of temporal (3) and non-temporal continuous pattern.
 3. Have at least (2) audibility options.
 4. Maximum Pulse Duration: 0.2 second.
 5. Strobe Intensity: UL 1971.
 6. Flash Rate: UL 1971
 7. Strobe Candela Rating: Determine by positioning selector switch on back of device.

2.05 MAGNETIC DOOR HOLDERS

- A. Description: Units shall be listed to UL 228. Units are equipped for wall or floor mounting as indicated and are complete with matching door plate. Unit shall operate from a 120VAC, a 24VAC or a 24VDC source, and develop a minimum of 25 lbs. holding force.
- B. Material and Finish: Match door hardware.

2.06 DEVICE GUARDS

- A. Description: Welded wire mesh of size and shape for the manual station, smoke detector, gong, or other device requiring protection.
 1. Factory fabricated and furnished by manufacturer of device.
 2. Finish: Paint of color to match the protected device.

PART 3 – EXECUTION

3.01 INSTALLATION, GENERAL

- A. Install system components and all associated devices in accordance with applicable NFPA Standards and manufacturer's recommendations.

- B. Installation personnel shall be supervised by persons who are qualified and experienced in the installation, inspection, and testing of fire alarm systems. Examples of qualified personnel shall include, but not be limited to, the following:
 - 1. Factory trained and certified personnel.
 - 2. National Institute of Certification in Engineering Technologies (NICET) fire alarm level II certified personnel.
 - 3. Personnel licensed or certified by state or local authority.

3.02 EQUIPMENT INSTALLATION

- A. Furnish and install a complete Fire Alarm System as described herein and as shown on the plans. Include sufficient manual stations, automatic fire detectors, smoke detectors, audible and visible notification appliances, wiring, terminations, electrical boxes, Ethernet drops, and all other necessary material for a complete operating system.
- B. Existing Fire Alarm Equipment shall be maintained fully operational until the new equipment has been tested and accepted.
- C. Equipment Removal: After acceptance of the new fire alarm system, disconnect and remove the existing fire alarm equipment and restore damaged surfaces. Package operational fire alarm and detection equipment that has been removed and deliver to the Owner. Remove from the site and legally dispose of the remainder of the existing material.
- D. Install manual station with operating handle 48 inches (1.22 m) above floor. Install wall mounted audible and visual notification appliances not less than 80 inches (2.03 m) above floor to bottom of lens and not greater than 96 inches (2.44 m) above floor to bottom of lens.
- E. Mount outlet box for electric door holder to withstand 80 pounds pulling force.
- F. Make conduit and wiring connections to door release devices, sprinkler flow switches, sprinkler valve tamper switches, fire suppression system control units, duct smoke detectors .
- G. Automatic Detector Installation: Conform to NFPA 72.

3.03 CONNECTIONS

- A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Division 08 Section "Door Hardware." Connect hardware and devices to fire-alarm system.
 - 1. Verify that hardware and devices are NRTL listed for use with fire-alarm system in this Section before making connections.
- B. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 3 feet (1 m) from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
 - 1. Alarm-initiating connection to smoke-control system (smoke management) at firefighter smoke-control system panel.
 - 2. Alarm-initiating connection to stairwell and elevator-shaft pressurization systems.
 - 3. Smoke dampers in air ducts of designated air-conditioning duct systems.

4. Alarm-initiating connection to elevator recall system and components.
5. Alarm-initiating connection to activate emergency lighting control.
6. Alarm-initiating connection to activate emergency shutoffs for gas and fuel supplies.
7. Supervisory connections at valve supervisory switches.
8. Supervisory connections at low-air-pressure switch of each dry-pipe sprinkler system.
9. Supervisory connections at elevator shunt trip breaker.
10. Supervisory connections at fire-pump power failure including a dead-phase or phase-reversal condition.
11. Supervisory connections at fire-pump engine control panel.

3.04 WIRING INSTALLATION

- A. System Wiring: Wire and cable shall be a type listed for its intended use by an approval agency acceptable to the Authority Having Jurisdiction and shall be installed in accordance with the appropriate articles from the current approved edition of NFPA 70: National Electric Code (NEC).
- B. Contractor shall obtain from the Fire Alarm System Manufacturer written instruction regarding the appropriate wire/cable to be used for this installation. No deviation from the written instruction shall be made by the Contractor without the prior written approval of the Fire Alarm System Manufacturer.
- C. Color Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color code for alarm initiating device circuits wiring and a different color code for supervisory circuits. Color-code notification appliance circuits differently from alarm-initiating circuits. Paint fire alarm system junction boxes and covers red.

3.05 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."
- B. Install framed instructions in a location visible from fire-alarm control unit.

3.06 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: Provide services of a factory-authorized service representative to supervise the field assembly and connection of components and the pretesting, testing, and adjustment of the system.
- B. Service personnel shall be qualified and experienced in the inspection, testing, and maintenance of fire alarm systems. Examples of qualified personnel shall be permitted to include, but shall not be limited to, individuals with the following qualifications:
 1. Factory trained and certified.
 2. National Institute for Certification in Engineering Technologies (NICET) fire alarm certified.
 3. International Municipal Signal Association (IMSA) fire alarm certified.
 4. Certified by a state or local authority.
 5. Trained and qualified personnel employed by an organization listed by a national testing laboratory for the servicing of fire alarm systems.
- C. Pretesting: Determine, through pretesting, the conformance of the system to the requirements of the Drawings and Specifications. Correct deficiencies observed in pretesting. Replace malfunctioning or damaged items with new and retest until satisfactory performance and conditions are achieved.

- D. Inspection:
1. Inspect equipment installation, interconnection with system devices, mounting locations, and mounting methods.
 2. Verify that units and controls are properly installed, connected, and labeled and that interconnecting wires and terminals are identified.
- E. Acceptance Operational Tests:
1. Perform operational system tests to verify conformance with specifications:
 - a. Each alarm initiating device installed shall be operationally tested. Each device shall be tested for alarm and trouble conditions. Contractor shall submit a written certification that the Fire Alarm System installation is complete including all punch-list items. Test battery operated emergency power supply. Test emergency power supply to minimum durations specified. Test Supervising Station Signal Transmitter. Coordinate testing with Supervising Station monitoring firm/entity.
 - b. Test each Notification Appliance installed for proper operation. Submit written report indicating sound pressure levels at specified distances.
 - c. Test Fire Alarm Control Unit and Remote Annunciator.
 2. Provide minimum 10 days notice of acceptance test performance schedule to Owner, and local Authority Having Jurisdiction.
- F. Retesting: Correct deficiencies indicated by tests and completely retest work affected by such deficiencies. Verify by the system test that the total system meets the Specifications and complies with applicable standards.
- G. Report of Tests and Inspections: Provide a written record of inspections, tests, and detailed test results in the form of a test log. Use NFPA 72 Forms for documentation.
- H. Final Test, Record of Completion, and Certificate of Occupancy:
1. Test the system as required by the Authority Having Jurisdiction in order to obtain a certificate of occupancy. Provide completed NFPA 72 Record of Completion form to Owner and AHJ.

3.07 CLEANING AND ADJUSTING

- A. Cleaning: Remove paint splatters and other spots, dirt, and debris. Clean unit internally using methods and materials recommended by manufacturer.
- B. Occupancy Adjustments: When requested within one year of date of Substantial Completion, provide on-site assistance in adjusting sound pressure levels and adjusting controls and sensitivities to suit actual occupied conditions. Provide up to three visits to the site for this purpose.

END OF SECTION 28 3111

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections apply to this section.

1.2 GENERAL

- A. Security Systems include IP security cameras.
- B. The Owner will purchase all equipment directly from Securitas, Securitas will furnish approved submittals to the contractor.
- C. The contractor shall provide power and category 5E and other backbone cables for the systems.
- D. The contractor shall provide all back boxes and raceways required for the systems.
- E. Securitas will provide all system programming and head end hardware.
- F. The contractor shall assist Securitas and their certified installer with testing and commissioning the system.
- G. The certified installer shall make all terminations and mount devices on backboxes provided by the contractor.
- H. The contractor shall coordinate all work with:
Mr. Andy O'Reilly
518-376-6604
Andy.OReilly@securitas.com

1.3 SCOPE OF WORK

- A. The contractor shall provide the following:
 - 1. Remove the existing security equipment, box and turn over to Securitas for storage.
 - 2. Provide category 5E cables from the closest IDF to each security camera. Provide a lightning arrestor for all exterior cameras.
 - 3. Maintain record drawing of any wiring installation that deviates from shop drawing submittal. The contractor shall assist Securitas technicians with testing and certifying the security systems.

1.4 REFERENCES

- A. Underwriter's Laboratories UL-1069 current release
- B. NFPA – National Fire Protection Association
- C. NEC – National Electrical Code - NFPA 70 and 99
- D. ADA – Americans with Disabilities Act
- E. EIA – Electronic Industry Association
- F. NEMA – National Electrical Manufacturers Association – Installation Standards
- G. U.S. Dept. of Labor / Occupational Safety and Health Administration
- H. State Hospital Code / Joint Commission of Hospitals – Nurse Call
- I. Canadian Standards Association

1.5 SUBMITTALS

- A. Securitas will submit the following to the contractor and the engineer. The submittals will be furnished according to Conditions of Contract and Division 1 Specification Sections
 - 1. Product Data for each type of device and all equipment.
 - 2. Riser diagrams showing all devices and equipment.
 - 3. Single-line block diagrams showing cabling interconnection of all components for this specific equipment. Include cable type for each interconnection.
 - 4. Wiring Diagrams: Power, signal, and control wiring.
 - 5. Station Installation Details: For built-in equipment; dimensioned and to scale.
 - 6. Equipment Cabinet Drawings: Dimensioned and to scale.
 - 7. Manufacturer Certificates: Signed by manufacturers certifying that nurse call equipment complies with requirements.
 - 8. Manufacturer's Warranty Statement.
 - 9. Field Tests Reports and Observations: Include record of final adjustments certified by Installer.
 - 10. Operation and Maintenance Data:
 - a. Operating instructions.
 - b. Troubleshooting guide.
 - c. Wiring diagrams and terminal identification.
 - d. Equipment parts list.
 - e. Product data for types and sizes of wires and cables used.

- B. The contractor shall provide the following submittals. The submittals will be furnished according to Conditions of Contract and Division 1 Specification Sections
 - 1. Provide certification that all submittals have been received from Securitas and that they are complete and there are no questions

1.6 WARRANTY

- A. The installing manufacturer's representative shall guarantee all labor, parts, and installation for a period of 1 year from substantial completion or first beneficial use of the system.
- B. The contractor shall warrantee all Category 5 cable for a period of 1 year.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Securitas will furnish products from the Manufacturers:
- B. IP Security Cameras and servers – Axis Communications

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Wiring Method: Install wiring in raceway at door location and in open top cable hangers above accessible ceilings.
 - 1. Pull cables simultaneously if more than one is being installed in same raceway.
 - 2. Use pulling compound or lubricant if necessary. Use compounds that will not damage conductor or insulation.
 - 3. Use pulling means, including fish tape, cable, rope, and basket-weave wire or cable grips that will not damage media or raceway. Install exposed raceways and cables parallel and perpendicular to surfaces or exposed structural members, and follow surface contours. Secure and support cables by straps, staples, or similar fittings designed and installed so as not to damage cables. Secure cable at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, or fittings.
- B. Wiring within Enclosures: Provide adequate length of conductors.
- C. Separation of Wires: Run in separate raceways or, if exposed or in same enclosure, provide 12-inch minimum separation between conductors and adjacent parallel power and telephone wiring. Provide separation as recommended by equipment manufacturer for other conductors.
- D. Identification of Conductors and Cables: Retain color-coding of conductors and apply wire and cable marking tape to designate wires and cables so all media are identified in coordination with system wiring diagrams. Label stations, controls, and indications using approved consistent nomenclature.

- E. Category-5 or better wire termination will be connectorized according to ANSI Standard T568A. Grounding Provisions: Comply with requirements in Division 26 Section "Grounding and Bonding for Electrical Systems."

3.2 FIELD QUALITY CONTROL

- A. A factory-authorized service representative will inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.
- B. Test Procedure: Comply with the following:
 - 1. Schedule tests a minimum of seven (7) days in advance of performance of tests.
 - 2. Report: Submit a written record of test results.
 - 3. Operational Test: Perform an operational system test, and demonstrate proper operations, adjustment, and sensitivity of each station. Perform tests that include originating station-to-station and all-call messages and pages at each nurse call station. Verify proper call-in routing and volume levels for each intercom station.

3.3 DRAWINGS

- A. Provide as built drawings of all installed network components and associated wiring on building plans. Final payment for work will not be authorized unless these drawings are supplied.

END OF SECTION 284112



DANIEL P. McCOY
COUNTY EXECUTIVE

COUNTY OF ALBANY
DEPARTMENT OF GENERAL SERVICES
PURCHASING DIVISION
112 STATE STREET, ROOM 1000
ALBANY, NEW YORK 12207-2021
(518) 447-7140 - FAX (518) 447-5588

DAVID M. LATINA
COMMISSIONER OF GENERAL SERVICES

PAMELA O NEILL
PURCHASING AGENT

MEMORANDUM

TO: Mark Olsen
Executive Director

FROM: Pamela O Neill *Pamela*
Purchasing Agent

DATE: March 21, 2025

RE: RFB-2025-030

I am in receipt of your recommendation to award the aforementioned to the following bidders in the amounts listed

AOW Construction for General Contractor in the amount of \$468,828.00
Collett Mechanical for Mechanical Construction in the amount of \$300,686.00
Hewitt Young Electric for Electrical Construction in the amount of \$88,000.00
Collett Mechanical for Plumbing Construction in the amount of \$28,490.00

As these bidders are the lowest responsible and responsive bidders, I concur with your recommendation.

Please obtain the necessary contract approval of the Contract Administration Board and the County Legislature, so that we may issue a Notice of Award.



Daniel P. McCoy
County Executive

Mark S. Olsen
Executive Director

April 29th, 2025

The Honorable Joanne Cunningham
Chairwoman, Albany County Legislature
Legislative Clerk's Office
112 State Street, Suite 710
Albany, New York 12207

Dear Chairwoman Cunningham:

Shaker Place Rehabilitation and Nursing Center (SPRNC) respectfully requests approval of a contract for the mechanical construction of a Café in the employee dining area. The Café is part of the Food Service and Distribution Equipment project in the 2026-2030 Albany County Capital Plan.

A Request for Bid (RFB) was solicited for the construction project, RFB #2025-30. There was two (2) responsible bidders for the mechanical construction of the project. Collett Mechanical, Inc. was the lowest responsible bidder. The bid was submitted for \$261,466.00 with a 15% contingency allowance of \$39,220.00 for a total amount of \$300,686.00. The agreement will commence June 12th, 2025 and end June 11th, 2027.

If any additional information is required, please do not hesitate to contact me.

Sincerely,

Mark S. Olsen
Executive Director

cc: Dennis Feeney, Majority Leader
Frank Mauriello, Minority Leader
Rebekah Kennedy, Majority Counsel
James Curran, Minority Counsel





County of Albany

Harold L. Joyce
Albany County Office
Building
112 State Street - Albany,
NY 12207

Legislation Text

File #: TMP-6574, Version: 1

REQUEST FOR LEGISLATIVE ACTION

Description (e.g., Contract Authorization for Information Services):

CONTRACT AUTHORIZATION WITH COLLETT MECHANICAL, INC. FOR THE MECHANICAL CONSTRUCTION OF A CAFÉ AT SHAKER PLACE REHABILITATION AND NURSING CENTER

Date: 4/30/2025
Department: Shaker Place Rehabilitation and Nursing Center
Attending Meeting: Mark S. Olsen
Submitted By: Shawn Thelen
Title: Deputy Executive Director
Phone: 518-447-7108

Purpose of Request: Contract Authorization

CONTRACT TERMS/CONDITIONS:

Party Names and Addresses: Collett Mechanical, Inc.
138 Sicker Road, Latham, NY 12110

Term: (Start/end date or duration) June 12th, 2025 through June 11th, 2027
Amount/Raise Schedule/Fee: \$300,686.00

BUDGET INFORMATION:

Is there a Fiscal Impact: Yes ☒ No ☐
Anticipated in Budget: Yes ☒ No ☐
Spreadsheet attached: Yes ☐ No ☒

Source of Funding - (Percentages)

Federal:	0	County:	100
State:	0	Local:	0

County Budget Accounts:

Revenue Account and Line:	Enter text.
Revenue Amount:	Enter text.
Appropriation Account and Line:	Enter text.
Appropriation Amount:	Enter text.

ADDITIONAL INFORMATION:

Mandated Program/Service: Yes ☐ No ☒
If Mandated, Cite Authority: Enter text.

Request for Bids / Proposals:

Competitive Bidding Exempt: Yes ☐ No ☒

of Response(s): 2

of MWBE: 0

of Veteran Business: 0

Bond Resolution No.: Enter text.

Apprenticeship Program Yes ☐ No ☒

Previous requests for Identical or Similar Action:

Resolution/Law Number and Date: Enter text.

DESCRIPTION OF REQUEST: (state briefly why legislative action is requested)

Shaker Place Rehabilitation and Nursing Center (SPRNC) respectfully requests approval of a contract for the mechanical construction of a Café in the employee dining area. The Café is part of the Food Service and Distribution Equipment project in the 2026-2030 Albany County Capital Plan.

COUNTY OF ALBANY

MC - BID FORM

BID IDENTIFICATION:

Title: **Shaker Place Café Project**
 Bid Number: **2025-030 – MC - Mechanical Construction**

THIS BID IS SUBMITTED TO:

Pamela O Neill, Purchasing Agent
 Albany County Department of General Services
 Purchasing Division
 112 State Street, Room 1000
 Albany, NY 12207

1. The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into a Contract with the owner in the form included in the Contract Documents to complete all Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with the Contract Documents.
2. BIDDER accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the Disposition of Bid Security. This Bid may remain open for ninety (90) days after the day of Bid opening. BIDDER will sign the Contract and submit the Contract Security and other documents required by the Contract Documents within fifteen days after the date of OWNER'S Notice of Award.
3. In submitting this Bid, BIDDER represents, as more fully set forth in this Contract, that:

- (a) BIDDER has examined copies of all the Contract Documents and of the following addenda: (If none, so state)

Date	Number
03/10/2025	1

(receipt of all of which is hereby acknowledged) and also copies of the Notice to Bidders and the Instructions to Bidders;

- (b) BIDDER has examined the site and locality where the Work is to be performed, the legal requirements (federal, state and local laws, ordinances, rules and regulations) and the conditions affecting cost, progress or performance of the Work and has made such independent investigations as BIDDER deems necessary;

BF1

- (c) This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; BIDDER has not directly or indirectly induced or solicited any other BIDDER to submit a false or sham Bid; BIDDER has not solicited or induced any person, firm or a corporation to refrain from bidding; and BIDDER has not sought by collusion to obtain for himself any advantage over any other Bidder or over the owner.

4. BIDDER will complete the Work for the following prices(s): (Attach Bid Proposal)
5. BIDDER agrees to commence the Work within the number of calendar days or by the specific date indicated in the Contract. BIDDER agrees that the Work will be completed within the number of Calendar days or by the specific date indicated in the contract.
6. The following documents are attached to and made a condition of this Bid:
- (a) Non-Collusive Bidding Certificate (Attachment "A")
 - (b) Acknowledgment by Bidder (Attachment "B")
 - (c) Vendor Responsibility Questionnaire (Attachment "C")
 - (d) Iranian Energy Divestment Certification (Attachment "D")
 - (e) MS-4-1 Certification Statement RE: Stormwater Discharges (Attachment "E")
 - (f) Bidder Qualification Questionnaire (Attachment "F")
 - (g) Non Interruption of Work Agreement (Attachment "G")
 - (h) Required Apprenticeship Training Program Documentation (refer to RFB Section 27)

7. Communication concerning this Bid shall be addressed to:

Collett Mechanical, Inc

138 Sicker Rd

Latham, NY 12110

Phone: 518-862-2214

8. Terms used in this Bid have the meanings assigned to them in the Contract and General Provisions.

COUNTY OF ALBANY

MC - BID FORM

BID IDENTIFICATION:

Title: Shaker Place Café Project
 Bid Number: 2025-030 – MC - Mechanical Construction

Conditions:

1. All bid prices must include all materials, labor, equipment, incidentals and other associated costs.
2. Mechanical Construction Base Bid work shall carry a 15% Base Bid Contingency Allowance for additional work discovered during construction beyond scope of work indicated on drawings and specifications. Contractor shall receive advance approval from the County Engineer prior to performing any additional work.

LUMP SUM BASE BID: \$ 261,466.⁰⁰ (a)

15 % CONTINGENCY ALLOWANCE: \$ 39,220.⁰⁰ (b)

TOTAL BASE BID (a) + (b): \$ 300,686.⁰⁰
(Base Bid + Contingency Allowance)

COUNTY OF ALBANY**MC - BID FORM****BID IDENTIFICATION:**

Title: **Shaker Place Café Project**
Bid Number: **2025-030 – MC - Mechanical Construction**

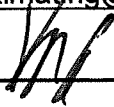
COMPANY: Collett Mechanical, Inc.
ADDRESS: 138 Slicker Rd
CITY, STATE, ZIP: Latham, NY 12110
TEL. NO.: 518-862-2214
FAX NO.: 518-862-2217
FEDERAL TAX ID NO.: 14-1775002

***CERTIFICATE OF REGISTRATION NUMBER
(ARTICLE 8 PUBLIC WORK CONTRACTOR REGISTRY)***

24-63HOZ-CR

REPRESENTATIVE: Kevin Farrell

E-MAIL: estimating@collettmechanical.com

SIGNATURE AND TITLE  **CFO**

DATE 03/20/2025



AIA[®] Document A310[™] – 2010

Bid Bond

CONTRACTOR:

(Name, legal status and address)

Collett Mechanical, Inc.

138 Sicker Road

Latham, NY 12110

SURETY:

(Name, legal status and principal place

of business) Western Surety Company

151 N. Franklin St., 17th Floor

Chicago, IL 60606

OWNER:

(Name, legal status and address)

Albany County

112 State Street, Albany, NY 12207

BOND AMOUNT: \$ Five Percent of Bid (5% of Bid)

PROJECT:

(Name, location or address, and Project number, if any)

Shaker Place Café Project

RFB #2025-030

HVAC

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

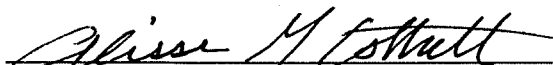
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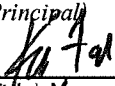
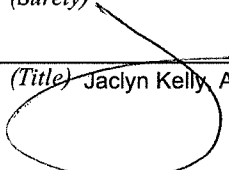
AIA Document A310[™] – 2010. Copyright © 1963, 1970 and 2010 by The American Institute of Architects. All rights reserved. WARNING: This AIA[®] Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA[®] Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:01:33 on 07/19/2010 under Order No.0700788384_1 which expires on 02/14/2011, and is not for resale.

User Notes:

(1113732179)

Signed and sealed this 11th day of March, 2025

(Witness)

 (Witness) Alissa M. Cottrell, Bond Representative

Collett Mechanical, Inc.
 (Principal)  (Seal)
 (Title) Ken Farrell CFO
 Western Surety Company
 (Surety)  (Seal)
 (Title) Jaclyn Kelly, Attorney-In-Fact

NOTARIAL JURAT

INDIVIDUAL ACKNOWLEDGEMENT

State of _____]
 County of _____] ss:
 On this _____ day of _____, _____ before me personally appeared

known to me to be the person _____ described in and who executed the foregoing instrument, and _____ he duly acknowledged to me that _____ he executed the same.

 Notary Public

PARTNERSHIP ACKNOWLEDGEMENT

State of _____]
 County of _____] ss:
 On this _____ day of _____, _____ before me personally appeared

known to me to be a member of the firm of _____ described in and which executed the foregoing instrument, and _____ he thereupon acknowledged to me that _____ he executed the same as and for the act and deed of said firm.

 Notary Public

CORPORATION ACKNOWLEDGEMENT

State of New York]
 County of Albany] ss:
 On this 20 day of March, 2025 before me personally appeared

Kerin Farrell to me known, who being by me duly sworn, did depose and say: that _____ he resides at Selkirk, NY

; that he is CFO of the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by order of the Board of Directors of said corporation; and that he signed his name thereto by like order.

Krista M. Heidinger
 Notary Public

KRISTA M HEIDINGER
 NOTARY PUBLIC-STATE OF NEW YORK
 No. 01HE6346645
 Qualified in Albany County
 My Commission Expires 08-15-2028

SURETY ACKNOWLEDGEMENT

State of New York]
 County of Schenectady] ss:
 On this 11th day of March, 2025 before me personally appeared

Jaclyn Kelly

to me known, who being by me duly sworn, did depose and say: that she resides in the City of _____

Scotia, New York; that she is the Attorney-In-Fact

of the above signed surety, the corporation described in and which executed the within instrument; that she knows the corporate seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by order of the Board of Directors of said corporation; and that she signed her name thereto by like order.

LAURIE W. GIBSON
 Notary Public-State of New York
 No. 4945994
 Qualified in Saratoga County
 Commission Expires January 27, 2027

Laurie W. Gibson

Notary Public

Western Surety Company

POWER OF ATTORNEY APPOINTING INDIVIDUAL ATTORNEY-IN-FACT

Know All Men By These Presents, That WESTERN SURETY COMPANY, a South Dakota corporation, is a duly organized and existing corporation having its principal office in the City of Sioux Falls, and State of South Dakota, and that it does by virtue of the signature and seal herein affixed hereby make, constitute and appoint

Jeanne M Maloy, Deborah L Kruman, Jaclyn Kelly, Kara M Epperson, Noelle Susan Burkins, Matthew Cronin, Individually

of Scotia, NY, its true and lawful Attorney(s)-in-Fact with full power and authority hereby conferred to sign, seal and execute for and on its behalf bonds, undertakings and other obligatory instruments of similar nature

- In Unlimited Amounts -

and to bind it thereby as fully and to the same extent as if such instruments were signed by a duly authorized officer of the corporation and all the acts of said Attorney, pursuant to the authority hereby given, are hereby ratified and confirmed.

This Power of Attorney is made and executed pursuant to and by authority of the Authorizing By-Laws and Resolutions printed at the bottom of this page, duly adopted, as indicated, by the shareholders of the corporation.

In Witness Whereof, WESTERN SURETY COMPANY has caused these presents to be signed by its Vice President and its corporate seal to be hereto affixed on this 31st day of January, 2024.



WESTERN SURETY COMPANY

Larry Kasten, Vice President

State of South Dakota }
County of Minnehaha } ss

On this 31st day of January, 2024, before me personally came Larry Kasten, to me known, who, being by me duly sworn, did depose and say: that he resides in the City of Sioux Falls, State of South Dakota; that he is a Vice President of WESTERN SURETY COMPANY described in and which executed the above instrument; that he knows the seal of said corporation; that the seal affixed to the said instrument is such corporate seal; that it was so affixed pursuant to authority given by the Board of Directors of said corporation and that he signed his name thereto pursuant to like authority, and acknowledges same to be the act and deed of said corporation.

My commission expires

March 2, 2026



M. Bent, Notary Public

CERTIFICATE

I, Paula Kolsrud, Assistant Secretary of WESTERN SURETY COMPANY do hereby certify that the Power of Attorney hereinabove set forth is still in force, and further certify that the By-Law and Resolutions of the corporation printed below this certificate are still in force. In testimony whereof I have hereunto subscribed my name and affixed the seal of the said corporation this 11th day of March, 2025.



WESTERN SURETY COMPANY

Paula Kolsrud, Assistant Secretary

Authorizing By-Laws and Resolutions

ADOPTED BY THE SHAREHOLDERS OF WESTERN SURETY COMPANY

This Power of Attorney is made and executed pursuant to and by authority of the following By-Law duly adopted by the shareholders of the Company.

Section 7. All bonds, policies, undertakings, Powers of Attorney, or other obligations of the corporation shall be executed in the corporate name of the Company by the President, Secretary, and Assistant Secretary, Treasurer, or any Vice President, or by such other officers as the Board of Directors may authorize. The President, any Vice President, Secretary, any Assistant Secretary, or the Treasurer may appoint Attorneys in Fact or agents who shall have authority to issue bonds, policies, or undertakings in the name of the Company. The corporate seal is not necessary for the validity of any bonds, policies, undertakings, Powers of Attorney or other obligations of the corporation. The signature of any such officer and the corporate seal may be printed by facsimile.

This Power of Attorney is signed by Larry Kasten, Vice President, who has been authorized pursuant to the above Bylaw to execute power of attorneys on behalf of Western Surety Company.

This Power of Attorney may be signed by digital signature and sealed by a digital or otherwise electronic-formatted corporate seal under and by the authority of the following Resolution adopted by the Board of Directors of the Company by unanimous written consent dated the 27th day of April, 2022:

"RESOLVED: That it is in the best interest of the Company to periodically ratify and confirm any corporate documents signed by digital signatures and to ratify and confirm the use of a digital or otherwise electronic-formatted corporate seal, each to be considered the act and deed of the Company."

Go to www.cnasurety.com > Owner / Obligor Services > Validate Bond Coverage, if you want to verify bond authenticity.

WESTERN SURETY COMPANY
Sioux Falls, South Dakota
Statement of Net Admitted Assets and Liabilities
December 31, 2023

ASSETS

Bonds	\$ 1,935,600,431
Stocks	15,281,696
Cash, cash equivalents, and short-term investments	36,335,353
Receivables for securities	14,770,000
Investment income due and accrued	18,185,645
Premiums and considerations	70,728,009
Amounts recoverable from reinsurers	4,459,042
Net deferred tax asset	18,202,272
Receivable from parent, subsidiaries, and affiliates	12,895,815
Other assets	157,742
Total Assets	\$ 2,126,616,005

LIABILITIES AND SURPLUS

Losses	\$ 247,328,673
Loss adjustment expense	56,340,495
Commissions payable, contingent commissions and other similar charges	13,245,319
Taxes, License and fees (excluding federal and foreign income taxes)	5,075,390
Federal and foreign income taxes payable	829,556
Unearned premiums	316,760,881
Advance premiums	6,183,112
Ceded reinsurance premiums payable (net of ceding commissions)	4,347,066
Amounts withheld or retained by company for account of others	3,094,680
Provision for reinsurance	157,388
Payable to parent, subsidiaries and affiliates	9,464
Other liabilities	(6,171)
Total Liabilities	\$ 653,365,853

Surplus Account:

Common stock	\$ 4,000,000
Gross paid in and contributed surplus	286,896,195
Unassigned funds	1,182,353,957
Surplus as regards policyholders	\$ 1,473,250,152
Total Liabilities and Capital	\$ 2,126,616,005

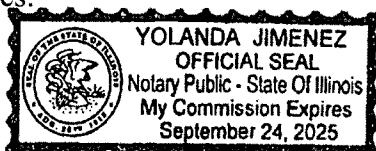
I, Julie Lee, Vice President of Western Surety Company hereby certify that the above is an accurate representation of the financial statement of the Company dated December 31, 2023, as filed with the various Insurance Departments and is a true and correct statement of the condition of Western Surety Company as of that date.

WESTERN SURETY COMPANY

By Julie Lee
Vice President, Accounting Policy & External Reporting

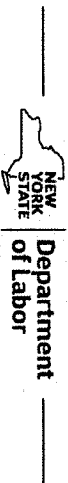
Subscribed and sworn to me this 14th day of March, 2024.

My commission expires:



By Yolanda Jimenez
Notary Public

WE ARE YOUR DOL



DIVISION OF SAFETY AND HEALTH LICENSE AND CERTIFICATE UNIT, STATE OFFICE CAMPUS, BUILDING 12, ALBANY, NY 12226

CERTIFICATE OF CONTRACTOR REGISTRATION

This Certificate Entitles the Holder to Perform and Bid on Public Work and

Covered Private Construction Projects in the State of New York,

Subject to the Prevailing Wage Requirements of

NYS Labor Law Article 8

Collett Mechanical, Inc.

138 Sicker Rd

Latham, New York 12110

Phone Number: 5188622214

Registration Number: 24-63HOZ-CR

Date of Issue: 2024-12-05

Expiration Date: 2026-12-29

(This license is valid only for the contractor named above)

Roberta Reardon

Commissioner

New York State Department of Labor



ATTACHMENT "A"
NON-COLLUSIVE BIDDING CERTIFICATE PURSUANT TO
SECTION 103-D OF THE NEW YORK STATE GENERAL MUNICIPAL LAW

A. By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid, each party thereto certifies as to its own organizations, under penalty of perjury, that to the best of knowledge and belief:

(1) The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor.

(2) Unless otherwise required by law, the prices which have been quoted in this bid have not knowingly been disclosed by the bidder and will not knowingly be disclosed by the bidder, directly or indirectly, prior to opening, to any bidder or to any competitor.

(3) No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

A bid shall not be considered for award nor shall any award be made where (1), (2), and (3) above have not been complied with; provided, however, that in any case the bidder cannot make the foregoing certification, the bidder shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons thereof. Where (1), (2), and (3) above have not been complied with, the bid shall not be considered for any award nor shall any award be made unless the head of the Purchasing Unit to the political subdivision, public department, agency or official thereof to which the bid is made, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

The fact that a bidder (a) has published price lists, rates, or tariffs covering items being procured, (b) has informed prospective customer of proposed or pending publication of new or revised price lists for such items, or (c) has sold the same items to other customers at the same prices being bid, does not constitute, without more, a disclosure within the meaning of paragraph "A" above.

B. Any bid hereafter made to any political subdivision of the state or any public department, agency or official thereof by a corporate bidder for work or services performed or to be performed or goods sold or to be sold, where competitive bidding is required by statute, rule, regulation, local law, and where such bid contains the certification referred to in paragraph "A" of this section, shall be deemed to have been authorized by the Board of Directors of the bidder, and such authorization shall be deemed to include the submission of the bid and the inclusion therein of the certificate as to non-collusion as the act and deed of the corporation



 Signature

CFO

 Title

03/20/2025

Date

Collett Mechanical, Inc.

Company Name

ATTACHMENT "B" **ACKNOWLEDGMENT BY BIDDER**

If Individual or Individuals:

STATE OF _____)
COUNTY OF _____) SS.:

On this _____ day of _____, 200____, before me personally appeared _____ to me known and known to me to be the same person(s) described in and who executed the within instrument, and he (or they severally) acknowledged to me that he (or they) executed the same.

Notary Public, State of _____

Qualified in _____

Commission Expires _____

If Corporation:

STATE OF New York)
COUNTY OF Albany) SS.:

On this 20 day of March, ~~20025~~, before me personally appeared Kevin Farrell to me known, who, being by me sworn, did say that he resides at (give address) 117 Trinity Place Selkirk, NY 12158; that he is the (give title) CFO of the (name of corporation) Collett Mechanical, Inc., the corporation described in and which executed the above instrument; that he knows the seal of the corporation, and that the seal affixed to the instrument is such corporate seal; that it was so affixed by order of the board of directors of the corporation, and that he signed his name thereto by like order.

KRISTA M HEIDINGER
NOTARY PUBLIC-STATE OF NEW YORK
No. 01HE6346645
Qualified in Albany County
My Commission Expires 08-15-2028

Krista Heidinger
Notary Public, State of New York

Qualified in Albany County

Commission Expires 08/15/2028

If Partnership:

STATE OF _____)
COUNTY OF _____) SS.:

On the _____ day of _____, 200____, before me personally came _____, to me known to be the individual who executed the foregoing, and who, being duly sworn, did depose and say that he / she is a partner of the firm of _____ and that he / she has the authority to sign the same, and acknowledged that he / she executed the same as the act and deed of said partnership.

Notary Public, State of _____

Qualified in _____

Commission Expires _____

ATTACHMENT "C"
ALBANY COUNTY
VENDOR RESPONSIBILITY QUESTIONNAIRE

1. VENDOR IS: ☒ PRIME CONTRACTOR			
2. VENDOR'S LEGAL BUSINESS NAME Collett Mechanical, Inc.		3. IDENTIFICATION NUMBERS a) FEIN # 14-17750002 b) DUNS #	
4. D/B/A – Doing Business As (if applicable) & COUNTY FIELD:		5. WEBSITE ADDRESS (if applicable) www.collettmechanical.com	
6. ADDRESS OF PRIMARY PLACE OF BUSINESS/EXECUTIVE OFFICE 138 Sicker Rd Latham, NY 12110		7. TELEPHONE NUMBER 518-862-2214	8. FAX NUMBER 518-862-2217
9. ADDRESS OF PRIMARY PLACE OF BUSINESS/EXECUTIVE OFFICE <i>IN NEW YORK STATE, if different from above</i>		10. TELEPHONE NUMBER	11. FAX NUMBER
12. AUTHORIZED CONTACT FOR THIS QUESTIONNAIRE Name Kevin Farrell Title CFO Telephone Number 518-862-2214 Fax Number 518-862-2217 e-mail estimating@collettmechanical.com			
13. LIST ALL OF THE VENDOR'S PRINCIPAL OWNERS.			
a) NAME Jack E. Collett	TITLE President	b) NAME Kevin Farrell	TITLE CFO
c) NAME	TITLE	d) NAME	TITLE
A DETAILED EXPLANATION IS REQUIRED FOR EACH QUESTION ANSWERED WITH A "YES," AND MUST BE PROVIDED AS AN ATTACHMENT TO THE COMPLETED QUESTIONNAIRE. YOU MUST PROVIDE ADEQUATE DETAILS OR DOCUMENTS TO AID THE COUNTY IN MAKING A DETERMINATION OF VENDOR RESPONSIBILITY. PLEASE NUMBER EACH RESPONSE TO MATCH THE QUESTION NUMBER.			
14. DOES THE VENDOR USE, OR HAS IT USED IN THE PAST FIVE (5) YEARS, ANY OTHER BUSINESS NAME, FEIN, or D/B/A OTHER THAN THOSE LISTED IN ITEMS 2-4 ABOVE? List all other business name(s), Federal Employer Identification Number(s) or any D/B/A names and the dates that these names or numbers were/are in use. Explain the relationship to the vendor. ☐ Yes ☒ No			
15. ARE THERE ANY INDIVIDUALS NOW SERVING IN A MANAGERIAL OR CONSULTING CAPACITY TO THE VENDOR, INCLUDING PRICIPAL OWNERS AND OFFICERS, WHO NOW SERVE OR IN THE PAST ONE (1) YEARS HAVE SERVED AS: a) An elected or appointed public official or officer? ☐ Yes ☒ No <i>List each individual's name, business title, the name of the organization and position elected or appointed to, and dates of service</i> b) An officer of any political party organization in Albany County, whether paid or unpaid? ☐ Yes ☒ No <i>List each individuals name, business title or consulting capacity and the official political position held with applicable service dates.</i>			

16.	WITHIN THE PAST (5) YEARS, HAS THE VENDOR, ANY INDIVIDUALS SERVING IN MANAGERIAL OR CONSULTING CAPACITY, PRINCIPAL OWNERS, OFFICERS, MAJOR STOCKHOLDER(S) (10% OR MORE OF THE VOTING SHARES FOR PUBLICLY TRADED COMPANIES, 25% OR MORE OF THE SHARES FOR ALL OTHER COMPANIES), AFFILIATE OR ANY PERSON INVOLVED IN THE BIDDING OR CONTRACTING PROCESS:	
a)	1. been suspended, debarred or terminated by a local, state or federal authority in connection with a contract or contracting process; 2. been disqualified for cause as a bidder on any permit, license, concession franchise or lease; 3. entered into an agreement to a voluntary exclusion from bidding/contracting; 4. had a bid rejected on an Albany County contract for failure to comply with the MacBride Fair Employment Principles; 5. had a low bid rejected on a local, state or federal contract for failure to meet statutory affirmative action or M/WBE requirements on a previously held contract; 6. had status as a Women's Business Enterprise, Minority Business Enterprise or Disadvantaged Business Enterprise, de-certified, revoked or forfeited; 7. been subject to an administrative proceeding or civil action seeking specific performance or restitution in connection with any local, state or federal government contract; 8. been denied an award of a local, state or federal government contract, had a contract suspended or had a contract terminated for non-responsibility; or 9. had a local, state or federal government contract suspended or terminated for cause prior to the completion of the term of the contract.	☐ Yes ☒ No
b)	been indicted, convicted, received a judgment against them or a grant of immunity for any business-related conduct constituting a crime under local, state or federal law including but not limited to, fraud extortion, bribery, racketeering, price-fixing, bid collusion or any crime related to truthfulness and/or business conduct?	☐ Yes ☒ No
c)	been issued a citation, notice, violation order, or are pending an administrative hearing or proceeding or determination of violations of: 1. federal, state or local health laws, rules or regulations.	☐ Yes ☒ No
17.	IN THE PAST THREE (3) YEARS, HAS THE VENDOR OR ITS AFFILIATES ¹ HAD ANY CLAIMS, JUDGMENTS, INJUNCTIONS, LIENS, FINES OR PENALTIES SECURED BY ANY GOVERNMENTAL AGENCY? Indicate if this is applicable to the submitting vendor or affiliate. State whether the situation(s) was a claim, judgment, injunction, lien or other with an explanation. Provide the name(s) and address(es) of the agency, the amount of the original obligation and outstanding balance. If any of these items are open, unsatisfied, indicate the status of each item as "open" or "unsatisfied."	☐ Yes ☒ No
18.	DURING THE PAST THREE (3) YEARS, HAS THE VENDOR FAILED TO: a) file returns or pay any applicable federal, state or city taxes? <i>Identify the taxing jurisdiction, type of tax, liability year(s), and tax liability amount the vendor failed to file/pay and the current status of the liability.</i> b) file returns or pay New York State unemployment insurance? <i>Indicate the years the vendor failed to file/pay the insurance and the current status of the liability.</i> c) Property Tax <i>Indicate the years the vendor failed to file.</i>	☐ Yes ☒ No ☐ Yes ☒ No ☐ Yes ☒ No
19.	HAVE ANY BANKRUPTCY PROCEEDINGS BEEN INITIATED BY OR AGAINST THE VENDOR OR ITS AFFILIATES ¹ WITHIN THE PAST SEVEN (7) YEARS (WHETHER OR NOT CLOSED) OR IS ANY BANKRUPTCY PROCEEDING PENDING BY OR AGAINST THE VENDOR OR ITS AFFILIATES REGARDLESS OF THE DATE OF FILING? Indicate if this is applicable to the submitting vendor or affiliate. If it is an affiliate, include the affiliate's name and FEIN. Provide the court name, address and docket number. Indicate if the proceedings have been initiated, remain pending or have been closed. If closed, provide the date closed.	☐ Yes ☒ No
20.	IS THE VENDOR CURRENTLY INSOLVENT, OR DOES VENDOR CURRENTLY HAVE REASON TO BELIEVE THAT AN INVOLUNTARY BANKRUPTCY PROCEEDING MAY BE BROUGHT AGAINST IT? Provide financial information to support the vendor's current position, for example, Current Ration, Debt Ration, Age of Accounts Payable, Cash Flow and any documents that will provide the agency with an understanding of the vendor's situation.	☐ Yes ☒ No

21. IN THE PAST FIVE (5) YEARS, HAS THE VENDOR OR ANY AFFILIATES¹ : ☐ Yes ☒ No
- a) defaulted or been terminated on, or had its surety called upon to complete, any contract (public or private) awarded;

Indicate if this is applicable to the submitting vendor or affiliate. Detail the situation(s) that gave rise to the negative action, any corrective action taken by the vendor and the name of the contracting agency.

¹ "Affiliate" meaning: (a) any entity in which the vendor owns more than 50% of the voting stock; (b) any individual, entity or group of principal owners or officers who own more than 50% of the voting stock of the vendor; or (c) any entity whose voting stock is more than 50% owned by the same individual, entity or group described in clause (b). In addition, if a vendor owns less than 50% of the voting stock of another entity, but directs or has the right to direct such entity's daily operations, that entity will be an "affiliate" for purposes of this questionnaire.

**ALBANY COUNTY
VENDOR RESPONSIBILITY QUESTIONNAIRE**

FEIN #

State of: New York)
) ss:
County of: Albany)

CERTIFICATION:

The undersigned: recognizes that this questionnaire is submitted for the express purpose of assisting the County of Albany in making a determination regarding an award of contract or approval of a subcontract; acknowledges that the County may in its discretion, by means which it may choose, verify the truth and accuracy of all statements made herein; acknowledges that intentional submission of false or misleading information may constitute a felony under Penal Law Section 210.40 or a misdemeanor under Penal Law Section 210.35 or Section 210.45, and may also be punishable by a fine and/or imprisonment of up to five years under 18 USC Section 1001 and may result in contract termination; and states that the information submitted in this questionnaire and any attached pages is true, accurate and complete.

The undersigned certifies that he/she:

- Has not altered the content of the questions in the questionnaire in any manner;
- Has read and understands all of the items contained in the questionnaire and any pages attached by the submitting vendor;
- Has supplied full and complete responses to each item therein to the best of his/her knowledge, information ad belief;
- Is knowledgeable about the submitting vendor's business and operations;
- Understands that Albany County will rely on the information supplied in the questionnaire when entering into a contract with the vendor;
- Is under duty to notify the Albany County Purchasing Division of any material changes to the vendor's responses.

Name of Business Collett Mechanical, Inc. Signature of Owner 

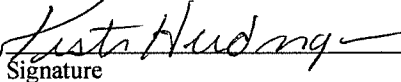
Address 138 Sicker Rd Printed Name of Signatory Kevin Farrell

City, State, Zip Latham, NY 12110 Title 'CFO

Sworn before me this 20 day of March, 2025

Notary Public _____

Krista Heidinger
Printed Name


Signature

03/20/2025
Date

KRISTA M HEIDINGER
NOTARY PUBLIC-STATE OF NEW YORK
No. 01HE6346645
Qualified in Albany County
My Commission Expires 08-15-2028

Attachment "D"
Certification Pursuant to Section 103-g
Of the New York State
General Municipal Law

- A. By submission of this bid/proposal, each bidder/proposer and each person signing on behalf of any bidder/proposer certifies, and in the case of a joint bid, each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that each bidder is not on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the New York State Finance Law.
- B. A Bid/Proposal shall not be considered for award, nor shall any award be made where the condition set forth in Paragraph A above has not been complied with; provided, however, that in any case the bidder/proposer cannot make the foregoing certification set forth in Paragraph A above, the bidder/proposer shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons therefor. Where Paragraph A above cannot be complied with, the Purchasing Unit to the political subdivision, public department, agency or official thereof to which the bid/proposal is made, or his designee, may award a bid/proposal, on a case by case business under the following circumstances:
1. The investment activities in Iran were made before April 12, 2012, the investment activities in Iran have not been expanded or renewed after April 12, 2012, and the Bidder/Proposer has adopted, publicized and is implementing a formal plan to cease the investment activities in Iran and to refrain from engaging in any new investments in Iran; or
 2. The political subdivision makes a determination that the goods or services are necessary for the political subdivision to perform its functions and that, absent such an exemption, the political subdivision would be unable to obtain the goods or services for which the contract is offered. Such determination shall be made in writing and shall be a public document.



 Signature

CFO

 Title

03/20/2025
 Date

Collett Mechanical, Inc.
 Company Name

ATTACHMENT "E"**Sheet MS4-1: Bidder/Proposer Certification Statement (to be used with Section 34 Part A – General Contracts)**

As a bidder seeking to provide services on behalf of Albany County, I certify under penalty of law that I understand and agree to comply with the terms and conditions of the New York State Pollutant Discharge Elimination System ("SPDES") General Permit for Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4 Permit) and Albany County Local Law 7 of 2007, and agree to implement any Best Management Practices or corrective actions identified by Albany County or an authorized representative thereof as necessary to maintain compliance. I understand that Albany County must comply with the terms and conditions of the aforementioned MS4 Permit, and that it is unlawful for any person to directly or indirectly cause or contribute to a violation of water quality standards. I am also aware that County Local Law 7 of 2007 prohibits any activities that cause or contribute to a violation of the County's SPDES permit. Further, I understand that any non-compliance by Albany County will not diminish, eliminate or lessen my own liability.

Name of Third Party Entity: Collett Mechanical, Inc.

Address: 138 Sicker Rd

Latham, NY 12110

Phone Number(s): 518-862-2214

Description of activities to be performed by your firm or organization within Albany County are related to the Albany County Storm Water Management Program (SWMP) (include any activities that have the potential to generate or prevent pollution and/or affect water quality):

Commercial HVAC & Plumbing Constrcution

Description of where the work is to be performed within Albany County facilities:

Commercial HVAC & Plumbing



Signature

Kevin Farrell

Printed Name

CFO

Title

03/20/2025

Date

ATTACHMENT "F"
BIDDER QUALIFICATION QUESTIONNAIRE

The undersigned guarantees the accuracy of all statements and answers herein contained. (Please print in ink or type in the spaces provided). Attach additional sheets if necessary. This statement of Bidder's qualifications is required of all Bidders. Additional data on Bidder's qualifications may be requested from selected Bidders after the Bid opening.

1. How many years has your firm been in business? 34 years

2. List up to three (3) projects of this nature that you have completed in the last three (3) years, and give the name, address and telephone number of a reference from each. Also give the completion date, the original contract bid price and the completed cost of each project listed.

1. Amsterdam Central High School - HVAC Rhase 3

Mike Greco - 518-843-3180 PO Box 309 Amsterdam, NY 12010

\$4,287,000 Comp 11/30/2022

2. Ichabod Crane CSD - District Wide Phase 3 HVAC

Sarah Plitnick 518-646-1049 - 1 Computer Drive South Albany, NY 12205

\$3,047,000 Comp Apr 2023

3. BOCES CTE Campus - Plumbing/HVAC

Jason Bruhn 518-452-8200 - 302 Washington Ave Ext Albany, NY 12203

\$1,512,800 Comp March 2023

BQ1

ATTACHMENT "F"
BIDDER QUALIFICATION QUESTIONNAIRE

3. List projects presently under contract by your firm, the dollar volume of the contract and the percentage completion of the contract.

Air Traffic Control Center \$1,415,000.00 - 95%

72 Bed Hospitality House - \$614,000 - 5%

Siena College Science Building - \$6,081,000 - 9%

Flight Simulator Facility - 1,640,000 - 7%

Watervliet Arsenal - Paint Booth - \$640,300 - 75%

Hyatt House Mohawk Harbor - \$1,505,000 - 5%

4. Has your firm ever failed to complete work awarded to it, if so, state where and why.

No

5. Is your firm presently or has your firm ever been a party defendant in a lawsuit commenced against your firm alleging failure to properly complete work in accordance with the contract for same; if so, give details.

No

ATTACHMENT "F"
BIDDER QUALIFICATION QUESTIONNAIRE

6. Has your firm received two (2) final determinations within any consecutive six-year period, the second final determination occurring within the past five (5) years, that your firm willfully failed to pay the prevailing rate of wages or to provide supplements with Article 8 of the Labor Law, if so, give details.

No

7. Do you plan to sublet any part of this work? If so, give details.

No

8. Give the name, address and telephone number of an individual who represents each of the following and whom the Owner may contact to investigate your financial responsibility: a surety, and a bank.

Surety - Wendy Diaco - 25 Mohawk Ave Scotia, NY 12302 - 518-384-1100

Bank - Brian Stickles - 302 Main St Catskill, NY 12414 - 518-943-2600

BQ3

ATTACHMENT "F"
BIDDER QUALIFICATION QUESTIONNAIRE

9. Give a summary of your financial statement. (List assets and liabilities, use an insert sheet, if needed).

See Attached

10. State the true, exact, correct and complete name of the partnership, corporation or trade name under which you do business, and the address of the place of business. (If a corporation, state the name and title of all officers. If a partnership, state the name of all partners. If a trade name, state the names of the individuals who do business under the trade name.) It is absolutely necessary that information be furnished.

Collett Mechanical, Inc.

Correct Name of Bidder

(a) The business is a: S- Corp

(b) The address of principal place of business is: 138 Sicker Rd Latham, NY 12110

(c) The names of the corporate officers, or partners, or individuals doing business under a trade name, are as follows:

Jack E. Collett - President

Kevin P. Farrell - Secretary

ATTACHMENT "F"
BIDDER QUALIFICATION QUESTIONNAIRE

11. Is your firm qualified to do business in the State of New York? Yes ☒ No ____.
If No, signing this qualification statement constitutes agreement to obtain such qualification prior to award of contract immediately upon owner's request.

Collett Mechanical, Inc._____
Firm

Dated: 03/20/2025

By _____

Kevin Farrell_____
(Typed)

COLLETT MECHANICAL, INC. AND AFFILIATES

**Consolidated Financial Statements
and Independent Accountant's Review Report**

December 31, 2023 and 2022

COLLETT MECHANICAL, INC. AND AFFILIATES

December 31, 2023 and 2022

Consolidated Financial Statements

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WOJESKI & COMPANY CPAs, P.C.

159 Wolf Road, Albany, New York 12205 | Phone 518-477-1102 | Fax 518-477-1302 | www.wojeskico.com

INDEPENDENT ACCOUNTANT'S REVIEW REPORT

To the Board of Directors
Collett Mechanical, Inc. and Affiliates

We have reviewed the accompanying consolidated financial statements of Collett Mechanical, Inc. and Affiliates (the "Company"), which comprise the consolidated balance sheets as of December 31, 2023 and 2022, and the related consolidated statements of income, changes in shareholder's equity, and cash flows for the years then ended, and the related notes to the consolidated financial statements. A review includes primarily applying analytical procedures to management's financial data and making inquiries of entity management. A review is substantially less in scope than an audit, the objective of which is the expression of an opinion regarding the consolidated financial statements as a whole. Accordingly, we do not express such an opinion.

Management's Responsibility for the Consolidated Financial Statements

Management is responsible for the preparation and fair presentation of these consolidated financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of consolidated financial statements that are free from material misstatement whether due to fraud or error.

Accountant's Responsibility

Our responsibility is to conduct the review engagements in accordance with Statements on Standards for Accounting and Review Services promulgated by the Accounting and Review Services Committee of the AICPA. Those standards require us to perform procedures to obtain limited assurance as a basis for reporting whether we are aware of any material modifications that should be made to the consolidated financial statements for them to be in accordance with accounting principles generally accepted in the United States of America. We believe that the results of our procedures provide a reasonable basis for our conclusion.

We are required to be independent of the Company and to meet our other ethical responsibilities, in accordance with the relevant ethical requirements related to our review.

Basis for Qualified Conclusions

As discussed in Note A to the consolidated financial statements, the Company recognizes revenue from contracts using the percentage-of-completion method and has not determined revenue under Accounting Standards Codification 606, *Revenue from Contracts with Customers*. Management has not determined the effects of this departure from accounting principles generally accepted in the United States of America on the financial position, results of operations, and cash flows.

Qualified Conclusions

Based on our reviews, except for the effect of the matter disclosed in the Basis for Qualified Conclusions paragraph, we are not aware of any material modifications that should be made to the accompanying consolidated financial statements in order for them to be in accordance with accounting principles generally accepted in the United States of America.

Supplementary Information

The accompanying supplementary information included in Schedules I, II, III and IV is presented for purposes of additional analysis and is not a required part of the basic consolidated financial statements. Such information is the responsibility of management and was derived from, and relates directly to, the underlying accounting and other records used to prepare the consolidated financial statements. The supplementary information has been subjected to the review procedures applied in our review of the basic consolidated financial statements. We are not aware of any material modifications that should be made to the supplementary information. We have not audited the supplementary information and do not express an opinion on such information.

Wojeski & Company, CPAs, P.C.

Albany, New York
June 14, 2024

COLLETT MECHANICAL, INC. AND AFFILIATES**Consolidated Balance Sheets**

	December 31,	
	2023	2022
ASSETS		
CURRENT ASSETS		
Cash and cash equivalents	\$ 394,339	\$ 389,407
Contract receivables, net of allowance for credit losses of \$115,527 and \$50,000, respectively.	7,993,109	9,904,079
Costs and estimated earnings in excess of billings on uncompleted contracts	294,847	675,888
Prepaid expenses	165,234	154,189
Inventory	318,630	318,630
TOTAL CURRENT ASSETS	9,166,159	11,442,193
PROPERTY, PLANT AND EQUIPMENT		
Vehicles	1,671,108	1,491,733
Office equipment	272,606	272,606
Machinery and equipment	948,587	870,587
Building and improvements	3,249,123	3,249,123
	6,141,424	5,884,049
Less accumulated depreciation	2,832,277	2,596,873
	3,309,147	3,287,176
	\$ 12,475,306	\$ 14,729,369

See accompanying notes and independent accountant's review report.

	December 31,	
	2023	2022
LIABILITIES AND SHAREHOLDER'S EQUITY		
CURRENT LIABILITIES		
Lines of credit	\$ 975,000	\$ 1,828,506
Current portion of long-term debt	256,267	237,482
Accounts payable	2,810,131	2,588,803
Accrued expenses and payroll	734,043	734,965
Billings in excess of costs and estimated earnings on uncompleted contracts	897,469	1,633,149
Deferred revenue	-	17,025
TOTAL CURRENT LIABILITIES	5,672,910	7,039,930
Long-term debt, net of current portion	2,438,004	2,456,219
TOTAL LIABILITIES	8,110,914	9,496,149
SHAREHOLDER'S EQUITY		
Common stock, no par value, 100 shares authorized, issued and outstanding	-	-
Additional paid-in capital	100,000	100,000
Retained earnings	2,870,248	4,042,139
	2,970,248	4,142,139
NONCONTROLLING INTEREST IN AFFILIATES	1,394,144	1,091,081
TOTAL SHAREHOLDER'S EQUITY	4,364,392	5,233,220
	\$ 12,475,306	\$ 14,729,369

See accompanying notes and independent accountant's review report.

COLLETT MECHANICAL, INC. AND AFFILIATES**Consolidated Statements of Income**

	December 31,	
	2023	2022
REVENUE		
Contract	\$ 24,594,478	\$ 25,246,024
Service	4,065,395	3,284,495
	<u>28,659,873</u>	<u>28,530,519</u>
TOTAL REVENUE		
COSTS OF REVENUE		
Contract	18,419,386	20,743,595
Service	2,868,334	2,382,817
	<u>21,287,720</u>	<u>23,126,412</u>
TOTAL COSTS OF REVENUE		
GROSS PROFIT	7,372,153	5,404,107
INDIRECT COSTS OF REVENUE	561,317	557,242
GENERAL AND ADMINISTRATIVE EXPENSES	<u>3,564,197</u>	<u>3,018,919</u>
INCOME FROM OPERATIONS	3,246,639	1,827,946
OTHER INCOME (EXPENSES)		
Gain on disposal of assets	4,092	-
Other income	88	646
Other expense	(1,500)	-
Interest expense	<u>(192,308)</u>	<u>(165,197)</u>
TOTAL OTHER INCOME (EXPENSES)	<u>(189,628)</u>	<u>(164,551)</u>
NET INCOME BEFORE NONCONTROLLING INTEREST	3,057,011	1,663,395
NET INCOME ATTRIBUTABLE TO NONCONTROLLING INTEREST IN AFFILIATES	<u>(753,220)</u>	<u>(567,877)</u>
NET INCOME	<u>\$ 2,303,791</u>	<u>\$ 1,095,518</u>

See accompanying notes and independent accountant's review report.

COLLETT MECHANICAL, INC. AND AFFILIATES

Consolidated Statements of Changes in Shareholder's Equity

	Additional Paid-in Capital	Retained Earnings	Noncontrolling Interest in Affiliates	Total
Balance at December 31, 2021	\$ 100,000	\$ 4,110,907	\$ 702,780	\$ 4,913,687
Net income	-	1,095,518	567,877	1,663,395
Shareholder distributions	-	(1,164,286)	(179,576)	(1,343,862)
Balance at December 31, 2022	100,000	4,042,139	1,091,081	5,233,220
Net income	-	2,303,791	753,220	3,057,011
Shareholder distributions	-	(3,475,682)	(450,157)	(3,925,839)
Balance at December 31, 2023	\$ 100,000	\$ 2,870,248	\$ 1,394,144	\$ 4,364,392

See accompanying notes and independent accountant's review report.

COLLETT MECHANICAL, INC. AND AFFILIATES**Consolidated Statements of Cash Flows**

	Years Ended December 31	
	2023	2022
CASH FLOWS FROM OPERATING ACTIVITIES		
Net income	\$ 2,303,791	\$ 1,095,518
Adjustments to reconcile net income to net cash provided by (used in) operating activities:		
Depreciation	264,001	224,823
Credit loss expense	65,527	-
Gain on disposal of assets	(4,092)	-
Increase in noncontrolling interest	753,220	567,877
Changes in operating assets and liabilities:		
Contract receivables	1,845,443	(4,080,439)
Costs and estimated earnings in excess of billings on uncompleted contracts	381,041	137,719
Prepaid expenses	(11,045)	(11,568)
Accounts payable	221,328	445,792
Accrued expenses and payroll	(922)	(6,313)
Billings in excess of costs and estimated earnings on uncompleted contracts	(735,680)	1,181,336
Deferred revenue	(17,025)	926
NET CASH PROVIDED BY (USED IN) OPERATING ACTIVITIES	5,065,587	(444,329)
CASH FLOWS FROM INVESTING ACTIVITIES		
Purchase of property, plant and equipment	-	(241,158)
NET CASH USED IN INVESTING ACTIVITIES	-	(241,158)

See accompanying notes and independent accountant's review report.

COLLETT MECHANICAL, INC. AND AFFILIATES**Consolidated Statements of Cash Flows--Continued**

	Years Ended December 31	
	2023	2022
CASH FLOWS FROM FINANCING ACTIVITIES		
Principal payments under long-term debt agreements	\$ (281,310)	\$ (196,088)
Proceeds from (payments on) lines of credit, net	(853,506)	1,828,506
Distributions to shareholder	(3,475,682)	(1,164,286)
Distributions to noncontrolling interests in affiliates	<u>(450,157)</u>	<u>(179,576)</u>
NET CASH PROVIDED BY (USED IN) FINANCING ACTIVITIES	<u>(5,060,655)</u>	<u>288,556</u>
NET INCREASE (DECREASE) IN CASH AND CASH EQUIVALENTS	4,932	(396,931)
Cash and cash equivalents at beginning of year	<u>389,407</u>	<u>786,338</u>
CASH AND CASH EQUIVALENTS AT END OF YEAR	<u><u>\$ 394,339</u></u>	<u><u>\$ 389,407</u></u>
SUPPLEMENTAL DISCLOSURES:		
Cash paid during the year for interest	<u><u>\$ 192,308</u></u>	<u><u>\$ 165,197</u></u>
SUPPLEMENTAL SCHEDULE OF NONCASH INVESTING AND FINANCING ACTIVITIES		
Property, plant and equipment additions	\$ 320,922	\$ 576,104
Less amount financed through long-term debt	<u>(320,922)</u>	<u>(334,947)</u>
Purchase of property, plant, and equipment	<u><u>\$ -</u></u>	<u><u>\$ 241,157</u></u>
Long-term debt retired through refinancing	<u><u>\$ 39,042</u></u>	<u><u>\$ 667,449</u></u>

See accompanying notes and independent accountant's review report.

COLLETT MECHANICAL, INC. AND AFFILIATES

Notes to Consolidated Financial Statements

December 31, 2023 and 2022

NOTE A--ORGANIZATION AND SIGNIFICANT ACCOUNTING POLICIES

Collett Mechanical, Inc. and Affiliates (the Company) is a closely held corporation formed in 1994. The Company is engaged primarily in the installation of plumbing, heating, and air conditioning systems for commercial and industrial facilities generally performed under fixed price contracts as modified from time to time, the majority of which are one year or less.

The following is a summary of the significant accounting policies of the Company:

Consolidated Variable Interest Entities

Collett Mechanical, Inc. is the primary beneficiary of Collett Mechanical Service, Inc., which is considered a variable interest entity. Accordingly, the assets and liabilities and revenues and expenses of Collett Mechanical Service, Inc. have been included in the Company's consolidated financial statements. Collett Mechanical Service, Inc. was formed for the purposes of performing service and maintenance contracts. As of December 31, 2023 and 2022, the consolidated amounts consisted of the following:

	<u>2023</u>	<u>2022</u>
Assets	\$ 2,134,013	\$ 2,078,704
Liabilities	\$ 570,818	\$ 784,050
Revenues	\$ 4,132,129	\$ 3,490,753
Expenses	\$ 3,459,322	\$ 2,986,061
Net income	\$ 672,807	\$ 504,692

Collett Mechanical, Inc. is also the primary beneficiary of DJCD Realty, LLC, which is considered a variable interest entity. Accordingly, the assets and liabilities and revenues and expenses of DJCD Realty, LLC have been included in the Company's consolidated financial statements. DJCD Realty, LLC was formed to hold real estate. As of December 31, 2023 and 2022, the consolidated amounts consisted of the following:

	<u>2023</u>	<u>2022</u>
Assets	\$ 1,212,899	\$ 1,220,981
Liabilities	\$ 1,363,480	\$ 1,416,366
Revenues	\$ 231,167	\$ 229,587
Expenses	\$ 140,473	\$ 145,259
Net income	\$ 90,694	\$ 84,328

COLLETT MECHANICAL, INC. AND AFFILIATES**Notes to Consolidated Financial Statements--Continued****NOTE A--ORGANIZATION AND SIGNIFICANT ACCOUNTING POLICIES--Continued**

Collett Mechanical, Inc. is also the primary beneficiary of DJCD Cortland Realty, LLC, which is considered a variable interest entity. Accordingly, the assets and liabilities and revenues and expenses of DJCD Cortland Realty, LLC have been included in the Company's consolidated financial statements. DJCD Cortland Realty, LLC was formed in the current year to hold real estate. As of December 31, 2023 and 2022, the consolidated amounts consisted of the following:

	<u>2023</u>	<u>2022</u>
Assets	\$ <u>904,019</u>	\$ <u>944,542</u>
Liabilities	\$ <u>922,489</u>	\$ <u>952,730</u>
Revenues	\$ <u>96,006</u>	\$ <u>74,000</u>
Expenses	\$ <u>106,287</u>	\$ <u>95,143</u>
Net loss	\$ <u>(10,281)</u>	\$ <u>(21,143)</u>

All intercompany accounts and transactions have been eliminated in consolidation.

Use of Estimates

The preparation of consolidated financial statements in conformity with accounting principles generally accepted in the United States of America (U.S. GAAP) requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the consolidated financial statements and the reported amounts of revenues and expenses during the reporting period. In these consolidated financial statements, certain assets and liabilities, and earnings from contracts involve extensive reliance on management's estimates. Actual results could differ from those estimates.

Cash and Cash Equivalents

For the purpose of reporting on the accompanying consolidated balance sheet and statement of cash flows, the Company considers all cash accounts, which are not subject to withdrawal restrictions or penalties, to be cash equivalents.

The Company's cash balances in financial institutions may at times exceed federally insured limits.

Contract Receivables

Contract receivables are non-interest-bearing short-term customer obligations and are stated at the amount invoiced to customers less an allowance for credit losses. Contract receivables represent the Company's unconditional right to receive consideration arising from the performance under contracts with customers.

COLLETT MECHANICAL, INC. AND AFFILIATES

Notes to Consolidated Financial Statements--Continued

NOTE A--ORGANIZATION AND SIGNIFICANT ACCOUNTING POLICIES--Continued

Contract Receivables--Continued

The allowance for credit losses is based on the Company's historic losses based on the aging of receivables. The estimate is adjusted for management's assessment of current economic conditions, reasonable and supportable forecasts regarding future events, and any other factors deemed relevant by the Company.

Contract receivables are written off and charged against the allowance for credit losses when the Company determines that it is probable the receivable will not be recovered. If any recoveries are made from amounts previously written off, the recoveries will be recognized in income or an offset to credit loss expense in the year of recovery.

Inventory

Inventory consists of equipment parts, reusable materials, and accessories, and is stated at the lower of cost or market.

Property, Plant and Equipment

Property, plant, and equipment are recorded at cost. The cost of property and equipment is depreciated using the straight-line method over the estimated useful lives of the related assets, generally ranging from 3 to 39 years. Expenditures for acquisitions, renewals and betterments that extend the useful lives of the property and equipment are capitalized. Expenditures for maintenance and repairs are charged to expense as incurred.

Revenue and Cost Recognition

The Company recognizes revenue from contracts using the percentage-of-completion method, measured by the percentage of cost incurred to date to estimated total cost for each contract. Management considers total costs to date to total estimated contract costs to be the best available measure of progress on the contracts. Management has not adopted the accounting pronouncements of Accounting Standards Codification 606, *Revenue from Contracts with Customers*.

Contract costs include all direct material, subcontractors and labor costs and those indirect costs related to contract performance, such as indirect labor, supplies, tools, repairs and depreciation. General and administrative costs are charged to expense as incurred.

Provisions for estimated losses on uncompleted contracts are made in the period in which such losses are determined. Changes in estimated job profitability resulting from job performance, job conditions, contract penalty provisions, claims, change orders, and settlements, are accounted for as changes in estimates in the current period. The asset, "Costs and estimated earnings in excess of billings on uncompleted contracts," represents revenue recognized in excess of amounts billed. The liability, "Billings in excess of costs and estimated earnings on uncompleted contracts," represents billings in excess of revenue recognized.

COLLETT MECHANICAL, INC. AND AFFILIATES

Notes to Consolidated Financial Statements--Continued

NOTE A--ORGANIZATION AND SIGNIFICANT ACCOUNTING POLICIES--Continued

Revenue and Cost Recognition--Continued

Service revenue is derived from maintenance or time and materials contracts. The revenue is recognized as the services are performed or, in the case of a maintenance contract, ratably over the maintenance term.

Due to inherent uncertainties in the Company's estimation process, and uncertainties relating to future performance as the contracts are completed, it is at least reasonably possible that estimated revenue and costs, in total or on individual contracts, will be revised.

Warranty Liability

The Company's warranty provisions will depend on the contract, but generally cover a period of up to one year from completed installation. Accordingly, the Company has established a warranty liability accrual at December 31, 2023 and 2022, of \$46,243 and \$51,859, respectively, which is included in the consolidated balance sheet caption "accrued expenses and payroll."

Income Taxes

The shareholder of Collett Mechanical, Inc. has elected under Subchapter "S" of the Internal Revenue Code to be treated as a "small business corporation." Collett Mechanical Service, Inc. has made the same election. As a result of this election, no federal income tax provision has been included in the consolidated financial statements since income or loss of the corporations for each year will be reported on the individual income tax return of its shareholder with the resulting income taxes paid by the shareholder. Some states, municipalities and foreign countries impose income taxes on corporations electing Subchapter "S" status. DJCD Realty, LLC and DJCD Cortland Realty, LLC are limited liability companies. A provision for income tax is not included in the consolidated financial statements as their income is taxed similar to a partnership. The members are taxed on their share of the limited liability companies' income.

The Company is no longer subject to income tax examinations by federal or state tax authorities for years before 2020, and currently, there are no income tax examinations in process nor has the Company been informed of any pending income tax examinations. Management has evaluated the Company's tax positions, including interest and penalties attributable thereto, and concluded that the Company has no income tax positions that required adjustment to its financial statements as of December 31, 2023 and 2022.

Accounting Standards Update Adopted

On January 1, 2023, the Company adopted FASB ASU 2016-13, *Financial Instruments – Credit Losses (Topic 326); Measurement of Credit Losses on Financial Instruments*, as amended, which modifies the measurement of expected credit losses on certain financial instruments that are measured at amortized cost, such as contract receivables. The most significant change in this standard is a shift from the incurred loss model to the expected loss model.

COLLETT MECHANICAL, INC. AND AFFILIATES**Notes to Consolidated Financial Statements--Continued****NOTE A--ORGANIZATION AND SIGNIFICANT ACCOUNTING POLICIES--Continued**Accounting Standards Update Adopted--Continued

Under the standard, disclosures are required to provide users of the financial statements with useful information in analyzing an entity's exposure to credit risk and the measurement of credit losses.

The Company adopted the new standard using the modified retrospective method for all financial assets measured at amortized cost as of January 1, 2023. A cumulative-effect adjustment of the beginning balance of retained earnings was not required. Results for reporting periods beginning prior to January 1, 2023 continue to be reported in accordance with the Company's historical accounting treatment.

Subsequent Events

The Company has evaluated for subsequent events between the consolidated balance sheet date of December 31, 2023 and June 14, 2024, the date the consolidated financial statements were available to be issued.

NOTE B--CONTRACT RECEIVABLES, NET OF ALLOWANCE FOR CREDIT LOSSES

Contract receivables consist of the following at December 31:

	<u>2023</u>	<u>2022</u>
Contract receivable	\$ 5,938,344	\$ 7,418,206
Retainage	<u>2,170,292</u>	<u>2,535,873</u>
	8,108,636	9,954,079
Less allowance for credit losses	<u>(115,527)</u>	<u>(50,000)</u>
	<u>\$ 7,993,109</u>	<u>\$ 9,904,079</u>

The Company had the following activity for its allowance for credit losses for accounts receivable for the year ended December 31, 2023:

	<u>2023</u>	<u>2022</u>
Beginning balance	\$ 50,000	\$ 50,000
Provision for expected credit losses	65,527	-
Write-offs	-	-
Ending balance	<u>\$ 115,527</u>	<u>50,000</u>

COLLETT MECHANICAL, INC. AND AFFILIATES**Notes to Consolidated Financial Statements--Continued****NOTE C--UNCOMPLETED CONTRACTS**

Costs, estimated earnings, and billings on uncompleted contracts are summarized as follows at December 31:

	<u>2023</u>	<u>2022</u>
Costs incurred on uncompleted contracts	\$ 23,113,397	\$ 24,682,853
Estimated earnings	<u>6,859,634</u>	<u>7,465,332</u>
	29,973,031	32,148,185
Less: billings to date	<u>30,575,653</u>	<u>33,105,446</u>
	<u>\$ (602,622)</u>	<u>\$ (957,261)</u>

The amounts shown above are included in the accompanying consolidated balance sheet under the following captions:

	<u>2023</u>	<u>2022</u>
Costs and estimated earnings in excess of billings on uncompleted contracts	\$ 294,847	\$ 675,888
Billings in excess of costs and estimated earnings on uncompleted contracts	<u>(897,469)</u>	<u>(1,633,149)</u>
	<u>\$ (602,622)</u>	<u>\$ (957,261)</u>

NOTE D--LINES OF CREDIT

Collett Mechanical, Inc. has available a \$2,000,000 revolving line of credit with a bank, collateralized by all assets of the Company and guaranteed by Collett Mechanical Services, Inc. and Collett Mechanical, Inc.'s sole shareholder. Interest is payable monthly at the prime rate (8.50% at December 31, 2023), with a floor of 3.25%. The balance outstanding on the line was \$900,000 and \$1,628,506 as of December 31, 2023 and 2022, respectively.

Collett Mechanical, Inc. has available a \$500,000 equipment line of credit with a bank. Interest is payable at the prime rate plus .5% (9.00% at December 31, 2023), with a floor of 3.75%. Withdrawals on the line are collateralized by specific vehicles or equipment purchased through the line of credit. The line is guaranteed by Collett Mechanical Services, Inc. and Collett Mechanical, Inc.'s sole shareholder. At December 31, 2023 and 2022, the Company had no outstanding balance.

Collett Mechanical Service, Inc. has available a \$200,000 equipment line of credit with a bank. Interest is payable at the prime rate (8.5% at December 31, 2023), with a floor of 3.25%. Withdrawals on the line are collateralized by all business assets of Collett Mechanical Service, Inc. and is guaranteed by Collett Mechanical, Inc. and Collett Mechanical, Inc.'s sole shareholder. The outstanding balance on the line was \$75,000 and \$200,000 as of December 31, 2023 and 2022, respectively.

COLLETT MECHANICAL, INC. AND AFFILIATES**Notes to Consolidated Financial Statements--Continued****NOTE E--LONG-TERM DEBT**

Long-term debt, summarized by debtor, consisted of the following at December 31:

	<u>2023</u>	<u>2022</u>
<u>Collett Mechanical, Inc.</u>		
Notes payable to various financial institutions, payable in monthly installments ranging from \$650 to \$5,623, plus interest ranging from 2.90% to 8.20%, due at various times through September 2028 collateralized by various assets of the Company.	\$ 356,468	\$ 300,087
<u>Collett Mechanical Service, Inc.</u>		
Notes payable to various financial institutions, payable in monthly installments of \$924 to \$1,631, plus interest ranging from 3.75% to 5.99%, due at various times through March 2029, collateralized by vehicles.	55,682	24,788
<u>DJCD Realty, LLC</u>		
Mortgage note payable with a fixed interest rate of 3.49%, payable in monthly installments of \$8,732, through April 2041. The interest rate is subject to a reset after 10 years and every 5 years thereafter, based on the Federal Home Loan Bank 10-year Amortizing Advance rate plus a margin of 3% per annum. The mortgage is collateralized by real property and is guaranteed by the sole shareholder of Collett Mechanical Service, Inc and Collett Mechanical, Inc.	1,360,532	1,416,096
<u>DJCD Cortland Realty, LLC</u>		
Mortgage note payable with a fixed interest rate of 4.49%, payable in monthly installments of \$5,957 including interest, through May, 2043, collateralized by the land, building and building improvements.	921,589	952,730
	2,694,271	2,693,701
	(256,267)	(237,482)
Less current portion	\$ 2,438,004	\$ 2,456,219
Long-term		

COLLETT MECHANICAL, INC. AND AFFILIATES

Notes to Consolidated Financial Statements--Continued

NOTE E--LONG-TERM DEBT--Continued

The principal maturities of long-term debt are as follows:

Year Ended December 31,	
2024	\$ 256,267
2025	171,883
2026	180,021
2027	158,914
2028	122,901
Thereafter	<u>1,804,285</u>
	<u>\$ 2,694,271</u>

Management believes the Company was in compliance with all covenants to which it is subject.

NOTE F--EMPLOYEE BENEFIT PLAN

The Company maintains a 401(k) profit sharing plan (the Plan) covering substantially all employees, subject to certain eligibility requirements. Eligible employees may make salary deferral contributions subject to limitations under Internal Revenue Code Section 401(k). Employer contributions to the Plan are discretionary and are determined annually by the Board of Directors. The Company made a profit sharing contribution of approximately \$76,000 and \$77,000 the years ended December 31, 2023 and 2022, respectively.

NOTE G--RELATED PARTY TRANSACTIONS

The Company performs subcontractor services for another entity that is minority owned by the sole shareholder of the Company. Revenues received from that entity were approximately \$324,000 and \$93,000 for the years ended December 31, 2023 and 2022, respectively.

NOTE H--MULTI-EMPLOYER PENSION AND POST RETIREMENT PLAN

In connection with its collective bargaining agreement with various unions, the Company participates with other companies in the construction industry in defined benefit pension plans. These plans cover the Company's employees who are members of the unions.

The following table summarizes the Company's participation in significant defined benefit plans:

COLLETT MECHANICAL, INC. AND AFFILIATES**Notes to Consolidated Financial Statements--Continued****NOTE H--MULTI-EMPLOYER PENSION AND POST RETIREMENT PLAN--Continued**

Pension Fund	EIN/Pension Plan Number	Pension Protection Act Zone Status 2023	Contributions 2023	Expiration Date of Collective Bargaining Agreement
Local 7	91-2055384-001	Green	\$ 948,805	4/30/25

Certified zone status (as defined by the Pension Protection Act) represents the level at which the plan is funded. Plans in the red zone are less than 65% funded; plans in the yellow zone are less than 80% funded; and plans in the green zone are at least 80% funded. The Company's contributions to all multi-employer defined benefit plans which employees participate in totaled \$1,019,280 and \$1,093,228 for the years ended December 31, 2023 and 2022, respectively.

NOTE I--MAJOR CONCENTRATIONSConcentration by revenue source--Continued

Approximately 67% and 68% of the Company's revenue for the years ended December 31, 2023 and 2022, was from five and three customers, respectively. Approximately 43% and 58% of the contract receivable balance at December 31, 2023 and 2022, were due from three and five customers, respectively.

Concentration by distributor

Approximately 48% and 90% of the Company's material and supply purchases were from four distributors and two distributors, for the years ended December 31, 2023 and 2022, respectively.

Concentration by labor union

Approximately 86% and 88% of the Company's contract labor were from three labor unions, for the years ended December 31, 2023 and 2022.

SUPPLEMENTARY INFORMATION

COLLETT MECHANICAL, INC. AND AFFILIATES**Consolidated Costs of Revenue (Schedule I)**

	Years Ended December 31	
	2023	2022
COSTS OF REVENUE		
Materials	\$ 6,668,641	\$ 7,366,755
Labor	5,719,438	6,181,700
Subcontractors	3,692,755	3,574,224
Payroll fringes and taxes	2,690,556	3,265,367
Equipment	1,987,915	2,126,520
Insurance	386,897	454,017
Fuel	10,470	14,000
Other equipment costs	131,048	143,829
TOTAL COSTS OF REVENUE	<u>\$ 21,287,720</u>	<u>\$ 23,126,412</u>

See independent accountant's review report.

COLLETT MECHANICAL, INC. AND AFFILIATES**Consolidated General and Administrative Expenses (Schedule II)**

	Years Ended December 31	
	2023	2022
GENERAL AND ADMINISTRATIVE EXPENSES		
Salaries and wages	\$ 1,821,557	\$ 1,546,783
Payroll taxes and benefits	670,086	472,773
Depreciation	264,001	224,823
Materials and supplies	128,696	98,844
Dues and subscriptions	108,617	78,630
Equipment	94,535	104,817
Taxes and licenses	89,174	73,405
Automobile	69,443	88,378
Telephone	75,551	79,118
Credit loss expense	65,527	-
Utilities	53,031	59,319
Repairs and maintenance	40,493	27,915
Professional fees	34,625	34,195
Computer	16,446	20,382
Travel	5,847	21,712
Charitable contributions	4,500	21,063
Bond expense	4,375	-
Postage	2,822	1,671
Bank fees	1,630	5,169
Marketing and development	1,155	33,500
Advertising	275	12,385
Landscaping	-	3,735
Other expenses	11,811	10,302
TOTAL GENERAL AND ADMINISTRATIVE EXPENSES	<u>\$ 3,564,197</u>	<u>\$ 3,018,919</u>

See independent accountant's review report.

COLLETT MECHANICAL, INC. AND AFFILIATES**Consolidated Earnings from Contracts (Schedule III)****For the year ended December 31, 2023**

	Contract Revenue Earned	Cost of Revenue Earned	Gross Profit
Contracts completed during the year	\$ 28,556,892	\$ 21,440,306	\$ 7,116,586
Contracts in progress at year end	29,973,031	23,113,397	6,859,634
Contracts in progress in prior year	<u>(33,935,445)</u>	<u>(26,134,317)</u>	<u>(7,801,128)</u>
	<u>\$ 24,594,478</u>	<u>\$ 18,419,386</u>	6,175,092
Service contracts	<u>\$ 4,065,395</u>	<u>\$ 2,868,334</u>	<u>1,197,061</u>
TOTAL GROSS PROFIT			<u>\$ 7,372,153</u>

See independent accountant's review report.

COLLETT MECHANICAL, INC. AND AFFILIATES

Consolidated Contracts Completed and in Progress (Schedule IV)

Year Ended December 31, 2023

Job #	Description	Estimated Cost at Completion	Estimated Gross Profit	Est Gross Profit %	Actual Costs to Date	Percent Comp %	Gross Profit to Date	Recognized Revenue to Date	Earnings in Excess of Billings	Costs in Billings in Excess of Earnings	Costs This Year	Billings Prior Year	Billings This Year	Billings to Date	Cost to Complete
17-039	Gilboa	653,597	184,416	28.22%	469,181	100.00%	184,416	653,597	-	-	14,331	646,011	7,586	653,597	-
20-006	Regeneron B17 Fill-Finish Plb	4,018,592	713,631	17.76%	3,304,761	100.00%	713,631	4,018,592	-	-	11,913	4,000,525	18,067	4,018,592	-
20-008	Monmouth County CF	926,020	178,698	19.30%	747,322	100.00%	178,698	926,020	-	-	3,235	907,430	18,590	926,020	-
20-034	Domestic Supply SPCA	39,500	22,468	56.88%	17,032	100.00%	22,468	39,500	-	-	1,603	17,897	18,897	39,500	-
20-036	Hosick Valley OGS Greene County	15,659	3,397	21.69%	12,262	100.00%	3,397	15,659	-	-	16,032	12,200	34,300	33,500	-
20-037	Hallmoon-Waterford Fire District #1	1,000,917	52,169	5.11%	948,748	100.00%	52,169	1,000,917	-	-	9,522	1,009,917	211	1,000,917	-
20-038	Regeneron B17 Fill-Finish Plb	2,056,027	345,477	16.80%	1,710,550	100.00%	345,477	2,056,027	-	-	21,521	1,975,551	80,466	2,056,027	-
21-012	BOCES CTE Camps	1,794,176	339,205	18.91%	1,454,971	100.00%	339,205	1,794,176	-	-	4,511	1,793,753	1,794,176	1,794,176	-
21-014	East Greenwich USD	712,530	790,029	-10.88%	790,029	100.00%	(77,499)	712,530	-	-	12,073	689,085	23,445	712,530	-
21-022	East Falls National Bank	552,624	64,262	11.61%	544,262	100.00%	64,262	552,624	-	-	16,187	516,697	38,927	552,624	-
21-026	East Falls National Bank	659,503	98,788	14.99%	560,715	100.00%	98,788	659,503	-	-	10,524	570,259	18,954	659,503	-
21-027	Cumtux C3-4 Exp	1,265,503	987,788	77.71%	277,715	100.00%	277,715	1,265,503	-	-	20,722	1,159,551	106,856	1,265,503	-
21-040	60 Choies Ave	643,759	534,947	82.96%	534,947	100.00%	108,812	643,759	-	-	35,234	623,136	15,623	643,759	-
21-041	Benjamin Moore	810,157	129,039	15.93%	681,118	100.00%	129,039	810,157	-	-	35,324	746,833	35,324	810,157	-
21-046	Regeneron Consult - Ken Wolf	147,258	72,632	49.30%	74,626	100.00%	147,258	147,258	-	-	10,573	126,330	20,928	147,258	-
22-004	Plug Power Vista	5,958,380	2,635,171	44.23%	3,323,209	100.00%	2,635,171	5,958,380	-	-	1,194,264	3,751,228	2,207,152	5,958,380	-
22-006	Walden Veterinary	1,168,894	931,363	79.71%	237,531	100.00%	931,363	1,168,894	-	-	19,053	1,132,751	36,143	1,168,894	-
22-009	Regeneron Consult - Ken Wolf	147,258	72,632	49.30%	74,626	100.00%	147,258	147,258	-	-	10,573	126,330	20,928	147,258	-
22-018	70 Cohoes Fill Room Flup	108,429	50,191	46.30%	58,238	100.00%	58,238	108,429	-	-	3,718	100,045	8,384	108,429	-
22-022	Lia Nissan	35,495	19,511	54.97%	15,984	100.00%	19,511	35,495	-	-	1,799	26,367	35,495	35,495	-
22-023	121 Everett Rd	59,641	18,802	31.53%	40,839	100.00%	18,802	59,641	-	-	21,016	26,270	33,371	59,641	-
22-025	Burt Crane Salkirk	57,378	13,263	23.12%	44,115	100.00%	13,263	57,378	-	-	5,378	37,378	57,378	57,378	-
22-026	B16 Grider Pump	81,888	18,650	22.78%	63,238	100.00%	18,650	81,888	-	-	6,328	77,545	81,888	81,888	-
22-028	Regeneron Vent Stack	21,875	13,846	63.31%	8,029	100.00%	13,846	21,875	-	-	9,655	12,915	31,949	12,849	-
22-029	Regeneron B85 Boiler #18	21,275	22,016	103.47%	22,016	100.00%	7,901	21,275	-	-	21,275	21,275	21,275	21,275	-
22-031	501 New Kerner Rd	95,000	60,586	63.78%	34,414	100.00%	34,414	95,000	-	-	15,200	79,800	95,000	95,000	-
22-035	Walnschaf 823 2nd Fl Reno	58,500	66,263	113.27%	66,263	100.00%	(7,763)	58,500	-	-	14,246	56,350	2,150	58,500	-
22-038	Dr Brass Drive	12,995	12,608	97.11%	12,608	100.00%	3,367	12,995	-	-	10,261	12,608	27,871	31,931	-
22-038	2 Wallaces Drive	14,455	14,455	100.00%	14,455	100.00%	14,455	14,455	-	-	12,995	12,995	12,995	12,995	-
22-042	Winners Restaurant	9,035	2,537	28.08%	6,498	100.00%	2,537	9,035	-	-	2,282	6,753	21,383	21,383	-
22-042	1028 Broadway	43,143	12,246	28.38%	30,897	100.00%	12,246	43,143	-	-	8,597	34,546	9,038	43,143	-
22-044	Park South Water Meter	2,822	853	30.21%	2,822	100.00%	853	2,822	-	-	3,675	3,675	3,675	3,675	-
22-044	2023 Warranty Work	9,892	(9,892)	#DIV/0!	9,892	100.00%	(9,892)	-	-	-	9,892	-	-	-	1,106
23-000	2023 Misc. Jobs	23,154	3,006	12.98%	20,148	100.00%	3,006	23,154	-	-	23,154	-	23,154	23,154	-
23-002	Regeneron T&B	314,470	344,060	109.41%	344,060	100.00%	(29,590)	314,470	-	-	344,060	-	314,470	314,470	-
23-003	205 Reverend Blvd 603	97,150	2,911	3.00%	94,239	100.00%	2,911	97,150	-	-	7,150	-	7,150	97,150	-
23-004	205 Reverend Blvd 603	97,150	2,911	3.00%	94,239	100.00%	2,911	97,150	-	-	7,150	-	7,150	97,150	-
23-005	Regeneron B85 Bathrooms	140,288	116,980	83.37%	23,308	100.00%	116,980	140,288	-	-	116,980	-	140,288	140,288	-
23-007	Walnschaf B30 1st Fl Demo	7,954	841	10.57%	7,113	100.00%	841	7,954	-	-	7,954	-	7,954	7,954	-
23-008	Plug Power Rochester	2,893,789	1,237,921	42.75%	1,655,868	100.00%	1,237,921	2,893,789	-	-	1,237,921	-	2,893,789	2,893,789	-
23-009	LaFarge Bathrooms Reno	116,413	102,234	87.90%	14,179	100.00%	102,234	116,413	-	-	102,234	-	116,413	116,413	-
23-010	4 Winners Circle - MCD	13,400	12,922	96.43%	4,478	100.00%	12,922	13,400	-	-	13,400	-	13,400	13,400	-
23-011	100 Choies - Tenant Flup	166,848	43,656	26.17%	123,192	100.00%	43,656	166,848	-	-	123,192	-	166,848	166,848	-
23-012	100 Choies - Tenant Flup	166,848	43,656	26.17%	123,192	100.00%	43,656	166,848	-	-	123,192	-	166,848	166,848	-
23-013	NBC Flup	6,400	5,825	91.01%	5,825	100.00%	575	6,400	-	-	5,825	-	6,400	6,400	-
23-015	Trustco Bank Clinton Park	17,200	4,793	27.86%	12,407	100.00%	4,793	17,200	-	-	4,793	-	17,200	17,200	-
23-015	Schoolhouse Rd Ped	91,549	26,364	28.80%	65,185	100.00%	26,364	91,549	-	-	65,185	-	91,549	91,549	-
23-017	Regeneron B30 1st Fl Reno	212,751	53,622	25.20%	159,129	100.00%	53,622	212,751	-	-	159,129	-	212,751	212,751	-
23-019	1204 Kings Rd Warehouse	91,310	79,683	87.16%	11,627	100.00%	79,683	91,310	-	-	79,683	-	91,310	91,310	-
23-020	42 Corporate Circle	96,507	11,514	11.93%	84,993	100.00%	11,514	96,507	-	-	86,993	-	96,507	96,507	-
23-021	Fort Lister Fire Dept	36,450	22,451	61.59%	13,999	100.00%	22,451	36,450	-	-	13,999	-	36,450	36,450	-
23-022	Fort Lister Fire Dept	100,519	20,123	20.02%	80,396	100.00%	20,123	100,519	-	-	80,396	-	100,519	100,519	-
23-024	Hudson Headwaters	10,940	10,613	97.00%	327	100.00%	10,613	10,940	-	-	10,613	-	10,940	10,940	-
23-025	Regeneron B7 VAV Piping	15,943	14,909	93.51%	1,034	100.00%	14,909	15,943	-	-	15,943	-	15,943	15,943	-
23-026	Regeneron B81 Condensate	17,597	13,508	76.77%	4,089	100.00%	13,508	17,597	-	-	13,508	-	17,597	17,597	-
23-028	Carey Electric Backflow	3,450	1,356	39.30%	2,094	100.00%	1,356	3,450	-	-	3,450	-	3,450	3,450	-
23-030	Decremento Water Heater	21,587	11,085	51.35%	10,502	100.00%	11,085	21,587	-	-	11,085	-	21,587	21,587	-
23-033	Croa 1367 2nd Fl Reno	78,467	49,649	63.29%	28,818	100.00%	49,649	78,467	-	-	49,649	-	78,467	78,467	-
23-036	Unit House Misc Work	5,490	1,837	33.45%	3,653	100.00%	1,837	5,490	-	-	1,837	-	5,490	5,490	-
23-037	Siena St. Franc & Serra Manor	13,924	11,223	80.63%	2,701	100.00%	11,223	13,924	-	-	11,223	-	13,924	13,924	-
23-038	Cumtux Compressor	8,990	3,646	40.55%	5,344	100.00%	3,646	8,990	-	-	3,646	-	8,990	8,990	-
23-039	2 Wallaces Water Meter	3,660	2,704	73.88%	956	100.00%	2,704	3,660	-	-	2,704	-	3,660	3,660	-
23-040	2 Wallaces Water Meter	3,660	2,704	73.88%	956	100.00%	2,704	3,660	-	-	2,704	-	3,660	3,660	-
23-041	Croa MBI & CT Replacement	18,350	10,815	59.00%	7,535	100.00%	10,815	18,350	-	-	10,815	-	18,350	18,350	-
23-045	Well Now Ballston Spa	15,760	13,030	83.32%	2,730	100.00%	13,030	15,760	-	-	13,030	-	15,760	15,760	-
23-047	Regeneron B12 Water Meter	9,870	3,218	32.60%	6,652	100.00%	3,218	9,870	-	-	6,652	-	9,870	9,870	-
23-048	QC Kneith	36,459	25,023	68.64%	11,436	100.00%	25,023	36,459	-	-	25,023	-	36,459	36,459	-
23-050	Plug Vista T&V	-	579,252	#DIV/0!	579,252	100.00%	(579,252)	-	-	-	579,252	-	-	-	-
23-888	CO2 - NO SPECIFIC JOB	-	30,355	#DIV/0!	30,355	100.00%	(30,355)	-	-	-	30,355	-	-	-	-
Total Closed Jobs		\$ 20,556,892	\$ 21,440,306		\$ 21,440,306	100.00%	\$ 7,110,366	\$ 20,556,892	\$ -	\$ -	\$ 16,256,299	\$ 20,321,388	\$ 8,235,504	\$ 20,556,892	\$ 1,106

See independent accountant's review report.

COLLETT MECHANICAL, INC. AND AFFILIATES
Consolidated Contracts Completed and in Progress (Schedule IV)—Continued
Year Ended December 31, 2023

Job #	Description	Revised	Estimated Cost at Completion	Estimated Gross Profit	Est Gross Profit %	Actual Costs to Date	Comp %	Gross Profit to Date	Revenue to Date	Billings in Excess of Costs & Earnings	Costs Prior Year	Costs This Year	Billings Prior Year	Billings This Year	Billings to Date	Cost to Complete	
20-090	IDA Verbruggen Apartments	7,934,015	3,470,000	4,414,070	55.42%	4,214,070	98.32%	4,214,070	7,656,954	24,716	5,780,908	574,635	5,780,908	1,961,331	7,643,239	52,270	
21-032	SUNY Albany Schuyler	7,583,474	3,901,210	3,2205	0.41%	3,768,640	98.32%	31,665	7,800,305	-	2,031,155	2,747,036	5,864,314	2,028,836	7,892,515	132,570	
21-048	Regeneron Consult McGeorge	900,000	648,540	251,460	27.94%	477,331	73.60%	185,077	949,221	22	-	238,097	238,202	339,684	662,386	171,209	
22-010	DASNY Capital District Psychiatric	1,449,726	1,160,000	289,726	19.98%	759,520	65.48%	189,701	949,221	42,416	-	238,097	238,202	339,684	662,386	171,209	
22-013	Autopark Drive MOB	2,860,640	2,860,000	600,640	21.00%	2,196,525	97.19%	583,770	2,780,295	-	-	1,282,692	1,876,213	972,958	2,849,711	400,480	
22-020	745 Broadway	1,046,362	890,000	156,362	14.94%	821,937	92.35%	144,004	966,341	-	-	166,301	653,634	335,310	1,009,409	68,063	
22-033	The Rise - Colar City	1,046,362	890,000	156,362	14.94%	821,937	92.35%	144,004	966,341	-	-	166,301	653,634	335,310	1,009,409	68,063	
22-037	Autopark CDHP	6,274,905	5,250,000	87,781	1.39%	4,408,658	83.97%	860,658	5,269,319	-	51,066	4,408,658	5,377,770	298,636	352,406	28,619	
22-041	The Real McCoy	73,846	85,000	(11,154)	-15.00%	65,842	77.46%	(16,640)	57,202	3,581	-	3,894	-	62,098	317,533	81,342	
23-001	Rifenburg Office	317,533	234,858	82,675	26.04%	234,858	100.00%	82,675	317,533	-	-	357,715	357,715	390,090	1,093,125	-	
23-006	Flight Simulator Facility	1,640,000	1,460,840	179,160	10.92%	367,715	25.17%	45,097	412,812	22,722	-	58,512	64,715	64,715	6,488	-	
23-016	Regeneron B16 Elevator	76,281	65,000	11,281	14.79%	58,512	90.02%	10,155	68,667	3,952	-	92,830	96,809	96,809	56,181	-	
23-016	Regeneron Water Treatment	156,809	149,011	7,798	4.97%	92,830	62.30%	4,858	97,688	879	-	887,134	913,580	913,580	4,803,658	-	
23-029	Reg BBS Equip Warehouse	6,081,000	5,670,792	410,208	6.75%	867,134	15.29%	62,726	928,860	16,280	-	18,316	34,744	34,066	3,256	-	
23-032	Regeneron Consult Fitzpatrick	273,523	225,000	48,523	21.72%	139,184	61.86%	24,926	160,160	6,504	-	186,037	251,494	251,494	13,983	-	
23-034	8 Roberts Lane	301,854	200,000	101,854	33.74%	186,037	93.02%	94,743	280,780	29,286	-	186,037	251,494	251,494	543,274	-	
23-035	72 Bed Hospitality House	614,000	550,000	64,000	10.42%	6,726	1.22%	783	7,509	7,509	-	6,726	25,969	25,969	2,863	-	
23-040	Reg B61 UPS Replacement	27,854	19,000	8,854	31.79%	16,137	84.93%	7,520	23,657	-	2,311	16,137	23,657	338,737	42,449	-	
23-041	Mohawk Recon Center	365,430	280,000	85,430	23.98%	237,551	64.84%	72,479	310,030	-	28,708	237,551	338,737	338,737	81,952	-	
23-041	Mohawk Recon Center	1,152,000	1,212,777	197,223	13.94%	82,165	6.75%	13,307	95,472	95,472	-	82,165	1,135,612	1,135,612	1,135,612	-	
23-049	Decrease Distribution	21,693	12,000	9,693	44.72%	113,046	0.00%	35,845	146,891	-	15,038	113,046	163,931	163,931	81,952	-	
23-051	WVA B35 Equip Foundations	14,575	12,000	2,575	17.67%	17,676	0.00%	-	-	-	-	40,611	40,611	40,611	12,000	-	
23-052	The Rise Midtown Square	152,250	141,440	10,810	7.10%	40,611	28.71%	3,104	43,715	-	19,410	40,611	40,611	40,611	63,125	-	
23-053	Regen BBS Washroom Ph 2	3,942,420	3,450,000	492,420	12.49%	48,600	1.41%	6,937	55,537	10,537	-	48,600	45,000	45,000	3,401,400	-	
23-054	Orienta Human Society	58,484	58,484	16,970	22.49%	1,953	3.34%	567	2,520	2,520	-	1,953	56,531	56,531	56,531	-	
23-055	ST. ANNE KITCHEN RENO	23,000	17,430	5,570	24.22%	-	0.00%	-	-	-	-	-	-	-	-	-	
23-055	ST. ANNE KITCHEN RENO	117,675	105,844	11,831	10.05%	3,320	3.14%	371	3,691	3,691	-	3,320	-	-	10,000	-	
23-058	60 Colchester - 500 State St	11,481	11,481	11,481	100.00%	11,481	100.00%	11,481	11,481	7,030	-	11,481	11,481	11,481	11,481	-	
23-059	Regeneron HW Tank Install	18,354	7,040	11,314	61.64%	1,549	22.00%	2,489	4,038	4,038	-	1,549	-	-	60,158	-	
23-060	HANYS - 1 Empire Drive	66,675	60,521	6,154	9.23%	363	0.60%	37	400	399	-	363	-	-	99,900	-	
23-061	Regeneron Insulation Repairs	114,885	99,900	14,985	13.04%	-	0.00%	-	-	-	-	-	-	-	-	-	
23-062	Pinehaven CC Reno	3,850	2,285	1,565	40.65%	2,285	100.00%	1,565	3,850	-	-	2,285	3,850	3,850	3,850	-	
23-063	Starbucks @ Midtown Rise	52,950	46,636	6,314	11.92%	-	0.00%	-	-	-	-	-	-	-	-	-	
23-065	Regeneron B7 Water Meter	11,075	9,000	2,075	18.74%	9,000	0.00%	-	-	-	-	-	-	-	-	-	
23-065	Regeneron B7 Water Meter	1,068,410	950,000	118,410	12.44%	905	0.00%	1,282	10,332	10,332	-	-	-	-	-	-	
24-002	Regeneron 2024 TSM	2,000	2,000	1,345	67.25%	32,125	100.00%	1,345	1,345	-	-	-	-	-	-	-	
24-002	Regeneron 2024 TSM	46,604,483	37,782,303	8,822,180	-	23,113,397	-	6,859,634	29,971,031	294,847	897,469	9,876,018	14,573,010	16,002,643	30,575,653	14,668,906	
Grand Total		75,161,375	59,222,609	15,938,766	-	44,853,703	-	13,976,220	58,529,923	724,847	897,469	26,134,317	18,419,286	34,894,398	24,238,147	59,132,545	14,670,012

See Independent accountant's review report.

ATTACHMENT "G"
NON-INTERRUPTION OF WORK AGREEMENT

By submission of the bid for:

The bidder agrees that if this bid is accepted, he/she will not intentionally engage in any course of conduct or activity, or employ for the purposes of performing the public work, any subcontractors, employees, labor or materials which will or may result in the interruption of the performance of the public work due to labor strife or unrest by workmen employed by the bidder or by any of the trades working in or about the public works and/or premises where the work is being performed.

Firm: Collett Mechanical, Inc.

By: 
(Signature)

Kevin Farrell
(Typed)

Title: CFO

Date: 03/20/2025

Plumbers and Steamfitters Local 7 Joint Apprenticeship and Training Committee

18 Avis Drive • Latham, New York 12110
www.ualocal7.org • (518) 785-9844

Mechanical Contractors Association

*Joseph Burniche, Co-Chairman
Theodore Lounsbury
Jesse Gorman*

Plumbers and Steamfitters Local 7

*Brian Lydon, Co-Chairman
Daniel Bliven
Omar Rivera*

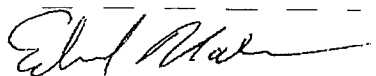
March 14, 2024

Re: Collett Mechanical
138 Sicker Rd
Latham, NY 12110

To Whom It May Concern:

Collett Mechanical is a signatory contractor in good standing with Plumbers and Steamfitters Local 7. Local 7 Apprenticeship Program is a New York State registered apprenticeship Program. Apprentices employed through Local 7 are registered with the NYS Department of Labor.

Sincerely,



Edward Nadeau
Business Manager



**Department
of Labor**

New York State Department of Labor

Apprentice Training Program Registration Agreement

Revision ☒

Nature of Change: Wage Rate Change
add Christine Fass as Signatory
Remove Bryan Puspurs as Signatory
Add Seth Madden

State Use Only	
AT Sponsor No.	<u>20334</u>
ATP Code	<u>13-363</u>
Effective Date of AT Program	<u>09/07/1989</u>

- Name of Sponsor: Plumbers & Steamfitters JAC LU#7
- Mailing Address: 18 Avis Drive Latham NY 12110 Albany
(number & street) (city) (state) (zip code) (county)
- Actual Address: 18 Avis Drive Latham NY 12110 Albany
(number & street) (city) (state) (zip code) (county)
- Telephone No.: 518-785-9808 Ext. _____ Fax No.: 518-785-9855
- E-mail Address: cfass@ualocal7.org
- Trade/Occupation: Plumber/Pipefitter
- No. Employees: 60 No. Apprentices: 98 No. Journeyworkers: 585 Ratio: 1:1:1:3
- DOT Code: 862381030
- Length of Program: 60 months
- Apprentice Probationary Period: 12 months
- Work process: Standard ☒ or Revised ☐
- Minimum Journeyworker Rate: \$ 48.30 per hour
- Effective Date of Wages: 05/01/2022
- Apprentice wage progression for each period – in months (M) or hours (H)

1	2	3	4	5	6	7	8	9	10
M ☐	M ☐	M ☐	M ☐	M ☐	M ☐	M ☐	M ☐	M ☐	M ☐
H ☐	H ☐	H ☐	H ☐	H ☐	H ☐	H ☐	H ☐	H ☐	H ☐
<u>12</u>	<u>12</u>	<u>12</u>	<u>12</u>	<u>12</u>					
<u>45%</u>	<u>55%</u>	<u>65%</u>	<u>75%</u>	<u>90%</u>					

16. The sponsor agrees to comply with the provisions on this side and on the reverse of this agreement.

- Signature of Official Sponsor Representative: Christine Fass Date: 5/17/22
 Print Name and Title: Christine Fass Asst. Trn Coordinator
- Signature of Union Representative: Edward Haden Date: 5/17/22
 Print Name, Title, and Union Name: Edward Haden, Business Manager Local 7
- Signature New York State Department of Labor: [Signature] Date: 6/2/22

NYS Department of Labor
Apprentice Training

MAY 31 2022

Central Office



**Department
of Labor**

New York State Department of Labor

Apprentice Training Program Registration Agreement

Revision ☒

Nature of Change: Wage Rate Change
add Christine Fass as Signatory
Remove Bryan Puspurs as Signatory
Add Seth Madden

State Use Only	
AT Sponsor No.	<u>20334</u>
ATP Code	<u>56-458</u>
Effective Date of AT Program	<u>9/7/1989</u> <u>7/8/2002</u>

- Name of Sponsor: Plumbers & Steamfitters JAC LU#7
- Mailing Address: 18 Avis Drive Latham NY 12110 Albany
(number & street) (city) (state) (zip code) (county)
- Actual Address: 18 Avis Drive Latham NY 12110 Albany
(number & street) (city) (state) (zip code) (county)
- Telephone No.: 518-785-9808 Ext. _____ Fax No.: 518-785-9855
- E-mail Address: cfass@ualocal7.org
- Trade/Occupation: HVAC
- No. Employees: 144 No. Apprentices: 14 No. Journeyworkers: 144 8. Ratio: 1:1:1:3
- DOT Code: 862381030 10. Length of Program: 60 months
- Apprentice Probationary Period: 12 months 12. Work process: Standard ☒ or Revised ☐
- Minimum Journeyworker Rate: \$ 48.30 per hour 14. Effective Date of Wages: 05/01/2022

15. Apprentice wage progression for each period – in months (M) or hours (H)

1	2	3	4	5	6	7	8	9	10
M ☐	M ☐	M ☐	M ☐	M ☐	M ☐	M ☐	M ☐	M ☐	M ☐
H ☐	H ☐	H ☐	H ☐	H ☐	H ☐	H ☐	H ☐	H ☐	H ☐
45%	55%	65%	75%	90%					

16. The sponsor agrees to comply with the provisions on this side and on the reverse of this agreement.

- Signature of Official Sponsor Representative: Christine Fass Date: 5/17/22
Christine Fass Asst. Coordinator
 Print Name and Title: Seth Madden Training Coordinator
- Signature of Union Representative: Edward Mackay Date: 5/17/22
Business Manager, Local 7
 Print Name, Title, and Union Name: Edward Mackay, Business Manager, Local 7
- Signature New York State Department of Labor: [Signature] Date: 6/2/22

NYS Department of Labor
Apprentice Training

AT 10 (4-16)

MAY 31 2022

Central Office



**Department
of Labor**

New York State Department of Labor

Apprentice Training Program Registration Agreement

Revision ☒

Nature of Change: Wage Rate Change
add Christine Fass as Signatory
Remove Bryan Puspurs as Signatory
Add Seth madden

State Use Only	
AT Sponsor No.	20334
ATP Code	33-295
Effective Date of AT Program	2/22/18

- Name of Sponsor: Plumbers & Steamfitters JAC LU#7
- Mailing Address: 18 Avis Drive Latham NY 12110 Albany
 (number & street) (city) (state) (zip code) (county)
- Actual Address: 18 Avis Drive Latham NY 12110 Albany
 (number & street) (city) (state) (zip code) (county)
- Telephone No.: 518-785-9808 Ext. _____ Fax No.: 518-785-9855
- E-mail Address: cfass@ualocal7.org
- Trade/Occupation: Welder
- No. Employees: _____ No. Apprentices: 19 No. Journeyworkers: 160 8. Ratio: 1:1;1:3
- DOT Code: 862381030 10. Length of Program: 60 months
- Apprentice Probationary Period: 12 months 12. Work process: Standard ☒ or Revised ☐
- Minimum Journeyworker Rate: \$ 48.30 per hour 14. Effective Date of Wages: 05/01/2022
- Apprentice wage progression for each period – in months (M) or hours (H)

1	2	3	4	5	6	7	8	9	10
M ☒	M ☒	M ☒	M ☒	M ☒	M ☐	M ☐	M ☐	M ☐	M ☐
H ☐	H ☐	H ☐	H ☐	H ☐	H ☐	H ☐	H ☐	H ☐	H ☐
45%	55%	65%	75%	90%					

16. The sponsor agrees to comply with the provisions on this side and on the reverse of this agreement.

17. Christine Fass 5/17/22 18. Edward Maderu 5/17/22
 Signature of Official Sponsor Representative Date Signature of Union Representative Date
Christine Fass Asst. Training Coordinator Edward Maderu Business Manager, Local 17
 Print Name and Title Print Name, Title, and Union Name
Seth W. Madden Training Coordinator
 19. _____ 6/2/22
 Signature New York State Department of Labor Date

NYS Department of Labor
Apprentice Training

AT 10 (4-16)

MAY 31 2022

Central Office

Approved Contingent
Upon Passing Probation



DANIEL P. McCOY
COUNTY EXECUTIVE

COUNTY OF ALBANY
DEPARTMENT OF GENERAL SERVICES
PURCHASING DIVISION
112 STATE STREET, ROOM 1000
ALBANY, NEW YORK 12207-2021
(518) 447-7140 - FAX (518) 447-5588

DAVID M. LATINA
COMMISSIONER OF GENERAL SERVICES

PAMELA O NEILL
PURCHASING AGENT

MEMORANDUM

TO: Mark Olsen
Executive Director

FROM: Pamela O Neill *Pamela*
Purchasing Agent

DATE: March 21, 2025

RE: RFB-2025-030

I am in receipt of your recommendation to award the aforementioned to the following bidders in the amounts listed

AOW Construction for General Contractor in the amount of \$468,828.00
Collett Mechanical for Mechanical Construction in the amount of \$300,686.00
Hewitt Young Electric for Electrical Construction in the amount of \$88,000.00
Collett Mechanical for Plumbing Construction in the amount of \$28,490.00

As these bidders are the lowest responsible and responsive bidders, I concur with your recommendation.

Please obtain the necessary contract approval of the Contract Administration Board and the County Legislature, so that we may issue a Notice of Award.

RFB-2025-030 Bid Tabulation Mechanical Construction
Shaker Place Café Project

Bidder	Collett Mechanical	Eckert Mechanical
Lump Sum Bid	\$ 261,466.00	\$ 285,372.00
15% Contingency	\$ 39,220.00	\$ 42,805.80
Total Bid Amount	\$ 300,686.00	\$ 328,177.80

VOLUME 1

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Section 00 5009	Affirmative Action Plan
Section 00 6000	Project Forms
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Section 00 6353	AIA - G709 - 2018 Sample
Section 00 6363	AIA - G701 - 2017 Sample
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Section 00 6519	AIA - G706A – 1994 Sample
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Section 00 8200.01	CAD Release Form

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Section 01 3119	Project Meetings
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Section 01 3300	Submittal Procedures
Section 01 4000	Quality Requirements
Section 01 4100	Regulatory Requirements
Section 01 5000	Temporary Facilities and Controls
Section 01 5010	Pedestrian & Vehicular Traffic Safety
Section 01 5080	General Provisions
Section 01 5100	Temporary Utilities
Section 01 5500	Vehicular Access and Parking
Section 01 6000	Product Requirements
Section 01 6116	Volatile Organic Compound (VOC) Content Restrictions
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DRAWINGS LIST

COVER SHEET

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**ALBANY COUNTY SHAKER PLACE REHABILITATION
& NURSING CENTER CAFÉ RENOVATION
ALBANY, NEW YORK**

October 6, 2023

OWNER

County of Albany
Shaker Place Nursing Home
Albany, New York

ARCHITECT

Angerame Architects, P.C.
30 Essex Street
Albany, New York 12206
(518) 454-9300

STRUCTURAL ENGINEER

MRH Engineering, P.C.
20 Bayberry Drive
Queensbury, New York 12804
(518) 792-4042

**MECHANICAL/PLUMBING/
ELECTRICAL ENGINEER**

Engineered Solutions
646 Plank Road, #104
Clifton Park, New York 12065
(518) 280-2410

NOTICE TO BIDDERS -- ALBANY COUNTY
REQUEST FOR BIDS #2024-150

Sealed Bids for Shaker Place Café Project as requested by Shaker Place Nursing and Rehabilitation Center will be received by the Albany County Purchasing Agent, Room 1000, 112 State Street, Albany, New York 12207 until 11:00 AM, local time on Thursday, _____.

Request for Bid (RFB) documents may be obtained at the office of the Albany County Purchasing Agent, as noted above. RFB documents may be available for download from the Empire State Bid System website at <http://www.empirestatebidsystem.com> starting by close of business (4:30 p.m.) on **(insert publish date)**.

A site visit will be held (insert date, time and location). This is the only scheduled site visit. Interested bidders are strongly urged to attend.

Pamela O Neill
Purchasing Agent

Dated: Albany, New York
(insert today's date)

PUBLISH ONE DAY – (insert publish date) -- THE EVANGELIST
PUBLISH ONE DAY – (insert publish date) -- THE TIMES UNION

**COUNTY OF ALBANY
DEPARTMENT OF GENERAL SERVICES PURCHASING DIVISION
112 STATE STREET, ROOM 1000, ALBANY, NY 12207
TELEPHONE: 518-447-7140/ FAX: 518-447-5588
Pamela.oneill@albanycountyny.gov**

TITLE: Shaker Place Café Project RFB NUMBER: 2024-150

Receipt Confirmation Form

Please complete and return this confirmation form as soon as possible:

Pamela O Neill
Purchasing Agent
County of Albany
112 State Street, Room 1000
Albany, NY 12207

**IF YOU PLAN TO SUBMIT A BID, YOU MUST RETURN
THIS FORM TO ENSURE THAT YOU WILL RECEIVE ALL
FURTHER COMMUNICATION REGARDING THIS RFB.**

Company Name: _____

Address: _____

City: _____ State: _____ Zip Code: _____

Contact Person: _____

Title: _____

Phone Number: _____ Fax Number: _____ E-Mail: _____

If a Bidders/Proposers meeting has been arranged for this Bid/RFP, please indicate if you plan to attend:
☐ **Yes** / ☐ **No**

I authorize the County of Albany to send further correspondence that the County deems to be of an urgent nature by the following method (check):

Fax Number: _____ E-Mail: _____

COUNTY OF ALBANY
DEPARTMENT OF GENERAL SERVICES
PURCHASING DIVISION
112 STATE STREET, ROOM 1000
ALBANY, NY 12207

NON-BIDDER RESPONSE

RFB #2023-109

The Albany County Department of General Services, Purchasing Division, is interested in the reasons why bidders fail to submit bids. Please indicate your reason(s) by checking all appropriate item(s) below and returning this form to the above address.

- ☐ Could not meet specifications or Scope of Services.
- ☐ Items or materials requested not manufactured by us or not available to our company.
- ☐ Insurance requirements are too restricting.
- ☐ Bond requirements are too restricting.
- ☐ Specifications or Scope of Services not clearly understood or applicable (too vague, too rigid, etc.).
- ☐ Project not suited to firm.
- ☐ Quantities too small.
- ☐ Insufficient time allowed for preparation of bid.
- ☐ Other reasons; please state and define:

Vendor Name: _____

Contact Person: _____

Vendor Address: _____

Vendor Telephone: _____

COUNTY OF ALBANY
REQUEST FOR BIDS
GENERAL INSTRUCTIONS TO BIDDERS

BID DISTRIBUTION- *IMPORTANT NOTICE*

The County of Albany officially distributes bidding documents through the Purchasing Division Office or through the Empire State Bid System website at <http://www.empirestatebidsystem.com>. Copies of bidding documents obtained from any other source are not considered official documents. Only those vendors who obtain bidding documents from either the Purchasing Division Office or the Empire State Bid System are guaranteed to receive addendum information, if such information is issued.

If you have obtained this document from a source other than the Albany County Purchasing Division or the Empire State Bid System, it is strongly recommended that you obtain an official copy.

SECTION 1: BID IDENTIFICATION

- 1.1 Title: **Shaker Place Café Project**
- 1.2 Requesting Department: **Shaker Place Nursing and Rehabilitation Center**
- 1.3 Bid Number: **2024-150**

SECTION 2: PURPOSE

- 2.1 The intent of these specifications is to furnish information to responsible bidders for the purpose of obtaining bids for **Shaker Place Café Project** as requested by **Shaker Place Nursing and Rehabilitation Center**.
- 2.2 Minority Business Enterprises (MBE's) and Women Business Enterprises (WBE's) are encouraged to apply.
- 2.3 The apparent Successful Bidder will be required to submit DBE participation information and, as a condition of receiving the contract, demonstrate good faith efforts in meeting DBE goals, as outlined in Article SC 19 of the Albany County Affirmative Action Plan, attached hereto

SECTION 3: BIDDING DOCUMENTS

- 3.1 Complete sets of the Bidding Documents may be obtained or examined as stated in the Notice to Bidders.

- 3.2 Complete sets of Bidding Documents must be used in preparing bids. The County does not assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

SECTION 4: SUBMISSION OF BIDS

- 4.1 Bids and any other required documents must be submitted, sealed in an opaque envelope, plainly marked with the name and number of the bid and the name and address of the bidder and accompanied by the required documents. Bids must be received no later than **XX:XX A.M. ON [INSERT BID OPENING DAY], [BID OPENING DATE] HERE**, at the following address:

Pamela O Neill
Albany County Purchasing Agent
112 State Street, **Room 1000**
Albany, NY 12207

- 4.2 All bids received after the time stated in the “Notice to Bidders”, or the bid submission deadline as modified by formal addendum consistent with Section 14 of this Request for Bids, may not be considered and will be returned to the bidder. The bidder assumes the risk of any delay in the mail or in the handling of the mail by employees of Albany County. Whether sent by mail or by means of personal delivery, the bidder assumes responsibility for having his bid deposited on time at the place specified.
- 4.3 Albany County reserves the right to reject any or all bids in whole or in part, to waive any and all informalities, and to disregard all non-conforming, non-responsive or conditional bids.

- 4.4 There will be a site visit on _____, at _____

This will be the only scheduled site visit. Interested bidders are strongly urged to attend.

SECTION 5: TERM OF BID

- 5.1 The bid shall be in effect from the date of contract execution until completion of all work under the contract. Prices shall remain firm for the entire bid period.

SECTION 6: BID SECURITY

- 6.1 Each bid must be accompanied by a bid bond or certified check in the amount of **5% of total bid in United State Currency** drawn upon a national or state bank or trust company, to the order of the Director of Finance, Albany, County. If bid is accepted, the successful

Bidder will enter into a contract for the same and will execute such further security as may be required for the performance of the contract. BID SECURITY SHALL BE INCLUDED WITH BID AT TIME OF BID OPENING; FAILURE TO DO SO MAY CAUSE REJECTION OF THE BID AS MATERIALLY INCOMPLETE.

6.2 The Bid Security of the successful Bidder will be retained until such Bidder has executed the contract and furnished the required Contract Security, whereupon it will be returned. If the successful Bidder fails to execute and deliver the contract and furnish the required Contract Security within fifteen (15) days of the Notice of Award, the County may annul the Notice of Award and the Bid Security of that Bidder will be forfeited.

6.3 Bid security of other bidders will be returned within seven (7) days after the award of contract to the successful Bidder.

SECTION 7: QUALIFICATION OF BIDDER

7.1 All bidders shall submit the Bidder Qualification Questionnaire as part of the bid. Each bid must contain evidence of the bidder's qualification to do business in New York State or covenant to obtain such qualification prior to award.

7.2 All bidders shall submit the Vendor Responsibility Questionnaire (Attachment "C") as part of the bid.

7.3 In addition, Albany County may make such investigations it deems necessary to determine the ability of the Bidder to perform the work. The bidder shall furnish to the County, within five (5) days of a request, all such information and data for this purpose as may be requested. The County reserves the right to reject any bid if the information submitted by, or investigation of, a bidder fails to satisfy the County that such bidder is properly qualified to carry out the obligations of the contract and to complete the work contemplated therein. Conditional bids will not be accepted.

7.4 All bidders must document five (5) or more years in the business of providing the **Construction Services**

7.5 Bidder must include at least five **Construction Services**, customer references.

SECTION 8: Section not in use

SECTION 9: DISQUALIFICATION

9.1 The County reserves the right to refuse to issue Bidding Documents to a prospective bidder should such bidder be in default for any of the following reasons:

- (a) Failure to comply with any pre-qualification regulations of the County, if such regulations are cited, or otherwise included, in the Bidding Documents as a requirement for bidding.
- (b) Bidder's failure to pay, or satisfactorily settle, all bills due for labor and materials on former contracts in force (with the Owner) at the time the County issues the Bidding Documents to a prospective bidder.
- (c) Bidder's default under previous contracts with the County.
- (d) Bidder's unsatisfactory work on previous contracts with the County.

9.2 Bids received from bidders who have previously failed to complete contracts within the time required, or who have previously performed similar work in an unsatisfactory manner, may be rejected. A bid may be rejected if the bidder cannot show that it has the necessary ability, plant and equipment to commence the work at the time prescribed and thereafter to perform and complete the work at the rate or within the time specified. A bid may be rejected if the bidder is already obligated for the performance of other work which would delay the commencement, performance or completion of the work.

9.3 Albany County reserves the right to reject any bid if the information submitted by, or investigation of, such bidder fails to satisfy the County that such bidder is properly qualified to carry out the obligations of the contract and to complete the work contemplated therein.

9.4 Bids will be considered irregular and shall be subject to rejection for the following reasons:

- (a) If the bid is on a form other than that furnished by Albany County, or, if the Albany County's form is altered, or, if any part of the bidding documents is detached.
- (b) If there are unauthorized additions, conditional or alternate pay items, or irregularities of any kind which make the bid incomplete, indefinite, or otherwise ambiguous.
- (c) If the bid is not accompanied by the bid security specified by the Albany County.

SECTION 10: PREVAILING WAGE

10.1 All laborers providing services under this contract, whether employed by the Contractor or by the Subcontractor(s), shall be paid not less than the current prevailing rate of wages and shall be provided supplements not less than the prevailing supplements as established by the New York State Department of Labor, per the New York State Prevailing Schedule of Wages.

10.2 All vendors submitting bids agree to conform to all current NYS Department of Labor and prevailing wage laws. The County has applied for and has received a PRC number for this project, which has been included with this document as an attachment. The successful vendor(s) is/are responsible for complying with all current labor rates and regulations

throughout the duration of any contract resulting from this document. For policy or rate questions call the NYS Department of Labor at (585) 258-4505. Actual rates are available via the internet at: <https://wpp.labor.state.ny.us/wpp/showFindProject.do?method=showIt> **or** from the Albany County Purchasing Department at the address listed on the Notice to Bidders.

- 10.3 Payrolls and Payroll Records: Every contractor and subcontractor MUST keep original payrolls or transcripts subscribed and affirmed as true under penalty of perjury. Payrolls must be maintained for at least five (5) years from the project's date of completion. At a minimum, payrolls must show the following information for each person employed on a public work project: Name, Social Security number, Classification(s) in which the worker was employed, Hourly wage rate(s) paid, Supplements paid or provide, and Daily and weekly number of hours worked in each classification.

Every contractor and subcontractor shall submit to the Department of Jurisdiction (Contracting Agency), within thirty (30) days after issuance of its first payroll and every thirty (30) days thereafter, a transcript of the original payrolls, subscribed and affirmed as true under penalty of perjury. The Department of Jurisdiction (Contracting Agency) shall receive and maintain such payrolls.

SECTION 11: NON-COLLUSIVE BIDDING CERTIFICATE

- 11.1 All bidders bidding under the provisions of the specifications are subject to the provisions of Section 103 of the General Municipal Law of the State of New York. A signed Non-Collusive Bidding Certificate (Attachment "A") is required to be submitted with each bid on the form provided by the County.

SECTION 12: BID FORM

- 12.1 The Bid Form is attached hereto; additional copies may be obtained from the County.
- 12.2 Bids must be made on the Bid Form provided by the County. The Bid Form must be completed in ink or by typewriter. The Bid Form must also be signed by an authorized representative of the bidder.
- 12.3 Bids by corporations must be executed in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign on behalf of the corporation) and the corporate seal must be affixed by the secretary or an assistant secretary. The corporate address and state of incorporation must be shown below the signature.
- 12.4 Bids by partnerships must be executed in the partnership name and signed by a partner, whose title must appear under the signature. The official address of the partnership must be shown below the signature.

12.5 All names must be printed or typed below the signature.

12.6 The bid must contain an acknowledgment of receipt of all Addenda (the number of which will be filled in on the Bid Form).

12.7 The address to which communications regarding the bid are to be directed must be included on the Bid Form.

SECTION 13: EQUIVALENT GOODS

13.1 Manufacturers name brands are listed to indicate minimum requirements and bidding may be on brands listed, (if specified), or equivalent. Specifications shall be furnished by bidder to support equivalency. In the event of any claim by any unsuccessful bidder concerning or relating to the issue of “equal or better” or “or equal”, the successful bidder agrees, that his own cost and expense, to defend such claim or claims and agrees to hold the County of Albany free and harmless from any and all claims for loss or damage arising out of this transaction for any reasons.

SECTION 14: SPECIFICATION CLARIFICATION

14.1 All inquiries with respect to this Request for Bids must be directed to the Albany County Purchasing Agent as follows:

Pamela O Neill
Albany County Purchasing Agent
112 State Street, **Room 1000**
Albany, NY 12207
Telephone: (518) 447-7140
Facsimile: (518) 447-5588
Email: pamela.oneill@albanycountyny.gov

14.2 All questions about the meaning or intent of the specifications must be submitted to the aforementioned designated person in writing. Replies will be issued by Addenda mailed or delivered to all parties recorded as having received the bidding documents. Questions received less than four (4) days prior to the date of submission of bids will not be answered. The County will be bound only by responses given by formal written Addenda.

SECTION 15: BID EVALUATION

15.1 Bids shall remain valid until:

- (a) the execution of a contract by Albany County; or
- (b) the award of a purchase order by Albany County; or

(c) as otherwise rejected by Albany County.

15.2 Bids received will be evaluated by Albany County and will be based, as a minimum, upon the following criteria:

(a) Lowest total bid cost and projected timetable for completion of services and/or delivery of goods described herein;

(b) Completeness of the bid; and

(c) Bidder's demonstrated capabilities and professional qualifications.

15.3 The County reserves the right to award this contract on a per item or aggregate basis, whichever is most beneficial to the County of Albany. Bidders need not submit bids for all items listed to be eligible for an award of this contract.

15.4 The County reserves the right to purchase items pursuant to General Municipal Law 103 from New York State Contracts, other County, political subdivision or district contracts, or other Governmental Agency or New York State Preferred Sources within its discretion.

SECTION 16: MODIFICATION AND WITHDRAWAL OF BIDS

16.1 Bids may be modified or withdrawn at any time prior to the opening of bids by an appropriate document duly executed (in the manner that a bid must be executed) and delivered to the place where bids are to be submitted.

16.2 If, prior to awarding of the contract or within three days after opening, whichever period is shorter, any bidder files a duly signed written notice with the County and promptly thereafter demonstrates to the reasonable satisfaction of the County that there was a material and substantial mistake in the preparation of its bid, that bidder may withdraw its bid and the bid security will be returned.

SECTION 17: AWARD OF BID

17.1 After the award has been approved by the proper County governing authority, the successful bidder will be issued a Notice of Award. A notice of contract award shall not be binding upon the County until the contract has been fully executed by both parties.

The following documents shall be incorporated, to the extent deemed appropriate in the sole discretion of the County, within the contract between Albany County and the apparent successful Bidder: the successful Bidder's bid, this Request For Bids and any written Addenda issued by Albany County in response to inquiries of prospective bidders as set forth in Section 12.2 hereof.

17.2 No successful bidder to whom a contract or purchase order is let, granted or awarded, shall assign, transfer, convey, sublet, or otherwise dispose of same, or of its right, title, and interest herein, including the performance of the contract or purchase order or the right to receive monies due or to become due, or of its power to execute the contract or purchase order without the prior written consent of the Albany County Purchasing Agent. In the event the contractor shall without prior written consent assign, transfer, convey, sublet or otherwise dispose of the contract or purchase order or of its right, title and interest therein, including the performance of this contract or purchase order, or the right to receive monies due or to become due, or its power to execute such contract or purchase order to any other person or corporations, or upon receipt by Albany County of an attachment against the Successful Bidder, the County of Albany shall be relieved and discharged from any and all liability and obligation growing out of such contract or purchase order to such contractor, and the person or corporation to which such contract or purchase order shall have been assigned, its assignees, transferees or sub lessees shall forfeit and lose all monies theretofore assigned under the contract or purchase order, except so much as may be required to pay its employees.

SECTION 18: PERFORMANCE BOND

18.1 A separate Performance and Payment, Labor and Materials Bond in a form satisfactory to the Albany County Purchasing Agent and the Albany County Attorney, or its cash equivalent, equal to **100% of Total bid** is required of the successful Bidder. The successful Bidder to whom the contract is awarded shall within seven (7) days after the date of notification of the acceptance of its bid, provide security as required by the contract in a form acceptable by the County.

In case of its failure to do so, or in case of its failure to give further security as herein prescribed, the successful Bidder will be considered as having abandoned the same and the certified check or other bid security accompanying its bid shall be forfeited to the County of Albany.

SECTION 19: INSURANCE REQUIREMENTS

19.1 The successful Bidder will be required to procure and maintain at its own expense the following insurance coverage:

- (a) **Workers' Compensation and Employers Liability Insurance:** A policy or policies providing protection for employees in the event of job-related injuries.
- (b) **Automobile Liability Insurance:** A policy or policies with the limits of not less than \$500,000 combined for each accident because of bodily injury sickness or disease, sustained by any person, caused by accident, and arising out of the ownership, maintenance or use of any automobile for damage because of injury to or destruction of property, including the loss of use thereof, caused by accident and arising out of the ownership, maintenance or use of any automobile.

- (c) **General Liability Insurance:** A policy or policies of comprehensive all-risk insurance with limits of not less than:

Liability For:	Combined Single Limit
Property Damage	\$1,000,000
Bodily Injury	\$1,000,000
Personal Injury	\$1,000,000

- (d) **Disability Insurance:** A policy or policies providing appropriate disability benefits in accordance with Section 220 Subdivision 8 of the Disability Benefits Law (DBL)

19.2 Each policy of insurance required shall be of form and content satisfactory to the Albany County Attorney.

- (a) The insurance policies shall name the County of Albany as certificate holder and primary/non-contributory additional insured on all liability policies. **The bid number must appear on policy.**
- (b) The policy shall not be changed or canceled until the expiration of thirty (30) days after written notice to Albany County. It shall be automatically renewed upon expiration and continued in force unless Albany County is given at least thirty (30) days written notice to the contrary.

19.3 No work shall be commenced under the contract or purchase order until the successful Bidder has delivered to the County Purchasing Agent or his designee proof of issuance of all policies of insurance required by the contract to be procured by the successful Bidder. If at any time, any of said policies shall expire or become unsatisfactory to the County, the successful Bidder shall promptly obtain a new policy and submit proof of insurance of the same to the County for approval. Upon failure of the successful Bidder to furnish, deliver and maintain such insurance as above provided, the contract or purchase order may, at the election of the County, be forthwith declared suspended, discontinued or terminated. Failure of the successful Bidder to procure and maintain any required insurance shall not relieve the successful Bidder from any liability under the contract, nor shall the insurance requirements be construed to conflict with the obligations of the successful Bidder concerning indemnification.

SECTION 20: INDEMNIFICATION

20.1 The successful Bidder shall defend, indemnify and save harmless the County, its employees and agents, from and against all claims, damages, losses and expenses (including, without limitation, reasonable attorneys' fees) arising out of, or in consequence of, any negligent or

intentional act or omission of the successful Bidder, its employees or agents, to the extent of its or their responsibility for such claims, damages, losses and expenses.

SECTION 21: REMEDY FOR BREACH

21.1 In the event of a breach by CONTRACTOR, CONTRACTOR shall pay to the COUNTY all direct and consequential damages caused by such breach, including, but not limited to, all sums expended by the COUNTY to procure a substitute contractor to satisfactorily complete the contract work, together with the COUNTY's own costs incurred in procuring a substitute contractor.

SECTION 22: DELIVERY AND PAYMENT

22.1 All bid prices shall include freight and shall be quoted F.O.B. destination.

22.2 Prior to payment, the items furnished and or work performed will be inspected by the Purchasing Agent or his designee to determine their conformity to specification. No payment will be made for items or work not meeting specification.

22.3 Payment will be made upon the submission of a completed Albany County Claim Form.

22.4 ALBANY COUNTY IS NOT SUBJECT TO FEDERAL, STATE OR LOCAL TAXES.

SECTION 23: CASH DISCOUNT

23.1 Cash discounts may be offered by a bidder for prompt payment of bills, but such cash discounts will not be taken into consideration in determining the low bidder.

23.2 For purposes of any applicable cash discount, the payment date shall be calculated from the receipt of invoice or final acceptance of the goods, whichever is later.

SECTION 24: EXTENSION OF BIDS TO ALL POLITICAL SUBDIVISIONS AND AUTHORIZED DISTRICTS LOCATED IN THE STATE OF NEW YORK

24.1 It is the intent of this Request For Bids that all political subdivisions, and districts located in the State of New York, be entitled to make purchases of materials, equipment or supplies from the resulting the bid award.

24.2 No officer, board or agency of a county, town, village, or school district shall make any purchase through the County when bids have been received for such purchase by such officer, board or agency, unless such purchase may be made upon the same terms, conditions and specifications at a lower price through the County.

24.3 All purchases shall be subject to audit and inspection by the other political subdivisions for which the purchase was made.

- 24.4 All orders will be placed by the participating entities. Each participating entity shall be billed by and make payment directly to the successful Bidder.
- 24.5 Upon request, participating entities must furnish the successful Bidder with the proper tax exemption certificates or documentation of tax exempt status. (Purchase orders should have this information and be retained for documenting the tax exempt sale.)
- 24.6 The sole responsibility in regard to performance of the bid, or any obligation, covenant, condition or term thereunder by the successful Bidder and the participating entities will be borne and is expressly assumed by the successful Bidder and the participating entities and not by Albany County. In the event of a failure or breach in performance of any such bid by a participating entity or the successful Bidder, Albany County, specifically and expressly disclaims any and all liability for such defective performance or breach, or failure of either party to perform in accordance with its obligations, covenants and the terms and conditions of this Albany County centralized bid.

SECTION 25: MACBRIDE PRINCIPLES

- 25.1 Contractor/Proposer hereby represents that said contractor/proposer is in compliance with the MacBride Principles of Fair Employment as set forth in Albany County Local Law No. [3] for 1993, in that said contractor/proposer either (a) has no business operations in Northern Ireland or (b) shall take lawful steps in good faith to conduct any business operations in Northern Ireland in accordance with the MacBride Principles, and shall permit independent monitoring of their compliance with such principles. In the event of a violation of this stipulation, the County reserves all rights to take remedial measures as authorized under section 4 of Local Law No. [3] in 1993, including, but not limited to, imposing sanctions, seeking compliance, recovering damages, declaring the contract/proposer in default and/or seeking debarment or suspension of the contractor/proposer.
- 25.2 In the case of a contract which must be let by competitive sealed bidding, whenever the lowest bidder has not agreed to stipulate to the conditions set forth in this section, and another bidder who has agreed to stipulate to such conditions has submitted a bid within five percent of the lowest bid for a contract to supply goods, services or construction of comparable quality, the contracting entity shall refer the contract to the County Legislature, which shall determine whether the lowest bidder is responsible. In making such determination, the County Legislature may consider, as a factor bearing on responsibility, whether the lowest bidder discriminates in employment in Northern Ireland.
- 25.3 As used in this section, the term “contract” shall not include contracts with government and non-profit organizations, contracts awarded pursuant to an emergency procurement procedure or contracts, resolutions, indentures, declarations of trust or other instruments of authorizing or relating to the authorization, issuance, award, sale or purchase or bonds, certificates of indebtedness, notes or other fiscal obligations of the County, provided that the policies of this section shall be considered when selecting managing underwriters in connection with such activities.

25.4 The provisions of this section shall not apply to contracts for which the County receive funds administered by the United States Department of Transportation, except to the extent Congress has directed that the Department of Transportation not withhold funds from states and localities that choose to implement selective purchasing policies based on agreement to comply with the MacBride Principles, or to the extent that such funds are not otherwise withheld by the Department of Transportation.

SECTION 26: NON-INTERRUPTION OF WORK AGREEMENT

26.1 The following is taken from Resolution No. 298 adopted by the Albany County Legislature on December 4, 1986:

“RESOLVED, That any person, firm, corporation, partnership or other entity (hereinafter “contractor”) as a prerequisite to the award of any public works contract by the County of Albany, shall agree that it will not intentionally engage in any course of conduct or activity, or employ for the purposes of performing the public work, any subcontractors, employees, labor or materials which will or may result in the interruption of the performance of the public work due to labor strife or unrest by workmen employed by the contractor or by any of the trades working in or about the public works and/or premises where the work is being performed, and, be it further

“RESOLVED, That in awarding contracts for public works, the County of Albany shall consider the ability of the contractor to undertake the work without interruption due to labor strife or unrest, and, be it further

“RESOLVED, That unless such contractor shall demonstrate to the satisfaction of the County of Albany that it will not intentionally engage in such conduct as aforesaid which will or may result in the interruption of the performance of the public work, then and in that event, such public works contract shall not be awarded to such contractor.”

A signed Non-Interruption of Work Agreement is required to be submitted with each bid in the form specified with the bid documents.

SECTION 27: APPRENTICESHIP TRAINING PROGRAMS

Contractors on an Albany Construction Project with an **anticipated total project cost** of more than \$250,000 are subject to the following:

- A. In accordance with Albany County Legislative Resolution No. 70 of February 10, 2003, Resolution No. 251-a of September 12, 2011 and Resolution No. 373 of August 13, 2018, together with Section 816-b of the New York State Labor Law, contractors of County construction projects with an aggregate value (which shall mean the total cost of all contracts of the project) in excess of \$250,000 or more shall have in place agreements providing appropriate apprenticeship training programs approved by the Commissioner of the Department of Labor for the type and scope of work to be performed, at the time of bid date and prior to entering into a contract with Albany County.

B. A bidder who submits a bid for a County construction contract for which the contract amount is \$250,000 or more **shall submit with the bid package** the following documents **for each apprentice agreement** intended to meet the requirements of Res. No. 373 for 2018:

(1). A copy of the current New York State Department of Labor (NYS DOL) “Apprentice Training Program Registration Agreement” (NYS DOL Agreement) issued to the bidder as a sponsor –or- issued to a NYS DOL apprenticeship sponsor with whom the bidder has an apprenticeship training agreement; AND

(2). If the bidder is not the named sponsor on the NYS DOL Agreement described in (a), a copy of the apprenticeship training agreement between the bidder and the named sponsor.

C. Prior to entering into a construction agreement with Albany County, a contractor shall submit, Certificates of Completion showing that the contractor, or its sponsor, graduated at least one apprentice from a state approved and registered apprenticeship program, in the trade and/or job title called for within the construction contract, within a time period immediately preceding the bid date of such project, the length of said time period to be calculated by adding twenty-four months to the specific trade’s program length as set forth in the New York State Prevailing Wage Schedule, except for the trade of laborer for which the length of the program is hereby defined to be two years. If a contractor is a signatory to a sponsor, the contractor shall submit to the County a letter from the sponsor verifying its signatory status.

Note: Apprenticeship agreements which are in probationary status shall be exempt from the graduation requirement during the period of probationary status, and apprenticeship agreements in place as of August 13, 2018 which were in probationary status during the period preceding the specific trade’s program length as set forth in the New York State Prevailing Wage Schedule, shall be exempt from the graduation requirement for a period measured from the date of the apprenticeship program is registered with the New York State Department of Labor, plus the specific trade’s program length, plus two years.

D. The contractor shall submit the required Certificates of Completion as part of any bid submitted in connection with a construction contract and shall provide to the County department or agency administering the construction contract the identity of apprentices who have graduated from its apprenticeship program.

E. If a contractor utilizes a subcontractor on the project, the contractor shall submit Certificates of Completion showing that the subcontractor or the subcontractor’s sponsor graduated at least one apprentice from a state approved and registered apprenticeship program, in the trade and/or job title called for within the construction contract, within a time period immediately preceding the bid date of such project, the length of said time period to be calculated by adding twenty-four months to the specific trade’s program length as set forth in the New York State Prevailing Wage Schedule, except for the trade of laborer for which

the length of the program is hereby defined to be two years. The contractor shall submit these certificates at a time designated by the department or agency administering the construction contract, but in any event, these forms must be received by the County prior to a subcontractor beginning work under the contract. If the subcontractor is a signatory to a sponsor, the contractor shall submit to the County a letter from the sponsor verifying the signatory status.

SECTION 28: OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) CONSTRUCTION SAFETY AND HEALTH COURSE

28.1 In compliance with NYS Labor Law Sec. 220-h, the contract required for the construction, reconstruction, maintenance and/or repair of the public work herein described, where the total cost of all work to be performed is at least TWO HUNDRED FIFTY THOUSAND (\$250,000.) DOLLARS, shall require that all laborers, workers, and mechanics employed in the performance of the work on the public work site either by the Contractor, sub-contractor or other person doing or contracting to do the whole or a part of the work herein described, shall be certified prior to performing any work on the project as having successfully completed a course in construction safety and health approved by the U.S. Department of Labor's Occupational Safety and Health Administration that is at least ten hours in duration.

SECTION 29: AFFIRMATIVE ACTION REQUIREMENTS

29.1 It is the policy of the County of Albany that Minority Business Enterprises (MBE) and Woman Business Enterprises (WBE) are afforded the maximum opportunity to participate in the performance of contracts, in excess of \$100,000, let by the County and its several agencies and authorities. The County commits itself to a goal oriented Contract Compliance Program which assures that Minority Business Enterprises and Woman Business Enterprises are considered in awarding contracts for goods, services and construction. Furthermore, it is the policy of the County of Albany that contractors and subcontractors utilize minority and women labor to the greatest extent feasible.

29.2 In bidding on this contract, the contractor acknowledges an understanding of this policy. The contractor shall carry out the policy by making every reasonable effort to award contracts and subcontracts to MBEs and WBEs and utilizing minority and women labor in the performance of this contract.

29.3 In an effort to assist contractors with compliance attached you will find the following:
Article SC19-Affirmative Action Plan and Department of Affirmative Action Compliance Forms.

SECTION 30: SUBCONTRACTORS

30.1 When the preparation of separate specifications is not required, each bidder must submit with its bid a separate sealed list that names each subcontractor that the bidder will use to perform the work on the contract, and the agreed upon amount to be paid to each, for (1) plumbing

and gas fitting, (2) steam heating, hot water heating, ventilating and air conditioning apparatus, and (3) electric wiring and standard illuminating fixtures. After the low bid is announced, the sealed list submitted with the low bid must be opened and the names of the subcontractors announced. The sealed lists submitted by all other bidders must be returned unopened after the award of the contract.

Any subsequent change of subcontractor or agreed upon amount to be paid to each subcontractor must be approved by the political subdivision, upon a showing of "legitimate construction need" for the change, which must be open to public inspection. The term "legitimate construction need" is defined to include, but not be limited to (1) a change in project specification, (2) a change in construction material costs, (3) a change in subcontractor status as determined pursuant to Labor Law §222(2)(e), relative to project labor agreements, or (4) a situation in which the subcontractor has become otherwise unwilling, unable or unavailable to perform the subcontract.

SECTION 31: INTERPRETATION

- 31.1 In the event of any discrepancy, disagreement or ambiguity among the documents which comprise this RFB, and/or, the Agreement (between the County and the successful bidder/proposer) and its incorporated documents, the documents shall be given preference in the following order to interpret and to resolve such discrepancy, disagreement or ambiguity: 1) the Agreement; 2) the RFB; 3) the Contractor's bid.

SECTION 32: NON APPROPRIATIONS CLAUSE

- 32.1 Notwithstanding anything contained herein to the contrary, no default shall be deemed to occur in the event no funds or insufficient funds are appropriated and budgeted by or are otherwise unavailable to the County for payment under this Agreement. The County will immediately notify the Contractor of such occurrence and this Agreement shall terminate on the last day of the fiscal period for which appropriations were received without penalty or expense to the County of any kind whatsoever, except as to those portions herein agreed upon for which funds shall have been appropriated and budgeted.

SECTION 33: IRANIAN ENERGY SECTOR DIVESTMENT

- 33.1 Contractor/Proposer hereby represents that said Contractor/Proposer is in compliance with New York State General Municipal Law Section 103-g entitled "Iranian Energy Sector Divestment", in that said Contractor/Proposer has not:
- (a) Provided goods or services of \$20 Million or more in the energy sector of Iran including but not limited to the provision of oil or liquefied natural gas tankers or products used to construct or maintain pipelines used to transport oil or liquefied natural gas for the energy sector of Iran; or

- (b) Acted as a financial institution and extended \$20 Million or more in credit to another person for forty-five days or more, if that person's intent was to use the credit to provide goods or services in the energy sector in Iran.

33.2 Any Contractor/Proposer who has undertaken any of the above and is identified on a list created pursuant to Section 165-a (3)(b) of the New York State Finance Law as a person engaging in investment activities in Iran, shall not be deemed a responsible bidder pursuant to Section 103 of the New York State General Municipal Law.

33.3 Except as otherwise specifically provided herein, every Contractor/Proposer submitting a bid/proposal in response to this Request for Bids/Request for Proposals must certify and affirm the following under penalties of perjury:

- (a) "By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid, each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief, that each bidder is not on the list created pursuant to NYS Finance Law Section 165-a (3)(b)."

Albany County will accept this statement electronically in accordance with the provisions of Section 103 of the General Municipal Law.

33.4 Except as otherwise specifically provided herein, any Bid/Proposal that is submitted without having complied with subdivision (a) above, shall not be considered for award. In any case where the Bidder/Proposer cannot make the certification as set forth in subdivision (a) above, the Bidder/Proposer shall so state and shall furnish with the bid a signed statement setting forth in detail the reasons therefor. The County reserves its rights, in accordance with General Municipal Law Section 103-g to award the Bid/Proposal to any Bidder/Proposer who cannot make the certification, on a case-by-case basis under the following circumstances:

- (1) The investment activities in Iran were made before April 12, 2012, the investment activities in Iran have not been expanded or renewed after April 12, 2012, and the Bidder/Proposer has adopted, publicized and is implementing a formal plan to cease the investment activities in Iran and to refrain from engaging in any new investments in Iran; or
- (2) The County of Albany has made a determination that the goods or services are necessary for the County to perform its functions and that, absent such an exemption, the County of Albany would be unable to obtain the goods or services for which the Bid/Proposal is offered. Such determination shall be made by the County in writing and shall be a public document.

SECTION 34: STORMWATER MANAGEMENT PROGRAM

34.1 Bidder understands that Albany County is a regulated entity subject to the SPDES General Permit for Stormwater Discharges from Municipal Separate Storm Sewer Systems (GP-0-15-003), and must comply with the terms and conditions of the aforementioned Permit. Bidder further understands that under the New York State Environmental Conservation Law, it is unlawful for any person to directly or indirectly cause or contribute to a violation of water quality standards, and that Albany County adopted Local Law 7 of 2007 enabling the County to take action against any discharges that cause or contribute to a violation of water quality standards. Bidder agrees to comply with the terms and conditions of the SPDES General Permit for Stormwater Discharges from Municipal Separate Storm Sewer Systems (GP-0-15-003) as well as Albany County Local Law No. 7 for 2007 and any Best Management Practices developed pursuant to the foregoing, as established in Albany County's Stormwater Management Program Plan. Bidder also agrees to implement any corrective actions identified by Albany County or a representative pursuant to the above regulations, and further understands that any non-compliance by the County will not diminish, eliminate, or lessen Bidder's own liability. **Awarded bidder shall execute and deliver to the County a certification statement acknowledging the above provisions prior to commencing any work (see Sheet MS4-1/Attachment "E").**

SECTION 35: Section not in use

COUNTY OF ALBANY

BID FORM

BID IDENTIFICATION:

Title: **Shaker Place Café Project**
Bid Number: **2024-150**

THIS BID IS SUBMITTED TO:

Pamela O Neill, Purchasing Agent
Albany County Department of General Services
Purchasing Division
112 State Street, Room 1000
Albany, NY 12207

1. The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into a Contract with the owner in the form included in the Contract Documents to complete all Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with the Contract Documents.
2. BIDDER accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the Disposition of Bid Security. This Bid may remain open for ninety (90) days after the day of Bid opening. BIDDER will sign the Contract and submit the Contract Security and other documents required by the Contract Documents within fifteen days after the date of OWNER'S Notice of Award.
3. In submitting this Bid, BIDDER represents, as more fully set forth in this Contract, that:

- (a) BIDDER has examined copies of all the Contract Documents and of the following addenda: (If none, so state)

Date

Number

(receipt of all of which is hereby acknowledged) and also copies of the Notice to Bidders and the Instructions to Bidders;

- (b) BIDDER has examined the site and locality where the Work is to be performed, the legal requirements (federal, state and local laws, ordinances, rules and regulations) and the conditions affecting cost, progress or performance of the Work and has made such independent investigations as BIDDER deems necessary;

BF1

(c) This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; BIDDER has not directly or indirectly induced or solicited any other BIDDER to submit a false or sham Bid; BIDDER has not solicited or induced any person, firm or a corporation to refrain from bidding; and BIDDER has not sought by collusion to obtain for himself any advantage over any other Bidder or over the owner.

4. BIDDER will complete the Work for the following prices(s): (Attach Bid Proposal)

5. BIDDER agrees to commence the Work within the number of calendar days or by the specific date indicated in the Contract. BIDDER agrees that the Work will be completed within the number of Calendar days or by the specific date indicated in the contract.

6. The following documents are attached to and made a condition of this Bid:

(a) Non-Collusive Bidding Certificate (Attachment "A")

(b) Acknowledgment by Bidder (Attachment "B")

(c) Vendor Responsibility Questionnaire (Attachment "C")

(d) Iranian Energy Divestment Certification (Attachment "D")

(e) MS-4-1 Certification Statement RE: Stormwater Discharges (Attachment "E")

(f) Bidder Qualification Questionnaire (Attachment "F")

(g) Non Interruption of Work Agreement (Attachment "G")

(h) Required Apprenticeship Training Program Documentation (refer to RFB Section 27)

7. Communication concerning this Bid shall be addressed to:

Phone: _____

8. Terms used in this Bid have the meanings assigned to them in the Contract and General Provisions.

BF2

COUNTY OF ALBANY

BID FORM

BID IDENTIFICATION:

Title: **Shaker Place Café Project**

Bid Number: 2024-150

Conditions:

- 1. All bid prices must include all materials, labor, equipment, incidentals and other associated costs.**
- 2. Construction Base Bid work shall carry a 20% Base Bid Contingency Allowance for additional work discovered during construction beyond scope of work indicated on drawings and specifications. Contractor shall receive advance approval from the County prior to performing any additional work.**

LUMP SUM BASE BID: \$_____ (a)

20 % CONTINGENCY ALLOWANCE: \$_____ (b)

TOTAL BASE BID (a) + (b): \$ _____
(Base Bid + Contingency Allowance)

BF3

COUNTY OF ALBANY

BID FORM

BID IDENTIFICATION:

Title: **Shaker Place Café Project**
Bid Number: **2024-150**

COMPANY: _____

ADDRESS: _____

CITY, STATE, ZIP: _____

TEL. NO.: _____

FAX NO.: _____

FEDERAL TAX ID NO.: _____

REPRESENTATIVE: _____

E-MAIL: _____

SIGNATURE AND TITLE _____

DATE _____

BF4



Kathy Hochul, Governor

Roberta Reardon, Commissioner

Albany County

Pamela O'Neill, Purchasing Agent
112 State Street
Albany NY 12207

Schedule Year 2024 through 2025
Date Requested 11/04/2024
PRC# 2024013880

Location Shaker Place Nursing
Project ID# 2024-150
Project Type New Cafe Project for the Shaker Place Nursing and Rehabilitation Center

PREVAILING WAGE SCHEDULE FOR ARTICLE 8 PUBLIC WORK PROJECT

Attached is the current schedule(s) of the prevailing wage rates and prevailing hourly supplements for the project referenced above. A unique Prevailing Rate Case Number (PRC#) has been assigned to the schedule(s) for your project.

The schedule is effective from July 2024 through June 2025. All updates, corrections, posted on the 1st business day of each month, and future copies of the annual determination are available on the Department's website www.labor.ny.gov. Updated PDF copies of your schedule can be accessed by entering your assigned PRC# at the proper location on the website.

It is the responsibility of the contracting agency or its agent to annex and make part, the attached schedule, to the specifications for this project, when it is advertised for bids and /or to forward said schedules to the successful bidder(s), immediately upon receipt, in order to insure the proper payment of wages.

Please refer to the "General Provisions of Laws Covering Workers on Public Work Contracts" provided with this schedule, for the specific details relating to other responsibilities of the Department of Jurisdiction.

Upon completion or cancellation of this project, enter the required information and mail **OR** fax this form to the office shown at the bottom of this notice, **OR** fill out the electronic version via the NYSDOL website.

NOTICE OF COMPLETION / CANCELLATION OF PROJECT

Date Completed: _____ Date Cancelled: _____

Name & Title of Representative: _____

Phone: (518) 457-5589 Fax: (518) 485-1870
W. Averell Harriman State Office Campus, Bldg. 12, Room 130, Albany, NY 12240

ATTACHMENT "A"
NON-COLLUSIVE BIDDING CERTIFICATE PURSUANT TO
SECTION 103-D OF THE NEW YORK STATE GENERAL MUNICIPAL LAW

A. By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid, each party thereto certifies as to its own organizations, under penalty of perjury, that to the best of knowledge and belief:

(1) The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor.

(2) Unless otherwise required by law, the prices which have been quoted in this bid have not knowingly been disclosed by the bidder and will not knowingly be disclosed by the bidder, directly or indirectly, prior to opening, to any bidder or to any competitor.

(3) No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

A bid shall not be considered for award nor shall any award be made where (1), (2), and (3) above have not been complied with; provided, however, that in any case the bidder cannot make the foregoing certification, the bidder shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons thereof. Where (1), (2), and (3) above have not been complied with, the bid shall not be considered for any award nor shall any award be made unless the head of the Purchasing Unit to the political subdivision, public department, agency or official thereof to which the bid is made, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

The fact that a bidder (a) has published price lists, rates, or tariffs covering items being procured, (b) has informed prospective customer of proposed or pending publication of new or revised price lists for such items, or (c) has sold the same items to other customers at the same prices being bid, does not constitute, without more, a disclosure within the meaning of paragraph "A" above.

B. Any bid hereafter made to any political subdivision of the state or any public department, agency or official thereof by a corporate bidder for work or services performed or to be performed or goods sold or to be sold, where competitive bidding is required by statute, rule, regulation, local law, and where such bid contains the certification referred to in paragraph "A" of this section, shall be deemed to have been authorized by the Board of Directors of the bidder, and such authorization shall be deemed to include the submission of the bid and the inclusion therein of the certificate as to non-collusion as the act and deed of the corporation

Signature

Title

Date

Company Name

ATTACHMENT "B"
ACKNOWLEDGMENT BY BIDDER

If Individual or Individuals:

STATE OF _____)
COUNTY OF _____) SS.:

On this _____ day of _____, 200__, before me personally appeared _____ to me known and known to me to be the same person(s) described in and who executed the within instrument, and he (or they severally) acknowledged to me that he (or they) executed the same.

Notary Public, State of _____

Qualified in _____

Commission Expires _____

If Corporation:

STATE OF _____)
COUNTY OF _____) SS.:

On this _____ day of _____, 200__, before me personally appeared _____ to me known, who, being by me sworn, did say that he resides at (give address) _____; that he is the (give title) _____ of the (name of corporation) _____, the corporation described in and which executed the above instrument; that he knows the seal of the corporation, and that the seal affixed to the instrument is such corporate seal; that it was so affixed by order of the board of directors of the corporation, and that he signed his name thereto by like order.

Notary Public, State of _____

Qualified in _____

Commission Expires _____

If Partnership:

STATE OF _____)
COUNTY OF _____) SS.:

On the _____ day of _____, 200__, before me personally came _____, to me known to be the individual who executed the foregoing, and who, being duly sworn, did depose and say that he / she is a partner of the firm of _____ and that he / she has the authority to sign the same, and acknowledged that he / she executed the same as the act and deed of said partnership.

Notary Public, State of _____

Qualified in _____

Commission Expires _____

**ATTACHMENT “C”
ALBANY COUNTY
VENDOR RESPONSIBILITY QUESTIONNAIRE**

1. VENDOR IS: ☐ PRIME CONTRACTOR			
2. VENDOR’S LEGAL BUSINESS NAME		3. IDENTIFICATION NUMBERS a) FEIN # b) DUNS #	
4. D/B/A – Doing Business As (if applicable) & COUNTY FIELD:		5. WEBSITE ADDRESS (if applicable)	
6. ADDRESS OF PRIMARY PLACE OF BUSINESS/EXECUTIVE OFFICE		7. TELEPHONE NUMBER	8. FAX NUMBER
9. ADDRESS OF PRIMARY PLACE OF BUSINESS/EXECUTIVE OFFICE <i>IN NEW YORK STATE, if different from above</i>		10. TELEPHONE NUMBER	11. FAX NUMBER
12. AUTHORIZED CONTACT FOR THIS QUESTIONNAIRE Name Title Telephone Number Fax Number e-mail			
13. LIST ALL OF THE VENDOR’S PRINCIPAL OWNERS.			
a) NAME	TITLE	b) NAME	TITLE
c) NAME	TITLE	d) NAME	TITLE
A DETAILED EXPLANATION IS REQUIRED FOR EACH QUESTION ANSWERED WITH A “YES,” AND MUST BE PROVIDED AS AN ATTACHMENT TO THE COMPLETED QUESTIONNAIRE. YOU MUST PROVIDE ADEQUATE DETAILS OR DOCUMENTS TO AID THE COUNTY IN MAKING A DETERMINATION OF VENDOR RESPONSIBILITY. PLEASE NUMBER EACH RESPONSE TO MATCH THE QUESTION NUMBER.			
14. DOES THE VENDOR USE, OR HAS IT USED IN THE PAST FIVE (5) YEARS, ANY OTHER BUSINESS NAME, FEIN, or D/B/A OTHER THAN THOSE LISTED IN ITEMS 2-4 ABOVE? List all other business name(s), Federal Employer Identification Number(s) or any D/B/A names and the dates that these names or numbers were/are in use. Explain the relationship to the vendor. ☐ Yes ☐ No 			
15. ARE THERE ANY INDIVIDUALS NOW SERVING IN A MANAGERIAL OR CONSULTING CAPACITY TO THE VENDOR, INCLUDING PRINCIPAL OWNERS AND OFFICERS, WHO NOW SERVE OR IN THE PAST ONE (1) YEARS HAVE SERVED AS: a) An elected or appointed public official or officer? <i>List each individual’s name, business title, the name of the organization and position elected or appointed to, and dates of service</i> ☐ Yes ☐ No b) An officer of any political party organization in Albany County, whether paid or unpaid? <i>List each individuals name, business title or consulting capacity and the official political position held with applicable service dates.</i> ☐ Yes ☐ No			

21.	IN THE PAST FIVE (5) YEARS, HAS THE VENDOR OR ANY AFFILIATES ¹ :	☐ Yes	☐ No
	a) defaulted or been terminated on, or had its surety called upon to complete, any contract (public or private) awarded;		
Indicate if this is applicable to the submitting vendor or affiliate. Detail the situation(s) that gave rise to the negative action, any corrective action taken by the vendor and the name of the contracting agency.			

¹ “Affiliate” meaning: (a) any entity in which the vendor owns more than 50% of the voting stock; (b) any individual, entity or group of principal owners or officers who own more than 50% of the voting stock of the vendor; or (c) any entity whose voting stock is more than 50% owned by the same individual, entity or group described in clause (b). In addition, if a vendor owns less than 50% of the voting stock of another entity, but directs or has the right to direct such entity’s daily operations, that entity will be an “affiliate” for purposes of this questionnaire.

**ALBANY COUNTY
VENDOR RESPONSIBILITY QUESTIONNAIRE**

FEIN #

State of:)
) ss:
County of:)

CERTIFICATION:

The undersigned: recognizes that this questionnaire is submitted for the express purpose of assisting the County of Albany in making a determination regarding an award of contract or approval of a subcontract; acknowledges that the County may in its discretion, by means which it may choose, verify the truth and accuracy of all statements made herein; acknowledges that intentional submission of false or misleading information may constitute a felony under Penal Law Section 210.40 or a misdemeanor under Penal Law Section 210.35 or Section 210.45, and may also be punishable by a fine and/or imprisonment of up to five years under 18 USC Section 1001 and may result in contract termination; and states that the information submitted in this questionnaire and any attached pages is true, accurate and complete.

The undersigned certifies that he/she:

- Has not altered the content of the questions in the questionnaire in any manner;
- Has read and understands all of the items contained in the questionnaire and any pages attached by the submitting vendor;
- Has supplied full and complete responses to each item therein to the best of his/her knowledge, information ad belief;
- Is knowledgeable about the submitting vendor's business and operations;
- Understands that Albany County will rely on the information supplied in the questionnaire when entering into a contract with the vendor;
- Is under duty to notify the Albany County Purchasing Division of any material changes to the vendor's responses.

Name of Business

Signature of Owner _____

Address

Printed Name of Signatory _____

City, State, Zip

Title

Sworn before me this _____ day of _____, 20__;

Notary Public

Printed Name

Signature

Date

Attachment "D"
Certification Pursuant to Section 103-g
Of the New York State
General Municipal Law

- A. By submission of this bid/proposal, each bidder/proposer and each person signing on behalf of any bidder/proposer certifies, and in the case of a joint bid, each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that each bidder is not on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the New York State Finance Law.
- B. A Bid/Proposal shall not be considered for award, nor shall any award be made where the condition set forth in Paragraph A above has not been complied with; provided, however, that in any case the bidder/proposer cannot make the foregoing certification set forth in Paragraph A above, the bidder/proposer shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons therefor. Where Paragraph A above cannot be complied with, the Purchasing Unit to the political subdivision, public department, agency or official thereof to which the bid/proposal is made, or his designee, may award a bid/proposal, on a case by case business under the following circumstances:
1. The investment activities in Iran were made before April 12, 2012, the investment activities in Iran have not been expanded or renewed after April 12, 2012, and the Bidder/Proposer has adopted, publicized and is implementing a formal plan to cease the investment activities in Iran and to refrain from engaging in any new investments in Iran; or
 2. The political subdivision makes a determination that the goods or services are necessary for the political subdivision to perform its functions and that, absent such an exemption, the political subdivision would be unable to obtain the goods or services for which the contract is offered. Such determination shall be made in writing and shall be a public document.

Signature

Title

Date

Company Name

ATTACHMENT "E"

Sheet MS4-1: Bidder/Proposer Certification Statement (to be used with Section 34 Part A – General Contracts)

As a bidder seeking to provide services on behalf of Albany County, I certify under penalty of law that I understand and agree to comply with the terms and conditions of the New York State Pollutant Discharge Elimination System ("SPDES") General Permit for Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4 Permit) and Albany County Local Law 7 of 2007, and agree to implement any Best Management Practices or corrective actions identified by Albany County or an authorized representative thereof as necessary to maintain compliance. I understand that Albany County must comply with the terms and conditions of the aforementioned MS4 Permit, and that it is unlawful for any person to directly or indirectly cause or contribute to a violation of water quality standards. I am also aware that County Local Law 7 of 2007 prohibits any activities that cause or contribute to a violation of the County's SPDES permit. Further, I understand that any non-compliance by Albany County will not diminish, eliminate or lessen my own liability.

Name of Third Party Entity: _____

Address: _____

Phone Number(s): _____

Description of activities to be performed by your firm or organization within Albany County are related to the Albany County Storm Water Management Program (SWMP) (include any activities that have the potential to generate or prevent pollution and/or affect water quality):

Description of where the work is to be performed within Albany County facilities:

Signature

Printed Name

Title

Date

ATTACHMENT "F"
BIDDER QUALIFICATION QUESTIONNAIRE

The undersigned guarantees the accuracy of all statements and answers herein contained. (Please print in ink or type in the spaces provided). Attach additional sheets if necessary. This statement of Bidder's qualifications is required of all Bidders. Additional data on Bidder's qualifications may be requested from selected Bidders after the Bid opening.

1. How many years has your firm been in business? _____ years

2. List up to three (3) projects of this nature that you have completed in the last three (3) years, and give the name, address and telephone number of a reference from each. Also give the completion date, the original contract bid price and the completed cost of each project listed.

1. _____

2. _____

3. _____

BQ1

ATTACHMENT "F"
BIDDER QUALIFICATION QUESTIONNAIRE

3. List projects presently under contract by your firm, the dollar volume of the contract and the percentage completion of the contract.

4. Has your firm ever failed to complete work awarded to it, if so, state where and why.

5. Is your firm presently or has your firm ever been a party defendant in a lawsuit commenced against your firm alleging failure to properly complete work in accordance with the contract for same; if so, give details.

BQ2

ATTACHMENT "F"
BIDDER QUALIFICATION QUESTIONNAIRE

6. Has your firm received two (2) final determinations within any consecutive six-year period, the second final determination occurring within the past five (5) years, that your firm willfully failed to pay the prevailing rate of wages or to provide supplements with Article 8 of the Labor Law, if so, give details.

7. Do you plan to sublet any part of this work? If so, give details.

8. Give the name, address and telephone number of an individual who represents each of the following and whom the Owner may contact to investigate your financial responsibility: a surety, and a bank.

BQ3

ATTACHMENT "F"
BIDDER QUALIFICATION QUESTIONNAIRE

9. Give a summary of your financial statement. (List assets and liabilities, use an insert sheet, if needed).

10. State the true, exact, correct and complete name of the partnership, corporation or trade name under which you do business, and the address of the place of business. (If a corporation, state the name and title of all officers. If a partnership, state the name of all partners. If a trade name, state the names of the individuals who do business under the trade name.) It is absolutely necessary that information be furnished.

Correct Name of Bidder

(a) The business is a: _____

(b) The address of principal place of business is: _____

(c) The names of the corporate officers, or partners, or individuals doing business under a trade name, are as follows:

BQ4

ATTACHMENT "F"
BIDDER QUALIFICATION QUESTIONNAIRE

11. Is your firm qualified to do business in the State of New York? Yes ____ No ____.
If No, signing this qualification statement constitutes agreement to obtain such qualification prior to award of contract immediately upon owner's request.

Firm

Dated: _____

By _____

(Typed)

ATTACHMENT "G"
NON-INTERRUPTION OF WORK AGREEMENT

By submission of the bid for:

The bidder agrees that if this bid is accepted, he/she will not intentionally engage in any course of conduct or activity, or employ for the purposes of performing the public work, any subcontractors, employees, labor or materials which will or may result in the interruption of the performance of the public work due to labor strife or unrest by workmen employed by the bidder or by any of the trades working in or about the public works and/or premises where the work is being performed.

Firm: _____

By: _____
(Signature)

(Typed)

Title: _____

Date: _____

County of Albany
Article SC19- Affirmative Action Plan

STATEMENT OF POLICY

The following is taken from Resolution No. 495 adopted by the Albany County Legislature on October 9, 2018.

Resolved, That the Albany County Legislature hereby approves and adopts the updates to the Affirmative Action Policy as reflected in the document annexed hereto, and be it further that the updated Affirmative Action Plan shall take effect immediately, and that the Commissioner of Human Resources and Director of the Division of Affirmative Action are directed to implement the policies reflected in the updated language of the Affirmative Action policy immediately and on a County-wide basis.

The following is taken from Resolution No. 26 adopted by the Albany County Legislature on June 10, 1996.

Resolved, By the Albany County Legislature that the Affirmative Action Plan so endorsed by the Albany County Executive and which is currently on file with the Clerk of the County Legislature, shall be the official plan of the County of Albany including the objectives, procedures and goals so stipulated.

It is the policy of the County of Albany that Minority Business Enterprises (MBE) and Woman Business Enterprises (WBE) are afforded the maximum opportunity to participate in the performance of contracts, in excess of \$100,000, let by the County and its several agencies and authorities. The County commits itself to a goal oriented Contract Compliance Program which assures that Minority Business Enterprises and Woman Business Enterprises are considered in awarding contracts for goods, services and construction. Furthermore, it is the policy of the County of Albany that contractors and subcontractors utilize minority and women labor to the greatest extent feasible.

In bidding on this contract, the contractor acknowledges an understanding of this policy. The contractor shall carry out the policy by making every reasonable effort to award contracts and subcontracts to MBEs and WBEs and utilizing minority and women labor in the performance of this contract.

ANTI-DISCRIMINATION CLAUSE 220-E - NYS Labor Law. Provisions in contracts prohibiting discrimination on account of race, creed, color or national origin in employment of citizens upon public works. Every contract for or on behalf of the state or a municipality for the construction, alteration or repair of any public building or public work or for the manufacture, sale or distribution of materials, equipment or supplies shall contain provisions by which the contractor with the state or municipality agrees: (a) That in the hiring of employees for the performance of work under this contract or any subcontract hereunder, no contractor, subcontractor, nor any person acting on behalf of such contractor or subcontractor, shall by reason of race, creed, color, disability, sex or national origin discriminate against any citizen of the state of New York who is qualified and available to perform the work to which the employment relates; (b) That no contractor, subcontractor, nor any person on his behalf shall, in any manner, discriminate against or intimidate any employee hired for the performance of work under this contract on account of race, creed, color, disability, sex or national origin; (c) That there may be deducted from the amount payable to the contractor by the state or municipality under this contract a penalty of fifty dollars for each person for each calendar day during which such person was discriminated against or intimidated in violation of the provisions of the contract; (d) That this contract may be cancelled or terminated by the state or municipality, and all moneys due or to become due hereunder may be forfeited, for a second or any subsequent violation of the terms or conditions of this section of the contract; and (e) The aforesaid provisions of this section covering every contract for or on behalf of the state or a municipality for the manufacture, sale or distribution of materials, equipment or supplies shall be limited to operations performed within the territorial limits of the state of New York.

ADMINISTRATION

The County's Division of Affirmative Action is charged with the responsibility of monitoring Affirmative Action in all contracts. All County procurements will be made with an understanding that the complete participation of bona fide MBE and WBE shall be assured by balanced and equitable contract involvement.

The **subcontracting participation goals** for County public procurements are:

- to award 7% of the total dollar value of the contract to a certified MBE.
- to award 5% of the total dollar value of the contract to a certified WBE.

The **workforce goals** for County public procurements are as follows:

- 7% of the total workforce should be minorities.
- 5% of the total workforce should be women.

• CONTRACTOR'S RESPONSIBILITIES

The Contractor's responsibilities include, but are not limited to, the following. The Contractor **must**:

- 1) Submit to the Division of Affirmative Action a completed Schedule of MBE/WBE and Labor Performance or Request for Waiver within **fifteen (15) days** of receiving the Notice of Award.
- 2) Prior to being issued a Notice to Proceed, submit evidence of MBE/WBE contracts proposed to the Division of Affirmative Action.
- 3) Submit monthly utilization reports to the Division of Affirmative Action for review.
- 4) Immediately notify the Division of Affirmative Action of any changes during the project, especially if the change affects the Schedule of MBE/WBE and Labor Performance submitted for the project.
- 5) Make good faith efforts to replace an MBE/WBE subcontractor that is unable to perform successfully with another MBE/WBE.
- 6) Notify the Division of Affirmative Action of any suspected instances of companies fraudulently claiming MBE/WBE status.
- 7) If possible, provide any needed technical assistance to MBE/WBE firms under subcontract.
- 8) If possible, design payment schedules to minimize cash flow problems faced by MBEs/WBEs.
- 9) Maintain for three years such records as are necessary to determine compliance with MBE/WBE obligations and to submit regular reports to enable the Albany County MBE Officer to monitor this compliance.

• DEVELOPING A SCHEDULE OF MBE/WBE AND LABOR PERFORMANCE

The Schedule of MBE/WBE and Labor Performance must detail:

1. The contractor's name, address, phone number, federal identification number and the total dollar value of the contract.
2. Whether the contract is a joint venture.
3. The MBE and WBE goal for the contract.
4. A brief description of each proposed subcontractor, including the name, address, phone number, federal identification number and the total dollar amount of each subcontractor.
5. An estimate of the total number of hours to be worked on the project.

• COMPLIANCE

Each contractor must furnish monthly utilization reports while working on the project. The reports must detail the total number of hours worked, total minority /female labor hours and payments made to MBE and WBE firms.

- **WAIVER REQUEST FOR SUBCONTRACTING AND/OR LABOR PERFORMANCE**

Contractors which determine that the subcontracting and/or labor participation goals must cannot be achieved **must** request a waiver within **fifteen (15) days** of receiving the Notice of Award. The request must justify why the firm cannot accomplish the subcontracting and/or labor participation goals established for the project. The justification must detail actions taken to solicit MBE/WBE subcontractors, minority or female labor participation and the impediments encountered. Each waiver request will be evaluated individually. Submission of the request for waiver does **not** guarantee the requirements will be waived. Additional information or supporting documentation may be required to determine a contractor's good faith effort.

- **MBE/WBE RESPONSIBILITIES**

Each Minority Business Enterprise/Woman Business Enterprise shall:

1. Establish through certification that the company is a bona fide MBE/WBE. The Division of Affirmative Action reviews MBE/WBE eligibility status for contractors and subcontractors.
2. Exhibit an interest in bidding a particular project by attending pre-bid conferences and/or by responding timely to contract solicitations for bid quotations prior to bid date.
3. Be responsible for entering into all necessary contractual agreements.
4. Arrange for and supervise contract performance.
5. Secure equipment, materials and crew sufficient to complete their contract or subcontract.
6. Provide bonding, insurance and collateral as required for surety in contract performance.
7. Authorize payrolls, payments and reports as required for routine compliance.

The County will accept MBE/WBE Certifications made by other governmental agencies which are in compliance with our DBE policy.

SANCTIONS

SC-19.5.1

If **CONTRACTOR** cannot meet the WBE/MBE participation goals, he must document to the Albany County MBE Officer, that he has made all positive efforts to achieve it. Failure to meet the goals or to document that all positive efforts have been made to achieve it may result in the County invoking any legal or equitable remedy available to the County for breach of contract including withholding future payments under the **CONTRACT** involved; disqualification of the **CONTRACTOR** from future contracting opportunities for a period not to exceed two years; and cancellation of the contract and declaration of forfeiture of the **PERFORMANCE BOND**.

A decision by the Albany County MBE Officer to invoke the above sanctions shall be issued in writing by registered mail. The **CONTRACTOR** shall have ten (10) days from receipt of the decision to appeal the MBE Officer's decision to the Grievance committee of the Albany County Legislature. Both sides of the dispute shall have the opportunity to be heard at a meeting of the Grievance Committee to be held within ten (10) days of the receipt of an appeal, and the Committee shall send a final decision to both sides within ten (10) days by registered mail (or hand delivery in the case of the MBE Officer's copy).

STANDARDS

A **Minority Business Enterprise (MBE)** shall be any business enterprise which is at least fifty-one percent (51%) owned or in that case of a publicly-owned business, at least fifty-one percent (51%) of the common stock of which is owned, by a minority person(s), and such ownership interest is real, substantial and continuing. The minority ownership must have and exercise the authority to independently control the business decisions of the entity.

A **Woman Business Enterprise (WBE)** shall be any business enterprise which is at least fifty-one percent (51%) owned or in the case of a publicly-owned business, at least fifty-one percent (51%) of the common stock of which is owned, by a woman (women), and such ownership interest is real, substantial and continuing. The woman ownership must have and exercise the authority to independently control the business decisions of the entity. WBEs shall not be considered as MBEs unless 51% of the assets of the company is held by a minority person(s).

A **Disadvantaged Business Enterprise (DBE)** mean a business enterprise controlled by one or more socially or economically disadvantaged individuals and whose management and daily business operations are controlled by one or more socially and economically disadvantaged individuals who own it. Such disadvantaged may arise from cultural, racial, chronic economic circumstances or background or other similar cause. Such persons include, but are not limited to citizens of the United States (or lawfully admitted permanent residents) and who are African Americans, Puerto Ricans, Hispanic Americans, Asian-Pacific Americans, American Indians, Eskimos, Aleuts, Asian Indians and Women.

Minority: A person who is a member of one or more of the following groups:

- A) Black (not of Hispanic origin) – a person having origins in any of the Black racial group of Africa.
- B) Hispanic -- a person of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish culture or origin, regardless of race.
- C) Asian or Pacific Islander – a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands. This area includes, for example, China, Japan, Korea, the Philippine Islands and Samoa.
- D) Native American or Alaskan Natives – a person having origins in any of the original peoples of North America, and who maintains cultural identification through tribal affiliation or community recognition.

Woman: A person who is of the feminine gender who are not otherwise classified as a minority. For

assistance or additional information, contact

County of Albany

Division of Affirmative Action

112 State Street, Room 900, Albany, NY 12207

Phone: (518) 447-7010

Fax: (518) 447-5586

County of Albany
Division of Affirmative Action
MBE/WBE Compliance Forms



Daniel P. McCoy
Albany County Executive

County of Albany
Schedule of MBE/WBE and Labor Performance

The Division of Affirmative Action monitors subcontracting and labor participation for contracts let by agencies and authorities of Albany County. The Schedule of MBE/WBE and Labor Performance must be completed and submitted within 15 days of receiving the Notice of Award. The figures represent the contractor's best estimate of workforce needs and minority/female representation of that workforce.

Questions regarding completion of this form can be directed to the County of Albany, Division of Affirmative Action at (518) 447-7010.

Contractor: _____ Address: _____

City: _____ State: _____ Zip: _____

Telephone: _____ Fax Number: _____ Federal ID No.: _____

Project Name: _____ Project Cost: _____ Completion Date: _____

Contract Description: _____

Bidder is an approved ☐ MBE ☐ WBE

If yes, specify agency: _____

Joint Venture

MBE/WBE participation is broken down into Joint Ventures with Bidder, Subcontracting Construction, Trucking or Services, and Materials or Supplies. Joint ventures between the Prime Bidder and MBE/WBE firms are shown below. Joint Ventures with Bidder (check one):

No MBE/WBE joint ventures
with Bidder on this Contract.

Bidder is joint venturing with the following firm(s)
(Attach a copy of joint venture agreements to this form)

Name: _____ Address: _____

City: _____ State: _____ Zip: _____

Telephone: _____ Federal ID No.: _____

MBE Share of Joint Venture: _____ % x Total Bid Amount = \$ _____

WBE Share of Joint Venture: _____ % x Total Bid Amount = \$ _____

Sub-contractor Performance

MBE Goal: 7% x Total Bid Amount = \$ _____

WBE Goal: 5% x Total Bid Amount = \$ _____

Please provide the information requested for **all** subcontractors participating on this project (include MBE/WBE firms).

Sub-contractor Name, Address, Phone	MBE, WBE or N/A	Amount of Sub- contract & Award Date	Description of Work (Trade)	Start Date Completion Date	Contracted Payment Schedule
	Select				
	Select				
	Select				
	Select				
	Select				
	Select				
	Select				
	Select				
	Select				
	Select				

I, _____, representative of _____
declare that the information provided is true and represents accurately my firm’s efforts to comply with the Affirmative Action Policy. We shall continue to make every effort to ensure that MBE/WBE firms have the maximum opportunity to compete for, and perform contracts let by the County of Albany.

SUBMIT MONTHLY**County of Albany MBE/WBE and
Labor Performance
Monthly Utilization Report**

This report must be completed by each firm working on the site and submitted to the General Contractor on a monthly basis. The General Contractor forwards the reports to the County of Albany, Division of Affirmative Action, 112 State Street, Room 900, Albany, NY 12207. Fax (518) 447-5560. For assistance, call (518) 447-7010.

Contractor:_____ Address:_____

City:_____ State:_____ Zip:_____

Telephone:_____ Fax Number:_____ Federal ID No.:_____

Project Name:_____ Project Cost:_____ Completion Date:_____

Reporting Period: _____ **Month** _____ **Year** _____

Trade	Number of Hours Worked by Minorities	Number of Hours Worked by Women	Number of Hours Worked by Non-Minorities	Total Hours Worked
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
Total(s):	0.00	0.00	0.00	0.00

Information Provided By _____

Date _____

MBE/WBE Payments

MBE/WBE Firm(s) Participating on the Project	Payments Made this Month	Payments Made to Date

INSTRUCTIONS

This form must be completed and submitted by the Contractor/Vendor by the **10th** of each month for the duration of the contract. The form must be accompanied by copies of checks (front and back) made payable to MBE/WBE subcontractor and suppliers.

This form is required pursuant to the contract specifications. Failure to submit will result in non-compliance.

County of Albany
Department of Human Resources Division of
Affirmative Action
112 State Street, Room 900, Albany, NY 12207
Phone:(518) 447-7010

NOTE: IF THERE IS NO ACTIVITY FOR THE REPORTING PERIOD, PLEASE NOTE ACCORDINGLY.

County of Albany
Waiver Request for MBE/WBE Subcontracting and/or Labor Performance

If your firm has determined that it is not feasible to meet the subcontracting and/or labor performance goals specified in the contract, complete and return this form within fifteen days of the Intent to Award. The request must identify reasons why the firm cannot reach the labor and subcontractor goals applicable. The Division of Affirmative Action will evaluate each waiver individually. Please be advised that sub- mission of this request does not guarantee waiver of the requirements. Attach additional sheets if necessary. Please refer to the County of Albany Criteria for Establishing Good Faith Effort.

Contractor:_____ Address:_____

City:_____ State:_____ Zip:_____

Telephone:_____ Fax Number:_____ Federal ID No.:_____

Contract Type/Number:_____ Project Cost:_____

(☐) **Request Waiver of Minority/Women Labor Participation Goal. Please explain:**

Actions taken to include minority/women labor _____

(☐) **Request Waiver of Minority Subcontractor Participation Goal. Please explain:**

Actions taken to include MBE and/or WBE Subcontractor(s) _____

Signature

Name (Printed)

Title

County Of Albany
Criteria for Establishing Good Faith Effort

The following list of the good faith efforts criteria complies with NYS Executive Law, Article 15-A which should be considered for determining whether a contractor has documented good faith efforts:

1. Was a completed, acceptable utilization plan submitted in accordance with applicable requirements to meet goals for participation of certified minority and women-owned business enterprises established in the same contract?
2. Were advertisements placed in appropriate trade, general circulation and minority and women- oriented publications in a timely fashion?
3. Were written solicitations made in a timely fashion of certified minority and women-owned business enterprises listed in the directory of certified business?
4. Were timely responses to any such advertisements and solicitations provided by certified minority and women-owned business enterprises?
5. Did the contractor attend pre-bid, pre-award, or other meetings, if any, scheduled by the agency awarding the contract, with certified minority or women-owned business enterprises which the State or County agency determined were capable of performing the contract scope of work, for purposes of complying with goal requirements?
6. What efforts were undertaken by the contractor to reasonably structure the contract scope of work for purposes of subcontracting with certified minority and women-owned business enterprises?
7. How many minority and women-owned business enterprises in the directories of certified businesses could perform work required by the contract scope of work in your region?
8. What actions were taken to contact and assess the financial ability of certified minority and women- owned businesses enterprises to participation on the contract, and which enterprises are located out- side of the region in which the contract scope of work was or will be performed?
9. Were relevant plans, specification or terms and conditions of the contract, necessary to prepare an informed response to a contractor solicitation, provided in a timely fashion to certified minority or women-owned business enterprises?
10. What subcontract terms and conditions were offered to certified minority and women- owned business enterprises, and how do those subcontract terms and conditions compare to those offered in the ordinary course of the contractor's business and to other subcontractors of the contractor?
11. Has the contractor made payments for work performed by certified minority and women- owned business enterprises in a timely fashion so as to facilitate continued performance by certified minority or women-owned business enterprises?
12. Has the contractor offered to make up any inability to comply with the minority and women-owned business enterprise goals established in a contract, in other contracts being performed or to be awarded to the contractor?

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provision of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings, and details to determine type and extent of work there if affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 FORM OF AGREEMENT AND GENERAL CONDITIONS

- A. The following form of Owner/Contractor Agreement and form of the General Conditions shall be used for Project:
 - 1. AIA Document A101-2017 "Standard Form of Agreement between Owner and Contractor Where the Basis of Payment is a Stipulated Sum."
 - a. The General Conditions for Project are AIA Document A201-2017 "General Conditions of the Contract for Construction."
 - 2. The General Conditions are included in the Project Manual.
 - 3. Owner's document(s) bound following this Document.

1.3 ADMINISTRATIVE FORMS

- A. Administrative Forms: Additional administrative forms are specified in Division 01 General Requirements.
- B. Copies of AIA standard forms may be obtained from the American Institute of Architects;
www.aiacontractdocsaiacontracts.org ; (800) 942-7732.
- C. Preconstruction Forms:
 - 1. Form of Certificate of Insurance: AIA Document G715-2017 "Supplemental Attachment for ACORD Certificate of Insurance 25."
- D. Information and Modification Forms:
 - 1. Form for Requests for Information (RFIs): AIA Document G716-2004 "Request for Information (RFI)."
 - 2. Form of Request for Proposal: AIA Document G709-2018 "Proposal Request."

3. Change Order Form: AIA Document G701-2017 "Change Order."
4. Form of Architect's Memorandum for Minor Changes in the Work: AIA Document G710-2017 "Architect's Supplemental Instructions."
5. Form of Change Directive: AIA Document G714-2017 "Construction Change Directive."

E. Payment Forms:

1. Schedule of Values Form: AIA Document G703-1992 "Continuation Sheet."
2. Payment Application: AIA Document G702-1992/703-1992 "Application and Certificate for Payment and Continuation Sheet."
3. Form of Contractor's Affidavit: AIA Document G706-1994 "Contractor's Affidavit of Payment of Debts and Claims."
4. Form of Affidavit of Release of Liens: AIA Document G706A-1994 "Contractor's Affidavit of Payment of Release of Liens."
5. Form of Consent of Surety: AIA Document G707-1994 "Consent of Surety to Final Payment."

PART- 2 PRODUCTS (NOT USED)

PART- 3 EXECUTION (NOT USED)

END OF SECTION 00 6000



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Performance Bond

CONTRACTOR:

(Name, legal status and address)

SURETY:

(Name, legal status and principal place of business)

OWNER:

(Name, legal status and address)

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONSTRUCTION CONTRACT

Date:

Amount:

Description:

(Name and location)

BOND

Date:

(Not earlier than Construction Contract Date)

Amount:

Modifications to this Bond: ☐ None ☐ See Section 16

CONTRACTOR AS PRINCIPAL

Company: (Corporate Seal)

SURETY

Company: (Corporate Seal)

Signature: _____

Name

and Title:

(Any additional signatures appear on the last page of this Performance Bond.)

Signature: _____

Name

and Title:

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:

OWNER'S REPRESENTATIVE:

(Architect, Engineer or other party:)

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

- .1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;
- .2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
- .3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

- .1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
- .2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

- .1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
- .2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and
- .3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 **Balance of the Contract Price.** The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 **Construction Contract.** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 **Contractor Default.** Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 **Owner Default.** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 **Contract Documents.** All the documents that comprise the agreement between the Owner and Contractor.

§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

Sample

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

SURETY

Company:

(Corporate Seal)

Company:

(Corporate Seal)

Signature: _____

Name and Title: _____

Address _____

Signature: _____

Name and Title: _____

Address _____

Init.



AIA[®] Document A312[™] – 2010

Payment Bond

CONTRACTOR:

(Name, legal status and address)

SURETY:

(Name, legal status and principal place of business)

OWNER:

(Name, legal status and address)

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONSTRUCTION CONTRACT

Date:

Amount:

Description:

(Name and location)

BOND

Date:

(Not earlier than Construction Contract Date)

Amount:

Modifications to this Bond: ☐ None ☐ See Section 18

CONTRACTOR AS PRINCIPAL

Company: *(Corporate Seal)*

SURETY

Company: *(Corporate Seal)*

Signature: _____

Name

and Title:

(Any additional signatures appear on the last page of this Payment Bond.)

Signature: _____

Name

and Title:

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:

OWNER'S REPRESENTATIVE:

(Architect, Engineer or other party:)

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

- .1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
- .2 have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- .1 the name of the Claimant;
- .2 the name of the person for whom the labor was done, or materials or equipment furnished;
- .3 a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- .4 a brief description of the labor, materials or equipment furnished;
- .5 the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- .6 the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- .7 the total amount of previous payments received by the Claimant; and
- .8 the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 Claimant. An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

§ 16.4 **Owner Default.** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 16.5 **Contract Documents.** All the documents that comprise the agreement between the Owner and Contractor.

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:

Sample

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

SURETY

Company:

(Corporate Seal)

Company:

(Corporate Seal)

Signature: _____

Name and Title: _____

Address _____

Signature: _____

Name and Title: _____

Address _____

Application and Certificate for Payment

TO OWNER: PROJECT: APPLICATION NO: DISTRIBUTION TO:
PERIOD TO: OWNER ☐
CONTRACT FOR: ARCHITECT ☐
CONTRACT DATE: CONTRACTOR ☐
PROJECT NOS: / / FIELD ☐
OTHER ☐

FROM CONTRACTOR: VIA ARCHITECT:

CONTRACTOR'S APPLICATION FOR PAYMENT
Application is made for payment, as shown below, in connection with the Contract.
AIA Document G703®, Continuation Sheet, is attached.

1. ORIGINAL CONTRACT SUM \$
2. NET CHANGE BY CHANGE ORDERS \$
3. CONTRACT SUM TO DATE (Line 1 ± 2) \$
4. TOTAL COMPLETED & STORED TO DATE (Column G on G703) \$
5. RETAINAGE:
a. % of Completed Work (Columns D + E on G703) \$
b. % of Stored Material (Column F on G703) \$
Total Retainage (Lines 5a + 5b, or Total in Column I of G703) \$

6. TOTAL EARNED LESS RETAINAGE (Line 4 minus Line 5 Total) \$
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT (Line 6 from prior Certificate) \$
8. CURRENT PAYMENT DUE \$
9. BALANCE TO FINISH, INCLUDING RETAINAGE (Line 3 minus Line 6) \$

CHANGE ORDER SUMMARY		ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	\$	\$	\$
Total approved this month	\$	\$	\$
TOTAL	\$	\$	\$
NET CHANGES by Change Order	\$		

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:
By: _____ Date: _____
State of: _____
County of: _____
Subscribed and sworn to before me this _____ day of _____
Notary Public: _____
My commission expires: _____

ARCHITECT'S CERTIFICATE FOR PAYMENT
In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED \$
(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

ARCHITECT:
By: _____ Date: _____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.



AIA[®] Document G716[™] – 2004

Request for Information (RFI)

TO:

FROM:

PROJECT:

ISSUE DATE:

RFI No.:

REQUESTED REPLY DATE:

PROJECT NUMBERS:

COPIES TO:

RFI DESCRIPTION: *(Fully describe the question or type of information requested.)*

REFERENCES/ATTACHMENTS: *(List specific documents researched when seeking the information requested.)*

SPECIFICATIONS

DRAWINGS

OTHER

SENDER'S RECOMMENDATION: *(If RFI concerns a site or construction condition, the sender may provide a recommended solution, including cost and/or schedule considerations.)*

RECEIVER'S REPLY: *(Provide answer to RFI, including cost and/or schedule considerations.)*

By: _____ Date: _____ Copies to: _____

NOTE: This reply is not an authorization to proceed with work involving additional cost, time or both. If any reply requires a change to the Contract Documents, a Change Order, Construction Change Directive or a Minor Change in the work must be executed in accordance with the Contract Documents.

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020711ACD44



AIA[®] Document G714[™] – 2017

Construction Change Directive

PROJECT: (name and address)

CONTRACT INFORMATION:

Contract For:

Date:

CCD INFORMATION:

Directive Number:

Date:

OWNER: (name and address)

ARCHITECT: (name and address)

CONTRACTOR: (name and address)

The Contractor is hereby directed to make the following change(s) in this Contract:
(Insert a detailed description of the change and, if applicable, attach or reference specific exhibits.)

PROPOSED ADJUSTMENTS

1. The proposed basis of adjustment to the Contract Sum or Guaranteed Maximum Price:

- ☐ Lump Sum (increase) (decrease) of \$
- ☐ Unit Price of \$ _____ per _____
- ☐ Cost, as defined below, plus the following fee:
(Insert a definition of, or method for determining, cost)

☐ As follows:

2. The Contract Time is proposed to (be adjusted) (remain unchanged). The proposed adjustment, if any, is (an increase of _____ days) (a decrease of _____ days).

NOTE: The Owner, Architect and Contractor should execute a Change Order to supersede this Construction Change Directive to the extent they agree upon adjustments to the Contract Sum, Contract Time, or Guaranteed Maximum price for the change(s) described herein.

When signed by the Owner and Architect and received by the Contractor, this document becomes effective IMMEDIATELY as a Construction Change Directive (CCD), and the Contractor shall proceed with the change(s) described above.

Contractor signature indicates agreement with the proposed adjustments in Contract Sum and Contract Time set forth in this CCD.

ARCHITECT (Firm name)

OWNER (Firm name)

CONTRACTOR (Firm name)

SIGNATURE

SIGNATURE

SIGNATURE

PRINTED NAME AND TITLE

PRINTED NAME AND TITLE

PRINTED NAME AND TITLE

DATE

DATE

DATE



AIA®

Document G709™ – 2018

Proposal Request

PROJECT: *(name and address):*

CONTRACT INFORMATION:

Contract For:
Date:

Architect's Project number:
Proposal Request Number:
Proposal Request Date:

OWNER: *(name and address):*

ARCHITECT: *(name and address):*

CONTRACTOR: *(name and address):*

The Owner requests an itemized proposal for changes to the Contract Sum and Contract Time for proposed modifications to the Contract Documents described herein. The Contractor shall submit this proposal within _____ () days or notify the Architect in writing of the anticipated date of submission.

(Insert a detailed description of the proposed modifications to the Contract Documents and, if applicable, attach or reference specific exhibits.)

THIS IS NOT A CHANGE ORDER, A CONSTRUCTION CHANGE DIRECTIVE, OR A DIRECTION TO PROCEED WITH THE WORK DESCRIBED IN THE PROPOSED MODIFICATIONS.

REQUESTED BY THE ARCHITECT:

PRINTED NAME AND TITLE

**AIA**[®]**Document G701[™] – 2017****Change Order****PROJECT:** *(name and address)***CONTRACT INFORMATION:**

Contract For:

Date:

CHANGE ORDER INFORMATION:

Change Order Number:

Date:

OWNER: *(name and address)***ARCHITECT:** *(name and address)***CONTRACTOR:** *(name and address)***THE CONTRACT IS CHANGED AS FOLLOWS:***(Insert a detailed description of the change and, if applicable, attach or reference specific exhibits. Also include agreed upon adjustments attributable to executed Construction Change Directives.)*

The original (Contract Sum) (Guaranteed Maximum Price) was

\$

The net change by previously authorized Change Orders

\$

The (Contract Sum) (Guaranteed Maximum Price) prior to this Change Order was

\$

The (Contract Sum) (Guaranteed Maximum Price) will be (increased) (decreased) (unchanged) by this Change Order in the amount of

\$

The new (Contract Sum) (Guaranteed Maximum Price), including this Change Order, will be

\$

The Contract Time will be (increased) (decreased) (unchanged) by

() days.

The new date of Substantial Completion will be

NOTE: This Change Order does not include adjustments to the Contract Sum or Guaranteed Maximum Price, or the Contract Time, that have been authorized by Construction Change Directive until the cost and time have been agreed upon by both the Owner and Contractor, in which case a Change Order is executed to supersede the Construction Change Directive.

NOT VALID UNTIL SIGNED BY THE ARCHITECT, CONTRACTOR AND OWNER.**ARCHITECT** *(Firm name)***CONTRACTOR** *(Firm name)***OWNER** *(Firm name)***SIGNATURE****SIGNATURE****SIGNATURE****PRINTED NAME AND TITLE****PRINTED NAME AND TITLE****PRINTED NAME AND TITLE****DATE****DATE****DATE**



AIA®

Document G704™ – 2017

Certificate of Substantial CompletionPROJECT: *(name and address)*

CONTRACT INFORMATION:

Contract For:

Date:

CERTIFICATE INFORMATION:

Certificate Number:

Date:

OWNER: *(name and address)*ARCHITECT: *(name and address)*CONTRACTOR: *(name and address)*

The Work identified below has been reviewed and found, to the Architect's best knowledge, information, and belief, to be substantially complete. Substantial Completion is the stage in the progress of the Work when the Work or designated portion is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. The date of Substantial Completion of the Project or portion designated below is the date established by this Certificate.

(Identify the Work, or portion thereof, that is substantially complete.)

ARCHITECT *(Firm Name)*

SIGNATURE

PRINTED NAME AND TITLE

DATE OF SUBSTANTIAL COMPLETION

WARRANTIES

The date of Substantial Completion of the Project or portion designated above is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below:

(Identify warranties that do not commence on the date of Substantial Completion, if any, and indicate their date of commencement.)

WORK TO BE COMPLETED OR CORRECTED

A list of items to be completed or corrected is attached hereto, or transmitted as agreed upon by the parties, and identified as follows:

(Identify the list of Work to be completed or corrected.)

The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Unless otherwise agreed to in writing, the date of commencement of warranties for items on the attached list will be the date of issuance of the final Certificate of Payment or the date of final payment, whichever occurs first. The Contractor will complete or correct the Work on the list of items attached hereto within () days from the above date of Substantial Completion.

Cost estimate of Work to be completed or corrected: \$

The responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work, insurance, and other items identified below shall be as follows:

(Note: Owner's and Contractor's legal and insurance counsel should review insurance requirements and coverage.)

The Owner and Contractor hereby accept the responsibilities assigned to them in this Certificate of Substantial Completion:

CONTRACTOR *(Firm Name)*

SIGNATURE

PRINTED NAME AND TITLE

DATE

OWNER *(Firm Name)*

SIGNATURE

PRINTED NAME AND TITLE

DATE

**AIA[®]**

Document G706A[™] – 1994

Contractor's Affidavit of Release of Liens

PROJECT: *(Name and address)***ARCHITECT'S PROJECT NUMBER:**OWNER ☐**CONTRACT FOR:**ARCHITECT ☐CONTRACTOR ☐**TO OWNER:** *(Name and address)***CONTRACT DATED:**SURETY ☐OTHER ☐

STATE OF:**COUNTY OF:**

The undersigned hereby certifies that to the best of the undersigned's knowledge, information and belief, except as listed below, the Releases or Waivers of Lien attached hereto include the Contractor, all Subcontractors, all suppliers of materials and equipment, and all performers of Work, labor or services who have or may have liens or encumbrances or the right to assert liens or encumbrances against any property of the Owner arising in any manner out of the performance of the Contract referenced above.

EXCEPTIONS:**SUPPORTING DOCUMENTS ATTACHED HERETO:**

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.
2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.

CONTRACTOR: *(Name and address)***BY:**

(Signature of authorized representative)

(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:

My Commission Expires:

CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.

PART- 1 GENERAL

1.1 POLICY

- A. As a service to Contractor, subcontractors, vendors, material suppliers and others needing electronic copies of Drawings, the Architect will provide CAD files electronically in accordance with the following policy:
1. By acceptance it is understood and agreed that the data and medium being supplied is to be used only for the project referenced.
 2. It is further understood and agreed that the undersigned will hold Angerame Architects, P.C. and/or its consultants harmless and indemnify Angerame Architects, P.C. and/or its consultants from all claims, liabilities, losses, and so forth, including attorney's fees arising out of the use or misuse of the transferred files.
 3. It is understood and agreed that the files transmitted are prepared from CAD files current at the time of preparation. All files are AutoCAD Architecture version 2019 dwg files.
 4. This information does not waive the need to verify and review current field conditions and the status of Addenda and/or Bulletin documentation.
 5. As a record of information to be transmitted, Angerame Architects, P.C. and/or its consultants will prepare a duplicate electronic back-up for its record.
 6. Compensation Fee for providing this material will be as follows:
 - a. Base Fee of \$250 for 1 to 2 Drawings.
 - b. Base Fee of \$500 for 3 to 5 Drawings.
 - c. For each additional Drawing after 5, the fee is \$75 per Drawing.
 - i. Example: 8 Drawings = \$725.
 - d. A signed copy of the Release Form and Fee must be provided before the files will be released.

1.2 REQUEST PROCEDURE

- A. To receive Drawing CAD files the Release Form must be completed in full and submitted to Angerame Architects, P.C.
1. A signed copy of the Release Form must be submitted.
 - a. Emailed copies will be accepted.

2. Upon remittance of the signed Release Form and Fee, allow five working days for processing.
3. Transmission of Drawings will be provided electronically after the receipt of Fee.

1.3 RELEASE FORM

- A. A. Release Form is located immediately after this Section. Refer to Section 00 8200.01 Electronic Files Release Form.

PART- 2 PRODUCTS (NOT USED)

PART- 3 EXECUTION

END OF SECTION 00 8200

A n g e r a m e

A r c h i t e c t s • P.C.

Architecture
Planning
Interior Design

RE: Authorization Form for CAD File Transfers

Project Name: Albany County Shaker Place Rehabilitation & Nursing Center Café Renovation

Dear Sir / Madame

At your request, Angerame Architects, P.C. will provide electronic files for your use, subject to the following terms and conditions:

1. Angerame Architects, P.C.'s electronic files are compatible with AutoDesk Architecture 2019. Angerame Architects, P.C. makes no representation as to the compatibility of these files with your hardware or your software beyond the specified release of the referenced specifications.
2. Data contained on these electronic files is part of Angerame Architects, P.C.'s instruments of service and shall not be used by you or anyone else receiving this data through or from you for any purpose other than for the referenced project. Any other use or reuse by you or by others will be at your sole risk and without liability or legal exposure to Angerame Architects, P.C. You agree to make no claim and hereby waive, to the fullest extent permitted by law, any claim or cause of action of any nature against Angerame Architects, P.C., its officers, directors, employees, agents or sub-consultants which may arise out of or in connection with your use of the electronic files.
3. Furthermore, you shall, to the fullest extent permitted by law, indemnify and hold harmless Angerame Architects, P.C. from all claims, damages, losses and expenses, including attorney's fees arising out of or resulting from your use of these electronic files.
4. These electronic files are not Contract Documents. Significant differences may exist between these electronic files and corresponding hard copy Contract Documents due to addenda, charge orders or other revisions. Angerame Architects, P.C. makes no representation regarding the accuracy or completeness of the electronic files you receive. In the event that a conflict arises between the signed documents prepared by Angerame Architects, P.C. and electronic files, the signed Contract Documents shall govern. You are responsible for determining if any conflict exists. By your use of these electronic files, you are not relieved of your duty to fully comply with the Contract Documents, including and without limitation, the need to check, confirm and coordinate all dimensions and details, take field measurements, verify field conditions and coordinate your work with that of other contractors for the project.
5. Because of the potential that the information presented on the electronic files can be modified, unintentionally or otherwise, Angerame Architects, P.C. reserves the right to remove all indicia of its ownership and/or involvement for each electronic display.

6. Under no circumstances shall delivery of the electronic files for use by you be deemed a sale by Angerame Architects, P.C. and Angerame Architects, P.C. makes no warranties, either expressed or implied of merchantability and fitness for any particular purpose. In no event shall Angerame Architects, P.C. be liable for any loss of profit or any consequential damages.

7. Compensation Fee for providing this material will be as follows:

- a. Base Fee of \$250 for 1 to 2 Drawings.
- b. Base Fee of \$500 for 3 to 5 Drawings.
- c. For each additional Drawing after 5, the fee is \$75 per Drawing.
- d. Example: 8 Drawings = \$725.

8. Payment must be provided along with a signed copy of this form before files will be released. Please remit to Angerame Architects, P.C. and allow five working days for processing.

Fee:\$_____ Requested Drawings: _____

Firm Requesting Files: _____

Company: _____

Address: _____

Signed: _____ Date: _____

Printed Name / Title: _____

Phone: _____ Email: _____

To Be Completed By Angerame Architects, P.C.

Released (signed by): _____ Angerame Architects, P.C.

Printed Name/Title: _____ Date: _____

COUNTY OF ALBANY

REQUEST FOR BIDS SHAKER PLACE NURSING AND REHABILITATION CENTER



RFB #2024-150

SHAKER PLACE CAFÉ PROJECT

VOLUME 1

**ALBANY COUNTY DEPARTMENT OF GENERAL SERVICES
PURCHASING DIVISION
PAMELA O NEILL, PURCHASING AGENT
112 STATE STREET, ROOM 1000
ALBANY, NY 12207**

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provision of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings, and details to determine type and extent of work there if affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. Section Includes:
- B. Project information.
- C. Work covered by Contract Documents.
- D. Work by Owner.
- E. Work under separate contracts.
- F. Access to site.
- G. Work restrictions.
- H. Specification and drawing conventions.
- I. Miscellaneous provisions.
- J. Related Requirements: 1. Section 01 5000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

- A. Project Identification: RFB #2024-150 SHAKER PLACE CAFÉ PROJECT.
 - 1. Project Location: Albany County Shaker Place Rehabilitation & Nursing Center, Albany, NY 12211.
- B. Owner: Shaker Place Rehabilitation & Nursing Center, Albany, NY 12211.
 - 1. Owner's Representative: Albany County Division of Facilities Engineering (ACFE); Michael Martin, Deputy Commissioner, 518-447-7032, Michael.Martin@albanycountyny.gov .
- C. Architect: Angerame Architects P.C., James R. Glenn, AIA, Vice President; 518-454-9300; jim@angeramearchitects.com .

- D. Architect's Consultants: The Architect has retained the following design professionals who have prepared designated portions of the Contract Documents:

1. STRUCTURAL ENGINEER: MRH Engineering, P.C.
20 Bayberry Drive
Queensbury, New York 12804
(518) 792-4042
2. MECHANICAL/PLUMBING/
ELECTRICAL ENGINEER Engineered Solutions
646 Plank Road, #104
900 Route 146
Clifton Park, New York 12065
(518) 280-2410

1.4 GENERAL NOTES ABOUT THE CONTRACT DOCUMENTS

- A. The title and location of the Work is printed on the cover of this Project Manual.
- B. Type of Contract: Lump Sum for a Single Prime Contract.
- C. The term "Owner's Representative" appears many times in these specifications. Wherever it appears, it shall be understood to mean either the Architect, Architect's Sub-Consultants, Construction Manager, the Albany County, or designated representatives.
- D. The term "Substantial Completion" appears many times in the contract Documents. It shall be understood by the standard AIA (American Institute of Architects) definition: "Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use."
- E. During the bidding process, all correspondence and requests for information are to be forwarded to the Albany County Purchasing Department and copied to the Construction Manager (refer to General Instructions to Bidders article 14 for further detail). Only questions or requests for information will be answered by the Architect. If the Architect determines that a clarification is necessary, an addendum will be issued. If not, no addendum will be issued. Note that no requests for information will be reviewed and/or answered within 72 hours of a bid due date. Please request information early in the bid process

1.5 WORK CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:
 3. The project is a renovation of an existing space within the Albany County Shaker Place Rehabilitation & Nursing Center for the construction of a new Café to serve staff, visitors, and residents.
- B. Type of Contract:
 1. The work of this project will be the responsibility of a Single Prime contractor to complete.
- C. Please note that work will need to be done while the building is occupied but there are strict work conditions that must be met. See specification Section 01 3200. The work of this project must be substantially complete per

section 01 3200.

D. All products used in this project shall be certified as asbestos free.

E. Owner's Tax Exempt Status

1. The Owner is exempt from payment of Federal Excise Tax, Sales and Compensating Use Taxes of the State of New York and of cities, counties and other subdivisions of the State Owner's Tax Exempt StatusThe Owner is exempt from payment of Federal Excise Tax, Sales and Compensating Use Taxes of the State of New York and of cities, counties and other subdivisions of the State.

1.6 WORK BY OWNER

- A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.
- B. Preceding Work: Owner may perform construction operations at Project site. Those operations are scheduled to be substantially complete before work under this Contract begins.
- C. Concurrent Work: Owner may perform construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.

1.7 WORK UNDER SEPARATE CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.
- B. Concurrent Work: Owner may award separate contract(s) for construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.

1.8 ACCESS TO SITE

- A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- B. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
- C. Limits: Confine construction operations to areas within the Contract limits indicated.
- D. Limits: Limit site disturbance, including earthwork and clearing of vegetation, to 30 feet beyond building perimeter; 10 feet beyond surface walkways, patios, surface parking, and utilities less than 12 inches in diameter; 15 feet beyond primary roadway curbs and main utility branch trenches; and 25 feet beyond constructed areas with permeable surfaces (such as pervious paving areas, stormwater detention facilities, and playing fields) that require additional staging areas in order to limit compaction in the constructed area.
- E. Driveways, Walkways and Entrances: Keep driveways and entrances serving premises clear and available to

Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

- F. Schedule deliveries to minimize use of driveways and entrances by construction operations.
- G. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- H. Site Utilization Plan: Prepare and submit a site utilization plan demonstrating the requirements provided by the Owner's Project representative. Do not commence mobilization on the Project site prior to written approval of the site utilization plan.

1.9 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
- B. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- C. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated.
- D. Weekend Hours: 7:00 a.m. to 5:00 p.m.
- E. Hours for Utility Shutdowns: Notify and coordinate with Owner.
- F. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
- G. Notify Director of Physical Plant/Maintenance, Andy Lucarelli at 518-869-2231 ext. 8938 not less than 7 (seven) days in advance of proposed utility interruptions.
- H. Obtain Owner's Representative written permission before proceeding with utility interruptions.
- I. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
- J. Notify Director of Physical Plant/Maintenance not less than 2 (two) days in advance of proposed disruptive operations.
- K. Tobacco-Free Campus: Smoking is prohibited, including e-cigarettes. Do not smoke or vape within the building or on the roof, anywhere on the construction site, or anywhere on the surrounding campus.
- L. Controlled Substances: Use of controlled substances is similarly prohibited.
- M. Employee Identification: Owner will provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.
- N. Employee Screening: Comply with the Owner's requirements for screening of Contractor personnel working on Project site.

- O. Maintain list of approved screened personnel with Owner's representative.

1.10 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
- B. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
- C. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- D. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.
- E. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- F. Drawing Coordination: Requirements for materials and products identified on Drawings may be described in detail in the Specifications.

1.11 CONSTRUCTION DOCUMENTS

- A. The Prime Contractor will receive digital copies of a complete set of construction documents after award. The Prime Contractor is responsible for distribution of drawings and drawing updates to their respective sub-contractors.
- B. The Prime Contractor shall keep one complete set of the latest contract drawings and specifications, with all Addenda, available on the job site until the work is accepted, and shall keep these documents up to date. The Prime Contract shall maintain the set in both digital and paper format.

PART- 2 PRODUCTS (NOT USED)

PART- 3 EXECUTION (NOT USED)

END OF SECTION 01 1000

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provision of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings, and details to determine type and extent of work there if affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
- B. Types of allowances include the following:
 - 1. Contingency allowances.

1.3 RELATED SECTIONS:

- A. Section 01 3300 "Submittal Procedures" for procedures for using Submittals for the selection and purchase of materials in the contract.
- B. Divisions 2 through 16 Sections for items of Work covered by allowances.

1.4 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

1.5 INFORMATIONAL SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.6 CONTINGENCY ALLOWANCES

- A. Use the contingency allowance only as directed by Architect/Engineer for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.
- B. Contractor's overhead, profit, and related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, insurance, equipment rental, and similar costs.
- C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit.
- D. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

1.7 COORDINATION

- A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.8 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection, or purchase and delivery, of each product or system described by an allowance must be completed by the Owner to avoid delaying the Work.
 - B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
 - C. Purchase products and systems selected by Architect/Engineer from the designated supplier
- CONTINGENCY ALLOWANCES**
- D. Use the contingency allowance only as directed by Architect for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.
 - E. Contractor's overhead, profit, and related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.
 - F. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.
 - G. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

1.9 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
 - 1. Include installation costs in purchase amount only where indicated as part of the allowance.
 - 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other markups.
- B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.
 - 1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of Work has changed from what could have been foreseen from information in the Contract Documents.
 - 2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART- 2 PRODUCTS (NOT USED)

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

- A. Contingency Allowance: Include a contingency allowance of a stipulated sum/price based on a percentage of each Contract Base Bid as follows:
 - 1. GC – General Construction – 25%

- B. This allowance includes material cost receiving, handling, and installation and Contractor overhead and profit.

END OF SECTION 01 2100

PART- 1 GENERAL

1.1 SECTION INCLUDES

- A. Drawings and general provision of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings, and details to determine type and extent of work there if affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract, including the General Conditions for Albany County Construction and other Division 01 specification sections, apply to this section.
- C. Section 01 3000 - Administrative Requirements: Submittal procedures, coordination.
- D. Section 01 6000 - Product Requirements: Fundamental product requirements, product options, delivery, storage, and handling.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
 - a. Unavailability.
 - b. Regulatory changes.
 - c. Compatibility relating to Proprietary vs Sole Source
 - 2. Substitutions to improve project performance: Proposed due to possibility of offering substantial advantage to the Project.
 - 3. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use form that is part of web-based Project management software acceptable to Architect.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

- a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
 - b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project, from ICC.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within fourteen (14) days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within twenty-one (21) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.

- a. Forms of Acceptance: Change Order, Construction Change Directive, Submittal Approval of final documentation after submission for Substitution, or Architect's Supplemental Instructions for minor changes in the Work.
- b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.7 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than fifteen (15) days prior to time required for preparation and review of related submittals.
 - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Architect will consider requests for substitution if received within sixty (60) days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - b. Requested substitution does not require extensive revisions to the Contract Documents.
 - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - d. Substitution request is fully documented and properly submitted.
 - e. Requested substitution will not adversely affect Contractor's construction schedule.
 - f. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - g. Requested substitution is compatible with other portions of the Work.
 - h. Requested substitution has been coordinated with other portions of the Work.
 - i. Requested substitution provides specified warranty.
 - j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved

PART- 2 PRODUCTS (NOT USED)

PART- 3 EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
 2. Agrees to provide the same warranty for the substitution as for the specified product.
 3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
 4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.

5. Has informed the Prime Contractor of any/all changes or impacts to other trades and construction, and all potential costs impacts have been fully addressed without cost impact to the Owner.
 6. Waives claims for additional costs or time extension that may subsequently become apparent.
 7. Agrees to reimburse Owner for review or redesign services associated with re-approval, through a deductive COP and then an amendment to the A/E.
- B. A Substitution Request for specified installer, constitutes a representation that the submitter:
1. Has acted in good faith to obtain services of specified installer.
- C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
1. Note explicitly any non-compliant characteristics.
- D. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
1. Forms indicated are adequate for this purpose and must be used.
 2. All requests for substitution shall be accompanied by the fully completed Substitution Request Form. Failure to fully complete or sign the form will result in rejection of substitution without review.
- E. Limit each request to a single proposed substitution item.
1. Submit samples where aesthetics or materials are different than those specified.

3.2 SUBSTITUTION PROCEDURES DURING PROCUREMENT

- A. Submittal (before award of contract):
1. Owner will consider requests for substitutions only if submitted at least 15 working days prior to the date for receipt of bids.
 - a. Substitutions are reviewed in the order they are received and pending the available time of the A/E design team. Every effort will be made to address substitutions requests received but are not guaranteed.
 - b. Acceptance will be acknowledged through Addendum only, and to include review time. Rejected requests will not be noted.

3.3 SUBSTITUTION PROCEDURES DURING CONSTRUCTION

- A. Submittal Form (after award of contract):
1. Submit request for Substitution for Cause within 14 days of discovery of need for substitution, but not later than 14 days prior to time required for review and approval by A/E, in order to stay on approved project schedule.

2. Submit request for Substitution for Convenience immediately upon discovery of its potential advantage to the project, but not later than 14 days prior to time required for review and approval by A/E, in order to stay on approved project schedule.
 - a. In addition to meeting general documentation requirements, document how the requested substitution benefits the Owner through cost savings, time savings, greater energy conservation, or in other specific ways.
 - b. Document means of coordinating of substitution item with other portions of the work, including work by affected subcontractors.
 - c. Bear the costs engendered by proposed substitution of:
 - i. Owner's compensation to the A/E for any required redesign, time spent processing and evaluating the request.
 - ii. Other construction by Owner.
 - iii. Other unanticipated project considerations.
3. Substitutions will not be considered under one or more of the following circumstances:
 - a. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval. Substitution request does not replace approval of shop drawings.
 - b. Without a separate written request.
 - c. When acceptance will require revisions to Contract Documents.

3.4 RESOLUTION

- A. A/E may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
- B. A/E will notify Contractor in writing of decision to accept or reject request.
 1. A/E's decision following review of proposed substitution will be noted on the submitted form.
 2. Review with Owner and DES PM before approving.

3.5 ACCEPTANCE

- A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

3.6 CLOSEOUT ACTIVITIES

- A. See Section 01 7800 - Closeout Submittals and Procedures, for closeout submittals.
 1. Include completed Substitution Request Forms as part of the Project record.

END OF SECTION 01 2500

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.
2. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

1. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.
2. Provisions of this Section apply to the Work of the Contractor.

1.3 PROPOSAL REQUESTS

1. Owner-Initiated Proposal Requests: Owner and its representatives will issue a detailed description of proposed changes (Proposed Change Order – P.C.O.) in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
2. Proposal Requests issued by Owner and its representatives are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
3. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
4. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
5. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.
6. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship.
7. Proposal Request Form: Use AIA Document G709 for Proposal Requests.

1.4 CHANGE ORDER PROCEDURES

1. On Owner's approval of a Proposal Request, Architect will issue Change Order for signatures of Owner and Contractor on AIA Document G701.
2. All quotations shall be accompanied by a complete itemization of costs, including labor (type, quantity and unit cost per hour), materials (type, quantity and unit cost) and copies of written quotations from subcontractors and suppliers itemized in the same manner.

3. Overhead and profit shall include costs for insurance, administrative, supervision, truck deliveries, safety, cleanup, guarantee, estimating and record document revisions when calculating change order pricing.
4. Indicate applicable delivery charges, equipment rental and amounts of trade discounts.
5. The combined overhead and profit included in the total cost to the Contractor shall be based on the following schedule:
6. CHANGES IN THE WORK
 - a. The allowance for the combined overhead and profit included in the total cost to Owner shall be based on the following schedule:
 - i. For the Contractor, for any work performed by their own forces, 15% of the actual cost;
 - ii. For each Subcontractor involved, work performed by their own forces, 15% of the actual cost;
 - iii. For the Contractor, for work performed by their Subcontractors, 5% of the amount due the Subcontractor.
7. Cost shall be limited to the following:
 - a. Cost of materials, including cost of delivery, cost of labor, including Social Security and Unemployment Insurance, Workmen's Compensation Insurance, rental value of power tools and equipment.
 - b. Overhead shall include the following: Bond Premiums, supervisions, superintendent's wages to time keepers, watchmen, clerks, small tools, incidental, general office expenses and all other expenses not included in "Cost".
 - c. If the net value of change results in a credit from the Contractor or Subcontractor the credit given shall be the net cost without overhead and profit.
 - d. The cost as used herein shall include all items of labor, materials and equipment.
8. Not more than three percentages, the aggregate allowed shall not exceed 8% regardless of the number of their Subcontractors, i.e., the markup on work Subcontractor by a Subcontractor will be limited to one overhead percentage and one profit percentage.
9. Performance and Payment Bond Adjustments: Do not itemize increased bond premiums for each individual Change Order per General Conditions of the Contract.

1.5 UNIT PRICES

1. On Owner's approval of a Contract quantity change, Architect will issue a Change Order for signatures of Contractor and Owner on AIA Document G701.
2. All quotations shall be accompanied by a complete itemization of costs, including labor (type, quantity and unit cost per hour), materials (type, quantity and unit cost) and copies of written quotations from subcontractors and suppliers itemized in the same manner.
3. Indicate applicable delivery charges, equipment rental and amounts of trade discounts.
4. Markups: Overhead and profit markups are same as for Change Order schedule as indicated.

1.6 PHOTOGRAPHS

1. Each month the Construction Manager shall furnish color prints to the Architect, 6 views, 3 prints of each, 8" x 10" mounted for inclusion into loose leaf binder. Each photo to include information of view, date, job, Architect and Contractor.

1.7 HOISTING EQUIPMENT

1. Contractor shall:
2. Provide material hoists as required for performance of own work and shall employ skilled operators. Provide all necessary guards, signals, safety devices, etc., required for safe operation, and suitable runways from hoists to each floor level and roof. Construction and operation of material hoists shall conform to all applicable requirements of the "American Standard Safety Code for Building Construction" published by the American Standard Association and the "Manual of Accident Prevention in Construction of the Association General Contractors of America OSHA Standards for the Construction Industry", and to all state and municipal codes. The Contractor shall prohibit the use of hoists for transporting personnel.
3. Provide temporary ladders, ramps, scaffolding and runways as required for performance of own work. All of above facilities shall be constructed and maintained in accordance with applicable requirements of all codes as set forth above in paragraph a. "Material Hoists" and shall be removed after they have served their purpose or when directed.

1.8 PROJECT SIGN

1. The Contractor shall furnish, erect and maintain, at the site of the work (the location determined by Architect), a construction sign 4' x 8' containing the title of the project, the Owner's name, project number, financing agency, names of the Architect and his Consultants and Contractor.

1.9 DEFECTIVE WORK AND MATERIALS

1. Any material or work found on inspection to be defective or not in strict conformance with requirements of Drawings and Specifications, or defaced or injured through the acts of fire or elements or any other cause shall be removed immediately from the premises and satisfactory materials or work or both, substituted therefore without delay.
2. If the Contractor does not remove such work or materials condemned by the Architect within the time limit fixed by written notice, the Owner may cause the same to be done and may store all materials at the expense of the Contractor. If the Contractor does not pay the expense of such removal within ten (10) days thereafter, the Owner may upon ten (10) days written notice, sell such materials at auction or at a private sale and shall account for the net proceeds thereof, after deducting all costs and expenses that should have been borne by the Contractor.
3. No previous inspection or certificates of payment shall be held as an acceptance of defective work or materials, or relieve the Contractor from the obligations to furnish sound materials and perform satisfactory work in accordance with Contract Documents.

1.10 RESPONSIBILITY FOR DAMAGE

1. The Contractor shall be responsible for all damages to life and property due to his operations. He shall be responsible for all parts of his work, both temporary and permanent, until the work under this Contract is accepted by the Owner.
2. He shall protect, indemnify, save harmless and defend the Owner from suits, actions, damages and costs of every name and description, resulting from the work, under this Contract, and the Owner may retain sufficient monies from the amount due or to become due the Contractor as may be necessary to satisfy any claim or damages filed against the Owner.
3. He shall be responsible for damages to work of other Contractors which are the result of his operations. Should the Contractor believe that the work shown by the drawings or specifications is not calculated when executed to procure safe and substantial results, or if any discrepancy appears, it is his duty to immediately notify the Architect in writing, stop work on same, and await the written instructions of the Architect.

END OF SECTION 01 2500

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provision of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings, and details to determine type and extent of work there if affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections:
 - 1. Division 1 Section "Allowances" for procedural requirements governing the handling and processing of allowances.
 - 2. Division 1 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 3. Division 1 Section "Unit Prices" for administrative requirements governing the use of unit prices.
 - 4. Division 1 Section "Submittal Procedures" for administrative requirements governing the preparation and submittal of submittal schedule.

1.3 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Correlate line items in the schedule of values with other required administrative forms and schedules, including the following:

- a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's construction schedule.
 2. Submit the schedule of values to ACFE at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
 3. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values correlated with each phase of payment.
 4. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide subschedules showing values correlated with each element.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 2. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
 - h. Labor.

- i. Materials.
 - j. Equipment.
- 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of Contract Sum.
 - a. Include separate line items under Contractor and principal subcontracts for project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
- 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
- 5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
- 6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
- 7. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
- 8. Purchase Contracts: Provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate owner payments or deposits, if any, and balance to be paid by Contractor.
- 9. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
- 10. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by ACFE and paid for by Owner.
 - 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
1. Submit draft copy of Application for Payment fourteen days prior to due date for review by ACFE.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 and an **Albany County Claim Form** as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. ACFE will return incomplete applications without action.
1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 3. Provide summary documentation for stored materials indicating the following:
 4. Materials previously stored and included in previous Applications for Payment.
 5. Work completed for this Application utilizing previously stored materials.
 6. Additional materials stored with this Application.
 7. Total materials remaining stored, including materials with this Application.
- F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to ACFE by a method ensuring receipt. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
 5. Products list (preliminary if not final).
 6. Schedule of unit prices.
 7. Submittal schedule (preliminary if not final).
 8. List of Contractor's staff assignments.
 9. List of Contractor's principal consultants.
 10. Copies of building permits.
 11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 12. Initial progress report.
 13. Report of preconstruction conference.
 14. Certificates of insurance and insurance policies.
 15. Performance and payment bonds.
 16. Data needed to acquire Owner's insurance.
- H. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

- I. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
 1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 6. Evidence that claims have been settled.
 7. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 8. Final liquidated damages settlement statement.

PART- 2 PRODUCTS (NOT USED)

PART- 3 EXECUTION (NOT USED)

END OF SECTION 0 12900

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes a summary of work The Prime Contract. One set of documents is being issued covering the work of the entire Project. The Prime Contractor is responsible to review all drawings and specifications for specific requirements indicated and is responsible for the work no matter what drawing on which the work appears.

1.3 DEFINITIONS

- A. Permanent Enclosure: As determined by Architect and CM, the condition at which roofing is insulated and weather tight; exterior walls are insulated and weather tight; and all openings are closed with permanent construction or substantial temporary closures equivalent in weather protection to permanent construction.

1.4 CONSTRUCTION MANAGER

- A. The Construction Manager shall facilitate coordination with the Prime Contractor. The Prime Contractor and all sub-tier Contractors shall cooperate to the fullest extent in this regard to achieve a successful project for the Owner.

1.5 GENERAL REQUIREMENTS OF THE PRIME CONTRACTOR

- A. Extent of Contract: Unless the Agreement contains a more specific description of the Work for the Prime Contract, requirements indicated on the Drawings and in Specification Sections determines the Project Scope of Work.

The following is not intended to limit the scope of work, but to provide clarification and/or amplification of the work described in the drawings and specifications. All work described by the documents must be performed, in addition to any work not shown but inherently necessary to achieve the intent complete and/or operable systems.

Unless otherwise indicated, the work described in this Section shall be complete systems and assemblies, including products, components, accessories, and installation required by the Contract Documents. No such labor, materials, services, supervision, scaffolding, tools, equipment, or other things necessary to provide or fully complete systems in accordance with the contract documents shall for any reason be considered additional work.

- B. The following temporary facilities as required by project will be the responsibility of the Prime Contractor; barricades, partitions, doors, stairs, landings, ramps, fencing, screens, signage; egress, directional, and safety, pedestrian overhead protection and fire extinguishers, as shown but not limited to the ones indicated on the construction drawings. The items referenced above shall be provided and or installed by the Prime Contractor, unless specifically noted otherwise in the construction documents.

- C. Trenches and other excavation for the work of the contract shall be the work of The Prime Contractor, unless specifically noted otherwise in the contract documents.
- D. Blocking, backing panels, sleeves, and metal fabrication supports for the work of each contract shall be the work of the Prime Contractor, unless specifically noted otherwise in the contract documents.
- E. Access Panels: The Prime Contractor shall identify access doors and panels required to access inaccessible installations.
- F. Access Panel types shall be the same as the Prime Contractor's approved submittal, shall match the fire rating of the assemblies of which they are installed and be provided in sizes adequate for easy access and/or replacement of the installation.
- G. The Prime Contractor shall take care to furnish the access panels in a timely fashion to allow installation during the scheduled installation of the work.
- H. Equipment pads for new work shall be provided by the Prime Contractor, unless specifically noted otherwise in the contract documents. The Prime Contractor shall install the equipment pads in a timely fashion for the work to progress according to the Project schedule.
- I. Roof-mounted equipment curbs for the work of The Prime Contract shall be furnished for work installed by the Prime Contractor.
- J. Roof penetrations shall be cut and patched in by the Prime Contractor as it pertains to the projects scope of work. The Prime Contractor shall also provide metal supporting frame as necessary under the perimeter of the opening in the roof deck. Penetrations shall be coordinated by the Prime Contractor in advance to allow for efficient installation in accordance with the project schedule.
- K. Roof penetrations created by the removal of existing equipment shall be patched in by the Prime Contractor. Removals which create open penetrations shall be coordinated in advance to allow for efficient installation of patches in accordance with the project schedule. All work shall be completed with existing roof warranties.
- L. Cutting and Patching: Prime Contractor to coordinate the cutting and patching of removed equipment and materials as shown on the drawings to ensure a complete building envelope.
- M. Through-penetration fire-stopping for the work required is the responsibility of the Prime Contractor to provide a complete fire rated system.
- N. The Prime Contractor shall be responsible for caulking and/or sealing all non-fire rated penetrations.
- O. Unless specifically excluded within the contract documents, the Prime Contractor is responsible for all sections of Divisions 00 and 01.
- P. All significant equipment mounted above the ceiling, which require periodic maintenance, shall be identified with a stick-on tag on the ceiling below. The tag shall contain identifying information, to be coordinated with the CM, A/E and Owner. This requirement is in addition to the Identification requirements delineated in the Contract Documents.

- Q. As applicable, The Prime Contractor shall offset all water and /or liquid containing piping around electrical equipment rooms, food preparation areas, telephone, data, and equipment and elevator rooms, as applicable to the work. Provide drip pans with piping to drains where re-routing is not feasible. Provide drip pans with drains in elevator machine rooms under roof drain and piping as required.
- R. The Prime Contractor shall coordinate all structural, mechanical, electrical, plumbing and fire protection shop drawings prior to fabrication/installation. The coordination conducted by the Prime Contractor shall be submitted to the Construction Manager for comment.
- S. The Prime Contractor shall be advised that there are sensitive existing and proposed mechanical, electrical, plumbing, fire protection and low voltage work on this project. Coordination is required with Prime Contractors Sub Contractors and the Construction Manager regarding embedment, penetrations and built-in items. Participation by each appropriate sub-tier Contractor is required to complete the coordination process.
- T. Any permitting required by the Local Authorities must be obtained by the Prime Contractor pertaining to the scope of work. Albany County is the Authority Having Jurisdiction for the Building Permit. There will be no fee associated with the Building Permit. Costs for all other permitting fees shall be the responsibility of the Prime Contractor.
- U. Any holes or openings created by the demolition or removal of equipment or materials (excluding roof penetrations) must be infilled by the Prime Contractor in respect to the scope of work.
- V. Contractor and vendor company signage and displays will not be allowed on site.
- W. Temporary Facilities and Controls: In addition to specific responsibilities for temporary facilities and controls indicated in this Section and in Division 01 Section "Temporary Facilities and Controls," The Prime Contractor is responsible for the following:
 - X. Installation, operation, maintenance, and removal of each temporary facility necessary for its own normal construction activity, and costs and associated with each facility, except as otherwise provided for in this Section.
 - Y. Plug-in electric power cords and extension cords, supplementary plug-in task lighting, and special lighting necessary exclusively for its own activities.
 - Z. The Prime Contractor shall provide a field office (refer to section "Temporary Facilities & Controls" for further detail). It is the Prime Contractors responsibility to coordinate additional field offices and storage with their Sub Contractors and the Construction Manager.
- AA. All temporary enclosures shall be coordinated with the Construction Manager and provided by the Prime Contractor.
- BB. Staging and scaffolding for construction activities.
- CC. All hoisting and rigging of tools, equipment and materials for construction activities.

- DD. Waste disposal facilities, including collection and legal disposal of its own hazardous, dangerous, unsanitary, or other harmful waste materials. If the Prime Contractor requires dumpsters for waste removal, the locations shall be coordinated in advance with the CM.
- EE. Progress cleaning of work areas affected by its operations on a daily basis.
- FF. Secure lockup of tools, materials, and equipment.
- GG. Construction aids and miscellaneous services and facilities necessary exclusively for construction activities.

END OF SECTION 01 3010

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General project coordination procedures
 - 2. Coordination drawings
 - 3. Administrative and supervisory personnel
 - 4. Project meetings

1.3 COORDINATION

- A. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
 - 2. Make adequate provisions to accommodate items scheduled for later installation.
- B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities included, but are not limited to, the following:

1. Installation and removal of temporary facilities and controls.
 2. Delivery and processing of submittals.
 3. Progress meetings.
 4. Pre-installation conferences.
 5. Project closeout activities.
- C. Drawings are diagrammatic; utilize spaces efficiently to maximize headroom and accessibility for installation, maintenance, or replacement of construction elements. It shall be this Contractor's responsibility to coordinate his work. It is the intention of the drawings and specifications for the Contractor to provide a complete system whether shown or not.
- D. Owner will furnish copies of approved shop drawings to each Contractor whose work is connected to this contract. Resolve all problems of connected, adjacent or otherwise related work with Contractor.
- E. Should conflicts and problems occur, Contractor and those subcontractors, sub-subcontractors and trades who might be affected, are to consult and cooperate in resolution of the problem, whether or not they are at fault and whether or not their work is directly involved.
- F. When a problem occurs with no readily discernible cause, Contractor and those subcontractors, sub-subcontractors and trades who might be affected are to consult, investigate and test as necessary, until cause is found or problem resolved.
- G. No extra costs will be allowed for any investigations, testing and/or consultations or extra work which may be necessary under the terms of this Article.
- H. The plans and these specifications are complimentary each to the other and what is called for in one shall be as binding as if called for by both. Should there be a conflict between drawings and specifications regarding a material shown, scope of work, described work, or detailed work; the Contractor shall figure in his base bid the more expensive system of the two. Architect shall be notified immediately prior to the start of any work in conflict.
- I. Contractor shall coordinate layout of all electrical and mechanical devices, fixtures, and equipment in finished spaces with all Architectural features (panel and wainscot designs, ceiling tile type, grid location, etc.) Locate devices equally spaced horizontally within panel layout. Where mounting height or equipment locations are not indicated, contact Architect prior to installation for decision.
- J. Contractor shall coordinate and verify all dimensions prior to start of work. If conflict occurs as a result of coordination, contractor shall be responsible to correct conditions at no additional cost.

1.4 COORDINATION DRAWINGS

- A. Composite Coordination Base Drawing:

1. Drawings shall identify each building layout at 1/4 inch equals 1 foot and includes walls, doors, windows, ceiling and roof elevations, soffit elevations, beam elevations and other items.
2. Contractor shall sign-off on Base Drawings for acknowledgement of review including accuracy and resolving conflicts.
3. HVAC sub-contractor shall add to this drawing exact locations and elevations of where the following items are proposed to be installed:
 - a. Registers
 - b. Grilles
 - c. Diffusers
 - d. Dampers
 - e. Turning valves
 - f. Damper operator
 - g. VAV boxes
 - h. Ducts
 - i. Duct access doors
 - j. Sensors
 - k. Unit heaters
 - l. Air handling units
 - m. Exhaust fans
 - n. Relief fans
 - o. Chiller
 - p. Air compressor
 - q. Boilers
 - r. Pumps
 - s. HVAC piping
 - t. HVAC supports

B. Plumbing sub-contractor shall add to the drawing after HVAC sub-contractor, the location of the following:

- a. Hot water boilers
- b. Hot water tanks
- c. Pumps
- d. Water meters
- e. Gas meters
- f. Location and routing of gas and water piping

C. Sprinkler sub-contractor shall add to the drawing after Plumbing sub-contractor the location of the following:

- a. Pumps
- b. Entrance riser
- c. Piping

D. Electrical sub-contractor shall add to the drawing after Sprinkler sub-contractor the location of the following:

- a. Location and routing of electrical equipment
- b. Distribution panels

- c. Lights
 - d. Fire alarm system components
 - e. Security system components and controls
- E. General Construction Contractor shall add to the drawing after Electrical Contractor, any architectural components provided by building trade, which must be coordinated with other trades.

1.5 SUBMITTALS

- A. Staff Names: At Preconstruction Conference submit a list of principal staff assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list business addresses and telephone numbers, including business office, field office, cellular and facsimile. List Manager's and Superintendent emergency telephone numbers.

1.6 OWNERSHIP OF DRAWINGS

- A. All drawings, specifications, and copies thereof, furnished to the Contractor, with the exception of the signed Contract set, are to be returned to the Owner at the completion of the work. All Drawings remain the property of the Architect.
- B. Duplication of Architect's Drawings is prohibited and violates Architect's copyright protection.

1.7 UTILITY SHUTDOWNS AND CUTOVERS

- A. Except as otherwise expressly provided in the Contract Documents, the Contractor shall be responsible for submitting to the Owner and its representatives for their approval a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the project; said schedule should contain a minimum of two (2) weeks advance notice prior to the time of the proposed shutdown and cutover.
- B. The contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the Contractor to complete the shutdowns or cutovers.

1.8 SITE ACCESS

- A. As determined by Owner and its representatives.

1.9 PARKING

- A. Parking for trailers, etc. shall be as designated by the Owner and its representatives. Comply with requirements of Albany County.

1.10 SALES TAX

- A. This project is exempt from sales tax and compensating use tax on labor and materials, which are incorporated into the final finished project. Owner shall furnish tax identification number at Contractor's request.

END OF SECTION 01 3100

PART- 1 GENERAL

1.1 INITIAL JOB MEETING

- A. The Owner's Representative will notify all parties concerned of the time and place of the initial kick off job meeting. ATTENDANCE IS MANDATORY. FAILURE TO ATTEND WILL RESULT IN A PENALTY OF \$1,000.00 in the form of a deduct change order.
- B. The Contractor must be in attendance.
- C. The meeting will be conducted by the Owner and its representatives.

1.2 BI-WEEKLY JOB MEETINGS

- A. Unless otherwise directed, job meetings will be held once every two weeks at a time and place agreed upon by the Owner's Representative, Contractor, and the Architect. Other interested parties may attend when needed, e.g., subcontractors and representatives from suppliers, public utilities, and local government. Bi-Weekly meetings will be titled "Job Progress Meetings".
- B. Attendance at progress meetings is MANDATORY for the Contractor in order to create seamless coordination and work within the tight construction schedules and budgets set forth by the Owner. For each progress meeting that the Contractor misses, without written consent from the Owner or its representatives, the Contractor will be charged a penalty fee of \$500.00. This amount will be deducted from the next applicable application for payment by change order. NO EXCEPTIONS TO THIS RULE WILL BE MADE.
 - 1. In addition, an unexcused absence from a progress meeting or a failure of a Contractor's employee(s) to work in accordance with the project schedule will subject the Contractor to Albany County's Vendor Complaint process, which may result in a non-responsible contractor determination.
- C. The meetings will be conducted by the Owner and its representatives for the following purposes:
 - 1. Review job progress, quality of Work, and approval and delivery of materials.
 - 2. Identify and resolve problems which impede planned progress.
 - 3. Coordinate the efforts of all concerned so that the project progresses on schedule to on time completion.
 - 4. Maintain a sound working relationship between the Contractor and the Owner and its representatives and a mutual understanding of the project requirements.
 - 5. Maintain sound working procedures.
 - 6. Review and approve minutes of previous meetings.
 - 7. Discuss work completed in the last two weeks since the last meeting. Contractor to provide a two week look ahead at each Job Progress Meeting outlining the work to be conducted two weeks in advance.

8. Discuss the work scheduled in the next two weeks up to the next meeting.
9. Review shop drawings and submittal schedules.
10. Review change order status.
11. Coordinate occupancy arrangements and access requirements with Owner and its representatives.
12. Discuss temporary exits and construction safety with the Architect.

1.3 PRIME CONTRACTOR WEEKLY SUBCONTRACTOR MEETING

- A. The Contractor is to hold at a minimum a weekly sub-contractor meeting to discuss items pertaining to the project. The Owner and its representatives reserves the right to attend the weekly subcontractor meeting and review meeting minutes for meetings not attended by the Owner and its representatives.

THE CONTRACTOR SHALL WRITE MINUTES OF ALL MEETINGS AND DISTRIBUTE THEM TO ALL PARTIES PRESENT AND TO THOSE ON THE DISTRIBUTION LIST GIVEN OUT AT THE KICK-OFF MEETING WITHIN 3 BUSINESS DAYS OF THE MEETING.

PART- 2 PRODUCTS (NOT USED)

PART- 3 EXECUTION (NOT USED)

END OF SECTION 01 3119

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provision of the Contract, including General and Supplementary conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Project Scheduling Requirements

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
 - 2. Predecessor activity is an activity that must be completed before a given activity can be started.
- B. Critical Path: The longest continuous chain of activities through the network schedule that establishes the minimum overall Project duration.
- C. Event: The starting or ending point of an activity.
- D. Major Area: A story of construction, a separate building, or a similar significant construction element.
- E. Milestone: A key or critical point in time for reference or measurement.

PART- 2 PRODUCTS (NOT USED)

PART- 3 EXECUTION

3.1 PREPARATION

- A. Preparation of Contractor Construction Schedule: Refer to Division 01 Section "Submittals" for administrative requirements governing preparation and submittal thereof.

- B. Contractor's own preliminary detailed critical path schedule is due at, or prior to the Pre-Construction Conference. The Construction Schedule must be completed and approved prior to commencing the work. No Application for Payment will be processed prior to receipt of approved construction schedule.
- C. Critical Submittals Schedule: Submittals that require expedited submission to facilitate successful project schedule completion.
- D. The Contractor's Construction Schedule shall be submitted, to the Owner and its representatives, for review and acceptance. The approved Contractor's Schedule will be incorporated into the Project Master Schedule which shall be maintained by the Owner and its representatives.
- E. Contractor shall be required to participate with Owner and its representatives in periodic interactive scheduling/pull-planning sessions to coordinate the work to be completed. The approved Project Master Schedule shall supercede all previous schedules. Master Schedule shall be reviewed weekly and updated as required, with each revision taking precedence over previously issued.
- F. The Contractor will be required to support the schedule and phasing plan by providing input to the planning, designing, and installation of temporary systems (walls, protections, M/E/P/FP/Low Voltage requirements) to support the facility and/or project needs during construction.
- G. A two week look ahead schedule will be submitted to the Owner and its representatives on a weekly basis for review which may detail smaller schedule segments or items not shown on the CPM schedule.

END OF SECTION 01 3200

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. One copy of Contractor's Final Submittal Log shall be returned to Construction Manager indicating anticipated dates for submission of each submittal by completing the submittal date column.
- C. Final Submittal Log shall be complete and submitted before first Application for Payment is received.
- D. Application for Payment approval will not occur until Architect has received Final Submittal Log.
- E. Date indicated for each submittal shall account for the lead-time required for ordering and fabricating of each item.
- F. Final Submittal Log shall indicate all submittals to be completed within 45 working days after execution of the Agreement, unless otherwise indicated.
- G. Indicate items requiring more than 45 days with an explanation for the additional time and on what dates that submittal will be submitted.

1.3 DEFINITIONS

- A. Preconstruction Submittals: Submittals which are required prior to issuing contract notice to proceed or starting construction. For example, Certificates of insurance; Surety bonds; Site-specific safety plan; Construction progress schedule; Schedule of values; Submittal register; List of proposed subcontractors.
- B. Shop Drawings: Drawings, diagrams, and schedules specifically prepared to illustrate some portion of the work. Drawings prepared by or for the Contractor to show how multiple systems and interdisciplinary work will be integrated and coordinated.
- C. Product Data: Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions, and brochures, which describe and illustrate size, physical appearance, and other characteristics of materials,

systems, or equipment for some portion of the work. Samples of warranty language when the contract requires extended product warranties.

- D. Samples: Physical examples of materials, equipment, or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged. Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project. Field samples and mock-ups constructed to establish standards by which the ensuing work can be judged.
- E. Design Data: Calculations, mix designs, analyses, or other data pertaining to a part of work.
- F. Test Reports: Report which includes findings of a test required to be performed by the Contractor on an actual portion of the work. Report which includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.
- G. Certificates: Document required of Contractor, or of a manufacturer, supplier, installer, or subcontractor through Contractor. The purpose is to document procedures, acceptability of methods, or personnel qualifications for a portion of the work.
- H. Manufacturer's Instructions: Pre-printed material describing installation of a product, system, or material, including special notices and MSDS concerning impedances, hazards, and safety precautions.
- I. Manufacturer's Field Reports: Documentation of the testing and verification actions taken by manufacturer's representative at the job site on a portion of the work, during or after installation, to confirm compliance with manufacturer's standards or instructions. The documentation must indicate whether the material, product, or system has passed or failed the test.
- J. Operation and Maintenance Data: Manufacturer data that is required to operate, maintain, troubleshoot, and repair equipment, including manufacturer's help, parts list, and product line documentation. This data shall be incorporated in an operations and maintenance manual.
- K. Closeout Submittals: Documentation necessary to properly close out a construction contract. For example, Record Drawings and as-built drawings. Also, submittal requirements necessary to properly close out a phase of construction on a multi-phase contract.

1.4 SUBMITTAL REGISTER

- A. Preparation: Submit register arranged by order of specification sections listed.
- B. The Contractor, immediately after being awarded the Contract and prior to the initial job meeting, promptly submit to Subcontractor a detailed schedule showing the order in which the Contractor proposes to carry out the work, with dates at which he will start the several parts of the work and estimated dates of completion of same. This schedule will fix the respective dates for the submission of all Shop Drawings, product data and samples, the beginning of manufacture, testing and installation of materials, supplies and equipment. A fully developed Submittal Register shall be submitted within 15 working days of the Notice of Award
- C. After development and acceptance of construction schedule, prepare a complete register of submittals.

- D. Updating: At bi-weekly intervals, update schedule to reflect actual submittal activity. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in the construction activity.
- E. The Contractor shall maintain the submittal register at the project site until final acceptance of all work by Contracting Officer.

1.5 SUBMITTAL SCHEDULING

- A. Submittals are to be scheduled, submitted, reviewed, and approved prior to the acquisition of the material or equipment.
- B. Coordinate scheduling, sequencing, preparing, and processing of submittals with performance of work so that work will not be delayed by submittal processing. Allow time for potential resubmittal.
- C. No delay costs or time extensions will be allowed for time lost in late submittals or resubmittals.
- D. All submittals are required to be approved prior to the start of the specified work activity. If material or equipment is installed before it is reviewed, Contractor shall be liable for its removal and replacement at no charge if, in opinion of Architect, material or equipment does not meet intent of drawings and specifications.

1.6 SHOP DRAWINGS, PRODUCT DATA, SAMPLES, AND COLOR SELECTIONS SUBMITTALS

- A. Each submittal is to be complete and in sufficient detail to allow ready determination of compliance with contract requirements.
- B. Collect required data for each specific material, product, unit of work, or system into a single submittal. Prominently mark choices, options, and portions applicable to the submittal. Partial submittals will not be accepted for expedition of construction effort. Submittal will be returned without review if incomplete.
- C. If available product data is incomplete, provide Contractor-prepared documentation to supplement product data and satisfy submittal requirements.
- D. All irrelevant or unnecessary data shall be removed from the submittal to facilitate accuracy and timely processing. Submittals that contain the excessive amount of irrelevant or unnecessary data will be returned with review.
- E. Submit shop drawings, product data and samples to the Architect for items required by contract to be reviewed. Items not requiring review will be returned to Contractor un-reviewed.
- F. All items requiring color selections shall be submitted as a complete package, allowing the Architect to develop a coordinated color scheme for the project; submittals made independently will be held until all items are received. This submittal should be completed within one month after award of contract. Submittals will take eight weeks for approval.
- G. All items shall be submitted with a transmittal form for each submittal with the following information

1. Project title, location and number.
 2. Contractor and Architect's name and address.
 3. Construction contract number.
 4. Date of the drawings and revisions.
 5. Name, address, and telephone number of subcontractor, supplier, manufacturer, and any other subcontractor associated with the submittal.
 6. List paragraph number of the specification section and sheet number of the contract drawings by which the submittal is required.
 7. When a resubmission, add R - # suffix on submittal description. For example, submittal 18 would become 18R-1, to indicate resubmission.
 8. Product identification and location in project.
- H. By approving and submitting Shop Drawings, Product Data and Samples, the Contractor represents that he has determined and verified all materials, field measurements, and field construction criteria related thereto, or will do so, and that he has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.
- I. Shop Drawings, Product Data and Samples submitted for review by the Contractor and shall be clearly marked by the Contractor with a stamp or other device indicating that the Contractor has reviewed the submittal. Submittals, which are not so marked, shall be returned to him for re-submittal.
- J. The Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by the Architect's review of Shop Drawings, Product Data, or Samples unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submission and the Architect has given written approval to the specific deviation. The Contractor shall not be relieved from responsibility for errors or omissions in the Shop Drawings, Product Data or Samples by the Architect's review thereof.
- K. Marked-up prints or other reproductions of Contractor's drawings are not acceptable as shop drawings.
- L. The Contractor shall direct specific attention, in writing, or on resubmitted Shop Drawings, Product Data or Samples, to revisions other than those requested by the Architect on previous submittals.
- M. No portion of the Work requiring submission of a Shop Drawing, Product Data or Sample shall be commenced until the Architect has approved the submittal. All such portions of the Work shall be in accordance with approved submittals.
- N. The Contractor shall prepare a progress chart at suitable scale, which shall indicate the salient features of the work, with suitable symbols to indicate the progress at any time. The above stipulated progress schedule and chart shall be submitted to the Subcontractor for approval before the work is commenced. The Contractor shall bring all progress schedules and charts up to date periodically as required and copies of same shall be delivered in quadruplicate to the Subcontractor.

- O. The Contractor shall review his schedule, and the composite schedule prepared by the Subcontractor, with the other Contractors for this project during the initial job meeting. The Contractor shall coordinate his Work and Schedule with the work and schedules of others and shall, within one week of the initial job meeting, submit to the Architect a revised schedule meeting the requirements of the above paragraph and reflecting the adjustments necessary for the coordination of his work with that of separate Contractors.
- P. The Contractor shall maintain at the site for the Owner, one record copy of all Drawings, Specifications, Addenda, Change Orders, and other Modifications, in good order and marked currently to record all changes made during construction, and approved Shop Drawings, Product Data and Samples. These shall be available to the Contractor and shall be delivered to him for the Owner upon completion of the Work.
- Q. The A/E will review up to two (2) submissions of any single shop drawing. The contractor will be invoiced on an hourly rate basis for the time spent reviewing the same shop drawing in excess of twice.
- R. Coordination of Submittal Times:
1. Prepare and transmit each submittal to Architect sufficiently in advance of performing the related work or other applicable activities, so that the installation will not be delayed by processing times including disapproval and resubmittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery, and similar sequenced activities.
 2. No extension of time will be authorized because of the Contractor's failure to transmit submittals to the Subcontractor sufficiently in advance of the work.
- S. Architect 's Review:
1. Allow three (3) weeks for Architect's initial processing of each submittal requiring his review and response, except allow longer period where processing must be delayed for coordination with subsequent submittals.
 2. Allow eight (8) weeks for color selections after receipt of all samples for the project.
 3. Architect will advise Contractor promptly when it is determined that a submittal being processed must be delayed for coordination.
 4. Advise Architect on each submittal, as to whether his processing time is critical to the progress of the work, and therefore the work would be expedited if his processing time could be foreshortened.
 5. If Architect review becomes more extensive as a result of Contractor submitting substitutions, then Architect shall be entitled to back-charge Contractor for time expended on review.

1.7 SEQUENCE REQUIREMENTS

- A. As applicable in each instance, do not proceed with purchasing, fabrication, and delivery of a unit of work until submittal procedures have been successfully completed and in a sequence which will not result in the approval being later modified or rescinded by reason of a subsequent submittal which should have been processed earlier or concurrently for coordination.

1.8 GENERAL PROCEDURES

- A. Transmit each submittal from the Contractor to the Subcontractor for review, who in turn will transmit submittal to Architect.
- B. Initial and Final Submittals:
1. The manner of submittal and Contractor's options for certain categories of initial submittals are specified in general in the individual work Sections of the Specifications.
 2. Except as otherwise indicated in individual work Sections, submit the following for each category and type to the Architect:
- C. Shop Drawings:
1. Provide submittals in electronic format, with the exception of material samples. Use PDF as the electronic format, unless otherwise specified or directed by the Contracting Officer at no additional cost to the Owner. Architect will review and return either PDF or hard copy to Construction Manager.
 2. Compile the electronic submittal file as a single, complete document. Name the electronic submittal file specifically according to its contents.
 3. Electronic files must be of sufficient quality that all information is legible. Generate PDF files from original documents so that the text included in the PDF file is both searchable and can be copied. If documents are scanned, Optical Character Resolution (OCR) routines are required.
 4. Samples: Submit the number stated in each specification section.
 5. Colors: One (1) set showing full range of manufacturer's colors.
 6. The Contractor or his consultants will stamp drawings, data and catalog cuts as indicated below and return to Subcontractor who will distribute to Contractor:

- NO EXCEPTION TAKEN	- SUBMIT SPECIFIED ITEM
- MAKE CORRECTIONS NOTED	- REJECTED
- REVISE AND RESUBMIT	
 7. Checking is only for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Any action shown is subject to the requirements of the plans and specifications.

Contractor is responsible for dimensions which shall be confirmed and correlated at the job site; fabrication processes and techniques of construction; coordination of his work with that of all other trades and the satisfactory performance of his work.

ANGERAME ARCHITECTS, P.C. (or Consultant)

Dated _____ By _____

1.9 SAMPLES

- A. Submit the number stated in each specification section.
- B. Colors: One (1) set showing full range of manufacturer's colors.
- C. Where samples are specified for selection of color, finish, pattern, or texture, submit the full set of available choices for the material or product specified.
- D. When color, texture, or pattern is specified by naming a particular manufacturer and style, include one sample of that manufacturer and style, for comparison.
- E. Before submitting samples, the Contractor is to ensure that the materials or equipment will be available in quantities required in the project. No change or substitution will be permitted after a sample has been approved.
- F. The Architect reserves the right to disapprove any material or equipment which previously has proven unsatisfactory in service.

1.10 MATERIAL SAFETY DATA SHEETS (MSDS)

- A. Contractor shall comply with "Right to Know" requirements of Chapter 551 of Laws of New York, 1980, concerning notification of the use of toxic substances.
- B. Any product or substance used by CONTRACTOR or its subcontractors which is listed in Sub-part Z of OSHA Part 1910 Title 29 of the Code of Federal Regulations entitled "Toxic and Hazardous Substances" shall be identified to the Owner by the contractor's submission of a standard Material Safety Data Sheet.

1.11 CONTRACTOR'S REVIEW

- A. In accord with Paragraph 3.12 of the General Conditions, shop drawings and submissions not properly identified, or which in Architect's opinion are incomplete, contain numerous errors or omissions, or have not been checked or only superficially checked by Contractor, will be returned for re-submissions without review by Architect.

1.12 ELECTRONIC SUBMITTALS

- A. An internet (web-based) service shall be used to provide an on-line database and repository which shall be used to transmit and track project related documents. The intent for using an on-line database and repository is to expedite the construction process by reducing paperwork and improving information flow.
- B. For each submittal, the Prime Contractor shall review and apply electronic stamp certifying that the submittal complies with the requirements of the Contract Documents, including verification of manufacturer/product, dimensions and coordination of information with other parts of the work.

- C. It is the Prime Contractor's responsibility to provide the submittals in a PDF format. The contractor may use any of the following options:
1. Subcontractors and suppliers provide electronic submittals in PDF format to the Contractor via the Submittals Website.
 2. Subcontractors and suppliers provide paper submittals to the Contractor, who electronically scans and converts them to PDF format.
 3. Contract a Scanning Service, which will allow the Contractor and the Contractor's subcontractors and suppliers to provide paper submittals to the Scanning Service, which electronically scans and converts them to PDF format. It will be the Prime Contractor's responsibility to transmit the scanned submittals to the Submittals Website.

D. Image Quality:

1. Image resolution: The PDF files shall be created at a minimum resolution of 200 dots per inch utilizing the original document size. The Prime Contractor will be responsible to increase the resolution of the scanned file or images being submitted as required to adequately present the information.
2. Image Color Rendition: When information represented requires color to convey the intent and compliance, provide full color PDF reproduction.

E. Internet Service and Equipment Requirements:

1. The Prime Contractor will be required to have an Email address and Internet access at the Prime Contractor's main office.
2. Unless the Prime Contractor will exclusively be using a Scanning Service to create all PDF documents, the Prime Contractor will be required to own a PDF reviewing, creating and editing software, such as Adobe Acrobat (www.adobe.com), Bluebeam PDF Revu (www.bluebeam.com), or other similar PDF reviewing, creating and editing software for applying electronic stamps and comments.

F. Training and Support:

1. Contractor shall provide orientation and training to the Owner, Architect and design team members, project personnel and Subcontractors at no cost to the Owner or its representatives. The Contractor is responsible to complete the training within 2 weeks of contract award. The Contractor shall have the project team participate in this training at no additional cost to the Owner or representatives.

G. Paper prints (hard copies) of reviewed submittals:

1. Record Copy: Within 14 days of receipt of submittals marked "Approved", "Approved As Noted", or meeting the requirements of Article 1.05 of this specification section, the Prime Contractor shall provide two paper copies of each approved submittal to the Construction Manager.
 - a. Paper copies shall be printed in a size format equal to the original document.
 - b. Scaled Shop Drawings shall be printed to the scale noted on the drawings.
 - c. The resolution of the printed copy shall be equal to that of the PDF file that it is being printed from.
 - d. The Record Copy shall be used by the Owner's Representative during the construction of the project and shall be retained as a turn-over item to the Owner at the end of the project as required section 017100 Contract Closeout.
2. Contractor Copies: The Contractor will be responsible for making copies, for the Contractors own use and for use by its subcontractors and suppliers.

PART- 2 PRODUCTS

2.1 PRODUCT DATA

- A. Collect manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts and other standard descriptive data into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for submittal because standard printed data is not suitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Modify each copy of each submittal to show which products and options are not applicable.
 - 3. Supplement Standard to provide additional information applicable to project.
 - 4. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Standard color charts.
 - e. Manufacturer's catalog cuts.
 - f. Wiring diagrams showing factory-installed wiring.
 - g. Printed performance curves.
 - h. Operational range diagrams.
 - i. Mill reports.
 - j. Standard product operation and maintenance manuals.
 - k. Compliance with recognized trade association standards.
 - l. Compliance with recognized testing agency standards.
 - m. Application of testing agency labels and seals.
 - n. Notation of coordination requirements.
- B. Shop Drawings: Original drawings, prepared by Contractor illustrating some portion of Project-specific information showing fabrication, layout, setting or erection details.
 - 1. Preparation: Include the following information, as applicable:
 - a. Dimensions.
 - b. Fabrication and installation drawings.
 - c. Roughing-in and setting diagrams.
 - d. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - e. Shop work manufacturing instructions.
 - f. Schedules.
 - g. Compliance with specified standards.
 - h. Notation of coordination requirements.
 - i. Notation of dimensions established by field measurement.
 - 2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.

- C. Samples: Prepare physical units of materials or products to illustrate equipment or workmanship establishing standards by which completed work is judged and including the following:
1. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 2. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 3. Preparation: Mount, display or package Samples in manner specified to facilitate review of qualities indicated.
 - a. Office samples to be of sufficient size and quantity to clearly illustrate.
 - i. Functional characteristics of product or material, with related parts and method of attachment.
 - ii. Full range of color samples.
 4. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
 5. Number of Samples for Initial Selection: Submit 2 full sets of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line.
- D. Material Safety Data Sheets (MSDSs): Submit information directly to Contractor.

PART- 3 EXECUTION (NOT USED)

END OF SECTION 01 3300

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether it is clearly or explicitly shown.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner, Construction Manager, or authorities having jurisdiction are not limited by provisions of this Section.

1.3 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced," unless otherwise further described, means having successfully completed a minimum of [5] five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- B. Field Quality-Control Tests and Inspections: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, subcontractor, or sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.
 - 1. Use of trade-specific terminology in referring to a Work result does not require that certain construction activities specified apply exclusively to specific trade(s).
- D. Mockups: Physical assemblies of portions of the Work constructed to establish the standard by which the Work will be judged. Mockups are not Samples.

1. Mockups are used for one or more of the following:
 - a. Verify selections made under Sample submittals.
 - b. Demonstrate aesthetic effects.
 - c. Demonstrate the qualities of products and workmanship.
 - d. Demonstrate successful installation of interfaces between components and systems.
 - e. Perform preconstruction testing to determine system performance.
 2. Product Mockups: Mockups that may include multiple products, materials, or systems specified in a single Section.
 3. In-Place Mockups: Mockups constructed on-site in their actual final location as part of permanent construction.
- E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria. Unless otherwise indicated, copies of reports of tests or inspections performed for other than the Project do not meet this definition.
- F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- G. Source Quality-Control Tests and Inspections: Tests and inspections that are performed at the source (e.g., plant, mill, factory, or shop).
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. The term "testing laboratory" has the same meaning as the term "testing agency."
- I. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work, to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- J. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work, to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect or Construction Manager.

1.4 DELEGATED DESIGN SERVICES

- A. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated Design Services Statement: Submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.5 CONFLICTING REQUIREMENTS

- A. **Conflicting Standards and Other Requirements:** If compliance with two or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, inform the Architect regarding the conflict and obtain clarification prior to proceeding with the Work. Refer conflicting requirements that are different, but apparently equal, to Architect for clarification before proceeding.
- B. **Minimum Quantity or Quality Levels:** The quantity or quality level shown or specified is the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.6 ACTION SUBMITTALS

- A. **Mockup Shop Drawings:**
 - 1. Include plans, sections, elevations, and details, indicating materials and size of mockup construction.
 - 2. Indicate manufacturer and model number of individual components.
 - 3. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

1.7 INFORMATIONAL SUBMITTALS

- A. **Contractor's Quality-Control Plan:** For quality-assurance and quality-control activities and responsibilities.
- B. **Qualification Data:** For Contractor's quality-control personnel.
- C. **Contractor's Statement of Responsibility:** When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:
 - 1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
 - 2. Primary wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.
- D. **Testing Agency Qualifications:** For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- E. **Schedule of Tests and Inspections:** Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Entity responsible for performing tests and inspections.
 - 3. Description of test and inspection.
 - 4. Identification of applicable standards.
 - 5. Identification of test and inspection methods.
 - 6. Number of tests and inspections required.
 - 7. Time schedule or time span for tests and inspections.

- 8. Requirements for obtaining samples.
 - 9. Unique characteristics of each quality-control service.
- F. Reports: Prepare and submit certified written reports and documents as specified.
 - G. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.8 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Plan, General: Submit quality-control plan within [10] ten days of Notice of Award, and not less than [5] five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities and to coordinate Owner's quality-assurance and quality-control activities. Coordinate with Contractor's Construction Schedule.
- B. Quality-Control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
 - 1. Project quality-control manager may also serve as Project superintendent.
- C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
- D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
 - 1. Contractor-performed tests and inspections, including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections. Distinguish source quality-control tests and inspections from field quality-control tests and inspections.
 - 2. Special inspections required by authorities having jurisdiction and indicated on the Statement of Special Inspections.
 - 3. Owner-performed tests and inspections indicated in the Contract Documents.
- E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring the Work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- F. Monitoring and Documentation: Maintain testing and inspection reports, including log of approved and rejected results. Include Work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming Work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.9 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
1. Date of issue.
 2. Project title and number.
 3. Name, address, telephone number, and email address of testing agency.
 4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Record of temperature and weather conditions at time of sample-taking and testing and inspection.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, telephone number, and email address of technical representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement of whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, telephone number, and email address of factory-authorized service representative making report.

2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement of whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

1.10 QUALITY ASSURANCE

- A. Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product.
- F. Specialists: Certain Specification Sections require that specific construction activities be performed by entities who are recognized experts in those operations. Specialists will satisfy qualification requirements indicated and engage in the activities indicated.
 1. Requirements of authorities having jurisdiction supersede requirements for specialists.
- G. Testing and Inspecting Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented in accordance with ASTM E329, and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect, demonstrate, repair, and perform service on installations of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

- J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following Contractor's responsibilities, including the following:
1. Provide test specimens representative of proposed products and construction.
 2. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 3. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 4. Build site-assembled test assemblies and mockups, using installers who will perform same tasks for Project.
 5. When testing is complete, remove test specimens and test assemblies, mockups; do not reuse products on Project.
 6. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, through Construction Manager, with copy to Contractor. Interpret tests and inspections, and state in each report whether tested and inspected Work complies with or deviates from the Contract Documents.
- K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups of size indicated.
 2. Build mockups in location indicated or, if not indicated, as directed by Architect or Construction Manager.
 3. Notify Architect and Construction Manager [7] seven days in advance of dates and times when mockups will be constructed.
 4. Employ supervisory personnel who will oversee mockup construction. Employ workers who will be employed to perform same tasks during the construction at Project.
 5. Demonstrate the proposed range of aesthetic effects and workmanship.
 6. Obtain Architect's and Construction Manager's approval of mockups before starting corresponding Work, fabrication, or construction.
 - a. Allow [7] seven days for initial review and each re-review of each mockup.
 7. Promptly correct unsatisfactory conditions noted by Architect's preliminary review, to the satisfaction of the Architect, before completion of final mockup.
 8. Approval of mockups by the Architect does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 9. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

- C. Specialty Mockups: See Section 014339 "Mockups" for additional construction requirements for integrated exterior mockups and room mockups.

1.11 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
 - 2. Payment for these services will be made from testing and inspection allowances specified in Section 012100 "Allowances," as authorized by Change Orders.
 - 3. Costs for retesting and reinspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be charged to Contractor.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
 - 1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 - 2. Engage a qualified testing agency to perform quality-control services.
 - a. Contractor will not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 - 3. Notify testing agencies at least [24] twenty-four hours in advance of time when Work that requires testing or inspection will be performed.
 - 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 - 5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 - 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- D. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."
- E. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

- F. Contractor's Associated Requirements and Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 - 1. Access to the Work.
 - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 - 3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
 - 4. Facilities for storage and field curing of test samples.
 - 5. Delivery of samples to testing agencies.
 - 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 - 7. Security and protection for samples and for testing and inspection equipment at Project site.
- G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
 - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- H. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's Construction Schedule. Update and submit with each Application for Payment.
 - 1. Schedule Contents: Include tests, inspections, and quality-control services, including Contractor- and Owner-retained services, commissioning activities, and other Project-required services paid for by other entities.
 - 2. Distribution: Distribute schedule to Owner, Architect, Construction Manager, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.12 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, as indicated in the Statement of Special Inspections attached to this Section, and as follows:
 - 1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
 - 2. Notifying Architect, Construction Manager, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 - 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect, through Construction Manager, with copy to Contractor and to authorities having jurisdiction.
 - 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.

5. Interpreting tests and inspections and stating in each report whether tested and inspected Work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected Work.

PART- 2 PRODUCTS (NOT USED)

PART- 3 EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
 1. Date test or inspection was conducted.
 2. Description of the Work tested or inspected.
 3. Date test or inspection results were transmitted to Architect.
 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's, Construction Manager's and authorities' having jurisdiction reference during normal working hours.
 1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, sample-taking, and similar services, repair damaged construction and restore substrates and finishes.
 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 4000

STATEMENT OF SPECIAL INSPECTIONS

Project:

Location:

Owner:

Design Professional in Responsible Charge:

This *Statement of Special Inspections* is submitted as a condition for permit issuance in accordance with the Special Inspection and Structural Testing requirements of the Building Code. It includes a schedule of Special Inspection services applicable to this project as well as the name of the Special Inspection Coordinator and the identity of other approved agencies to be retained for conducting these inspections and tests. This *Statement of Special Inspections* encompass the following disciplines:

☐ Structural

☐ Mechanical/Electrical/Plumbing

☐ Architectural

☐ Other: _____

The Special Inspection Coordinator shall keep records of all inspections and shall furnish inspection reports to the Building Official and the Registered Design Professional in Responsible Charge. Discovered discrepancies shall be brought to the immediate attention of the Contractor for correction. If such discrepancies are not corrected, the discrepancies shall be brought to the attention of the Building Official and the Registered Design Professional in Responsible Charge. The Special Inspection program does not relieve the Contractor of his or her responsibilities.

Interim reports shall be submitted to the Building Official and the Registered Design Professional in Responsible Charge.

A *Final Report of Special Inspections* documenting completion of all required Special Inspections, testing and correction of any discrepancies noted in the inspections shall be submitted prior to issuance of a Certificate of Use and Occupancy.

Job site safety and means and methods of construction are solely the responsibility of the Contractor.

Interim Report Frequency:

or ☐ per attached schedule.

Prepared by:

(type or print name)

Signature

Date

Design Professional Seal

Owner's Authorization:

Building Official's Acceptance:

Signature

Date

Signature

Date

Schedule of Inspection and Testing Agencies

This Statement of Special Inspections / Quality Assurance Plan includes the following building systems:

- | | |
|--|--|
| ☐ Soils and Foundations | ☐ Spray Fire Resistant Material |
| ☐ Cast-in-Place Concrete | ☐ Wood Construction |
| ☐ Precast Concrete | ☐ Exterior Insulation and Finish System |
| ☐ Masonry | ☐ Mechanical & Electrical Systems |
| ☐ Structural Steel | ☐ Architectural Systems |
| ☐ Cold-Formed Steel Framing | ☐ Special Cases |

Special Inspection Agencies	Firm	Address, Telephone, e-mail
1. Special Inspection Coordinator		
2. Inspector		
3. Inspector		
4. Testing Agency		
5. Testing Agency		
6. Other		

Note: The inspectors and testing agencies shall be engaged by the Owner or the Owner's Agent, and not by the Contractor or Subcontractor whose work is to be inspected or tested. Any conflict of interest must be disclosed to the Building Official, prior to commencing work.

Quality Assurance Plan

Quality Assurance for Seismic Resistance

Seismic Design Category

Quality Assurance Plan Required (Y/N)

Description of seismic force resisting system and designated seismic systems:

Quality Assurance for Wind Requirements

Basic Wind Speed (3 second gust)

Wind Exposure Category

Quality Assurance Plan Required (Y/N)

Description of wind force resisting system and designated wind resisting components:

Statement of Responsibility

Each contractor responsible for the construction or fabrication of a system or component designated above must submit a Statement of Responsibility.

Qualifications of Inspectors and Testing Technicians

The qualifications of all personnel performing Special Inspection and testing activities are subject to the approval of the Building Official. The credentials of all Inspectors and testing technicians shall be provided if requested.

Key for Minimum Qualifications of Inspection Agents:

When the Registered Design Professional in Responsible Charge deems it appropriate that the individual performing a stipulated test or inspection have a specific certification or license as indicated below, such designation shall appear below the *Agency Number* on the Schedule.

PE/SE Structural Engineer – a licensed SE or PE specializing in the design of building structures
 PE/GE Geotechnical Engineer – a licensed PE specializing in soil mechanics and foundations
 EIT Engineer-In-Training – a graduate engineer who has passed the Fundamentals of Engineering examination

American Concrete Institute (ACI) Certification

ACI-CFTT Concrete Field Testing Technician – Grade 1
 ACI-CCI Concrete Construction Inspector
 ACI-LTT Laboratory Testing Technician – Grade 1&2
 ACI-STT Strength Testing Technician

American Welding Society (AWS) Certification

AWS-CWI Certified Welding Inspector
 AWS/AISC-SSI Certified Structural Steel Inspector

American Society of Non-Destructive Testing (ASNT) Certification

ASNT Non-Destructive Testing Technician – Level II or III.

International Code Council (ICC) Certification

ICC-SMSI Structural Masonry Special Inspector
 ICC-SWSI Structural Steel and Welding Special Inspector
 ICC-SFSI Spray-Applied Fireproofing Special Inspector
 ICC-PCSI Prestressed Concrete Special Inspector
 ICC-RCSI Reinforced Concrete Special Inspector

National Institute for Certification in Engineering Technologies (NICET)

NICET-CT Concrete Technician – Levels I, II, III & IV
 NICET-ST Soils Technician - Levels I, II, III & IV
 NICET-GET Geotechnical Engineering Technician - Levels I, II, III & IV

Exterior Design Institute (EDI) Certification

EDI-EIFS EIFS Third Party Inspector

Other

Soils and Foundations

Page of

Item	Agency # (Qualif.)	Scope
1. Shallow Foundations	PE/GE	<i>Inspect soils below footings for adequate bearing capacity and consistency with geotechnical report.</i> <i>Inspect removal of unsuitable material and preparation of subgrade prior to placement of controlled fill</i>
2. Controlled Structural Fill	PE/GE	<i>Perform sieve tests (ASTM D422 & D1140) and modified Proctor tests (ASTM D1557) of each source of fill material.</i> <i>Inspect placement, lift thickness and compaction of controlled fill.</i> <i>Test density of each lift of fill by nuclear methods (ASTM D2922)</i> <i>Verify extent and slope of fill placement.</i>
3. Deep Foundations	PE/GE	<i>Inspect and log pile driving operations. Record pile driving resistance and verify compliance with driving criteria.</i> <i>Inspect piles for damage from driving and plumbness.</i> <i>Verify pile size, length and accessories.</i> <i>Inspect installation of drilled pier foundations. Verify pier diameter, bell diameter, lengths, embedment into bedrock and suitability of end bearing strata.</i>
4. Load Testing		
4. Other:		

Item	Agency # (Qualif.)	Scope
1. Mix Design	ACI-CCI ICC-RCSI	Review concrete batch tickets and verify compliance with approved mix design. Verify that water added at the site does not exceed that allowed by the mix design.
2. Material Certification		
3. Reinforcement Installation	ACI-CCI ICC-RCSI	Inspect size, spacing, cover, positioning and grade of reinforcing steel. Verify that reinforcing bars are free of form oil or other deleterious materials. Inspect bar laps and mechanical splices. Verify that bars are adequately tied and supported on chairs or bolsters
4. Post-Tensioning Operations	ICC-PCSI	Inspect placement, stressing, grouting and protection of post-tensioning tendons. Verify that tendons are correctly positioned, supported, tied and wrapped. Record tendon elongations.
5. Welding of Reinforcing	AWS-CWI	Visually inspect all reinforcing steel welds. Verify weldability of reinforcing steel. Inspect preheating of steel when required.
6. Anchor Rods		Inspect size, positioning and embedment of anchor rods. Inspect concrete placement and consolidation around anchors.
7. Concrete Placement	ACI-CCI ICC-RCSI	Inspect placement of concrete. Verify that concrete conveyance and depositing avoids segregation or contamination. Verify that concrete is properly consolidated.
8. Sampling and Testing of Concrete	ACI-CFTT ACI-STT	Test concrete compressive strength (ASTM C31 & C39), slump (ASTM C143), air-content (ASTM C231 or C173) and temperature (ASTM C1064).
9. Curing and Protection	ACI-CCI ICC-RCSI	Inspect curing, cold weather protection and hot weather protection procedures.
10. Other:		

Item	Agency # (Qualif.)	Scope
1. Plant Certification / Quality Control Procedures ☐ Fabricator Exempt	ACI-CCI ICC-RCSI	Review plant operations and quality control procedures.
2. Mix Design	ACI-CCI ICC-RCSI	Inspect concrete batching operations and verify compliance with approved mix design
3. Material Certification		
4. Reinforcement Installation	ACI-CCI ICC-RCSI	Inspect size, spacing, position and grade of reinforcing steel. Verify that reinforcing bars are free of form oil or other deleterious materials.
5. Prestress Operations	ICC-PCSI	Inspect placement, stressing, grouting and protection of prestressing tendons
6. Connections / Embedded Items		
7. Formwork Geometry		
8. Concrete Placement	ACI-CCI ICC-RCSI	Inspect placement of concrete. Verify that concrete conveyance and depositing avoids segregation or contamination. Verify that concrete is properly consolidated .
9. Sampling and Testing of Concrete	ACI-CFTT ACI-STT	Test concrete compressive strength (ASTM C31 & C39), slump (ASTM C143), air-content (ASTM C231 or C173) and temperature (ASTM C1064).
10. Curing and Protection	ACI-CCI ICC-RCSI	Inspect curing, cold weather protection and hot weather protection procedures.
11. Erected Precast Elements	PE/SE	Inspect erection of precast concrete including member configuration, connections, welding and grouting.
12. Other:		

Masonry

Required Inspection Level: ☐ 1 ☐ 2

Page of

Item	Agency # (Qualif.)	Scope
1. Material Certification		
2. Mixing of Mortar and Grout	ICC-SMSI	<i>Inspect proportioning, mixing and retempering of mortar and grout.</i>
3. Installation of Masonry	ICC-SMSI	<i>Inspect size, layout, bonding and placement of masonry units.</i>
4. Mortar Joints	ICC-SMSI	<i>Inspect construction of mortar joints including tooling and filling of head joints.</i>
5. Reinforcement Installation	ICC-SMSI AWS-CWI	<i>Inspect placement, positioning and lapping of reinforcing steel.</i> <i>Inspect welding of reinforcing steel.</i>
6. Prestressed Masonry	ICC-SMSI	<i>Inspect placement, anchorage and stressing of prestressing bars.</i>
7. Grouting Operations	ICC-SMSI	<i>Inspect placement and consolidation of grout. Inspect masonry clean-outs for high-lift grouting.</i>
7. Weather Protection	ICC-SMSI	<i>Inspect cold weather protection and hot weather protection procedures. Verify that wall cavities are protected against precipitation.</i>
9. Evaluation of Masonry Strength	ICC-SMSI	<i>Test compressive strength of mortar and grout cube samples (ASTM C780).</i> <i>Test compressive strength of masonry prisms (ASTM C1314).</i>
10. Anchors and Ties	ICC-SMSI	<i>Inspect size, location, spacing and embedment of dowels, anchors and ties.</i>
11. Other:		

Item	Agency # (Qualif.)	Scope
1. Fabricator Certification/ Quality Control Procedures ☐ Fabricator Exempt	AWS/AISC- SSI ICC-SWSI	Review shop fabrication and quality control procedures.
2. Material Certification	AWS/AISC- SSI ICC-SWSI	Review certified mill test reports and identification markings on wide-flange shapes, high-strength bolts, nuts and welding electrodes
3. Open Web Steel Joists		Inspect installation, field welding and bridging of joists.
4. Bolting	AWS/AISC- SSI ICC-SWSI	Inspect installation and tightening of high-strength bolts. Verify that splines have separated from tension control bolts. Verify proper tightening sequence. Continuous inspection of bolts in slip-critical connections.
5. Welding	AWS-CWI ASNT	Visually inspect all welds. Inspect pre-heat, post-heat and surface preparation between passes. Verify size and length of fillet welds. Ultrasonic testing of all full-penetration welds.
6. Shear Connectors	AWS/AISC- SSI ICC-SWSI	Inspect size, number, positioning and welding of shear connectors. Inspect studs for full 360 degree flash. Ring test all shear connectors with a 3 lb hammer. Bend test all questionable studs to 15 degrees.
7. Structural Details	PE/SE	Inspect steel frame for compliance with structural drawings, including bracing, member configuration and connection details.
8. Metal Deck	AWS-CWI	Inspect welding and side-lap fastening of metal roof and floor deck.
9. Other:		

Cold-Formed Steel Framing

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Item	Agency # (Qualif.)	Scope
1. Member Sizes		
2. Material Thickness		
3. Material Properties		
4. Mechanical Connections		
5. Welding		
6. Framing Details		
7.		
8.		
9. Other:		

Item	Agency # (Qualif.)	Scope
1. Material Specifications		
2. Laboratory Tested Fire Resistance Design	ICC-SFSI	Review UL fire resistive design for each rated beam, column, or assembly.
3. Schedule of Thickness	ICC-SFSI	Review approved thickness schedule.
4. Surface Preparation	ICC-SFSI	Inspect surface preparation of steel prior to application of fireproofing
5. Application	ICC-SFSI	Inspect application of fireproofing.
6. Curing and Ambient Condition	ICC-SFSI	Verify ambient air temperature and ventilation is suitable for application and curing of fireproofing.
7. Thickness	ICC-SFSI	Test thickness of fireproofing (ASTM E605). Perform a set of thickness measurements for every 1,000 SF of floor and roof assemblies and on not less than 25% of rated beams and columns.
8. Density	ICC-SFSI	Test the density of fireproofing material (ASTM E605).
9. Bond Strength	ICC-SFSI	Test the cohesive/adhesive bond strength of fireproofing ASTM E736). Perform not less than one test for each 10,000 SF.
10. Other:		

Wood Construction

Page of

Item	Agency # (Qualif.)	Scope
1. Fabricator Certification/ Quality Control Procedures ☐ Fabricator Exempt		<i>Inspect shop fabrication and quality control procedures for wood truss plant.</i>
2. Material Grading		
3. Connections		
4. Framing and Details		
5. Diaphragms and Shearwalls		<i>Inspect size, configuration, blocking and fastening of shearwalls and diaphragms. Verify panel grade and thickness.</i>
6.		<i>Inspect the fabrication of wood trusses.</i>
7.		
8. Other:		

Exterior Insulation & Finish Systems (EIFS)

Page of

Item	Agency # (Qualif.)	Scope
1. Material Submittals		
2. Condition of Substrate		
3. Application of Foam Plastic Board		
4. Application of Coatings		
5. Application of Mesh		
6. Ambient Condition and Curing		
7. Flashing and Joint Details		
8. Sealants/Caulks		
9. Other:		

Mechanical & Electrical Systems

Page of

Item	Agency # (Qualif.)	Scope
1. Smoke Control		
2. Mechanical, HVAC & Piping		
3. Electrical System		
4. Other:		

Architectural Systems

Page of

Item	Agency # (Qualif.)	Scope
1. Wall Panels & Veneers		
2. Suspended Ceilings		
3. Access Floors		
4. Other:		

Special Cases

Page of

Item	Agency # (Qualif.)	Scope

Instructions – Preparation of the Statement of Special Inspections

1. Who Prepares the Form:

The program of inspection and testing for a project should be prepared by the Registered Design Professional (RDP) that is in responsible charge of the building system requiring inspections and testing. The Structural Engineer of Record (SER) should prepare the sections required for the structural elements such as foundations, concrete, structural steel, etc. The Architect and MEP Engineer of Record should prepare the corresponding sections of the SSI for the building systems that they are responsible for. For further explanation, please refer to the “Guide to Special Inspections and Quality Assurance”.

2. The Front Page:

2-1 At the top of the page indicate the project name and location as they appear on the Contract Documents, provide the Owner’s name (individual, private company, municipality, government agency, etc.), and indicate the Design Professional In Responsible Charge. This should be the RDP in responsible charge of the building systems for which this Statement of Special Inspections is being prepared. See explanation in item 1 above.

2-2. Next, read the first paragraph and check the box below indicating the discipline(s) that this SSI will encompass (Structural, Architectural, Mechanical/Electrical/Plumbing, or Other).

2-3. After reading the remaining paragraphs, the RDP must indicate the frequency of “Interim Reports” required from the Special Inspection Coordinator for the project. This can be indicated directly on the page, i.e. “weekly”, or the adjacent box can be checked to attach a more specific schedule.

2-4. Near the bottom of the page, the RDP must print, sign, and date the form, and stamp the form with their professional seal in the box provided.

2-5. The Owner or Owner’s agent must sign and date the front page after the SSI has been completed by the RDP.

2-6. The Building Official must sign and date the form upon acceptance.

3. Page 2 – Schedule of Inspection and Testing Agencies:

3-1. The top of the page lists all of the categories of building systems with a box next to each. The RDP must check the boxes for only the building systems that are going to be covered in this SSI. A completed inspection program page must be attached for each building system that is checked off. (See instruction #5 below.)

3-2. The chart below is where the members of the Special Inspection Program are listed. Their names, addresses, telephone numbers, and emails should be filled out in the appropriate boxes. If the Inspectors and Testing Agencies have not been determined yet, the RDP can fill in the boxes with “To Be Determined”.

4. Page 3 – Quality Assurance Plan:

4-1. The RDP must review sections 1705 and 1706 in Chapter 17 of the IBC to determine if the project requires a Quality Assurance Plan for the seismic force and wind force resisting systems and components.

4-2. The RDP must indicate whether or not a Quality Assurance Plan is required by filling in the information requested on the page. It is only necessary to provide descriptions of the seismic and wind force resisting systems if it is determined that a Quality Assurance Plan is required.

5. Inspection Program Pages For Each Building System:

5-1. There is a page attached for each building system where the RDP identifies the inspection requirements of each system. Fill out the pages for only the building systems included in this SSI. Do not include blank pages for building systems not covered under this SSI.

5-2. Indicate the inspection or testing firm (Agency #) that will perform each inspection task. The Agency # is the number listed next to the Inspector or Testing Laboratory on the chart on page 2 of the SSI.

5-3. Indicate the required qualifications of the Inspector for each inspection. A list of qualifications of Inspectors and testing technicians is provided on page 4 of the SSI for reference. The RDP may require additional qualifications beyond the ones listed if they feel it is appropriate. Suggested qualifications have been included for consideration. The RDP must determine what qualifications are appropriate for the particular project and confirm that the selected agency employs individuals with the specified qualifications.

5-4. The scope of each inspection must be filled in by the RDP. The editable text provided in italics reflects the code mandated minimum inspection requirements designated in section 1704 of IBC Chapter 17. The editable text does not include the inspections requirements for seismic and wind resisting systems listed in sections 1705 through 1708. The RDP must determine if the project falls under the requirements of sections 1705 to 1708 and add the required inspections to the building systems. The final scope of the inspections required for the project must be determined by the RDP.

5-5. Descriptions of all inspections must include the required frequency of each inspection or test.

PART- 1 GENERAL

1.1 SCOPE OF WORK

- A. To enable the Owner to compare and total cost where alternate materials and methods might be used, alternates have been established as described on the drawings and in this Section of these Specifications.
- B. If the Owner elects to proceed on the basis of the described alternate, make all modification to the work required in furnishing and installing the selected alternative no additional cost to the Owner other than as proposed on the Bid Form.

1.2 COMPLIANCE

- A. Comply with applicable regulatory requirements and various codes referenced in these specifications. Where conflicts exist between local, State, and/or Federal regulatory requirements, codes, or these specifications advise the Director's Representative. The Director's Representative will assist in resolving the conflicts to the satisfaction of the regulatory agencies prior to commencing the Work.

1.3 CODES

- A. All Work shall comply with OSHA (site specific safety plans are required on all projects), the New York State Uniform Fire Prevention and Building Code (the "Uniform Code"), which includes the current editions (see Subparagraph 1.a below) of Part 1220 (Residential Code), Part 1221 (Building Code), Part 1222 (Plumbing Code), Part 1223 (Mechanical Code), Part 1224 (Fuel Gas Code), Part 1225 (Fire Code), Part 1226 (Property Maintenance Code), Part 1227 (Existing Building Code). And Part 1240 (New York State Energy Conservation Construction Code: see Subparagraph 1.b below) and their referenced standards.
 - 1. The contractor shall be aware of, and comply with, contractor requirements identified in the above referenced codes and standards; for example, but not limited to: OSHA (Occupational Safety and Health Administration) – Building Code of New York State - Chapter 33 Safeguards During Construction, Existing Building Code of New York State - Chapter 15 Construction Safeguards, Fire Code of New York State – Chapter 33 Fire Safety During Construction and Demolition, Fire Code of New York State – Chapter 35 Welding and Other Hot Work (which governs safety during construction).
 - a. The Uniform Code shall consist of the listed codes of the 2015 International Codes and the New York State 2017 Uniform Code Supplement, as documented by the New York State Department of State.
 - b. The New York State Energy Conservation Construction Code shall consist of the 2015 International Energy Conservation Code and the New York State 2016 Supplement to the New York State Energy Conservation Construction Code (REVISED JULY 2017), as documented by the New York State Department of State.
- B. Electrical Work: Conform to the requirements of the National Electrical Code (NEC), as referenced in the Building Code of New York State, unless otherwise shown or specified. The Director will be the sole judge of the interpretation of these rules and requirements.
- C. Elevator Work; conform to:

1. Safety Code for Elevators and Escalators, ASME A17.1, as referenced in the Building Code of New York State, or more recent publication currently referenced and accepted by the NYS Building Code.

1.4 STATE REQUIRED PERMITS AND INSPECTIONS

- A. Obtain a New York Board of Fire Underwriters inspection and certificate.
- B. The Contractor or subcontractor performing site work which disturbs the site shall submit an executed and completed Contractor Certification Statement to the Director's Representative prior to the commencement of work. This required document is found in the Appendix. The failure to execute this required document may result in the Contract being considered for Termination for Cause under the provisions of Article 13 of the General Conditions.

1.5 LISTINGS

- A. Equipment and materials for which Underwriters' Laboratories, Inc. (UL) provides product listing service, shall be listed and bear the listing mark.
 1. Alternately, any product listed and bearing the mark from one of the other Nationally Recognized Testing Laboratories (NRTL – as recognized by OSHA) shall be an acceptable alternative to being UL listed and marked, if the listed product has been tested to the applicable standard.

1.6 FIRE RESISTANT CONSTRUCTION MATERIALS AND ASSEMBLIES

- A. Conform to the fire rating classifications based upon the test methods and acceptance criteria in the Standard, Fire Tests of Building Construction and Materials for which Underwriters' Laboratories, Inc. (UL) provides listings.
 1. Materials and assemblies shall comply with the acceptance criteria, detailed description of the assembly, its performance in the fire test and other pertinent details such as specification of materials, Classification coverage, and alternate assembly details.
 2. Alternatively, fire resistance rating classifications by other issuing organizations listed in the New York State Uniform Fire Prevention and Building Code are acceptable.

1.7 UTILITIES

- A. Underground Utilities:
 1. Locate existing underground utilities prior to commencing excavation work. Conform to all requirements of NYCRR 16 Part 753, including the following:
 - a. Notify Dig Safely New York at least 48 hours in advance not counting the date of contact.
 - i. Statewide: 800-962-7962.
 - ii. Website: www.digsafelynewyork.com
 - b. Refer to Section 023313 Underground Utility Locator Service of the Project Manual to locate all utilities on facility and/or private property.

- c. Determine exact utility locations by hand excavated test pits. Contractor will be responsible for the proper support and protection of all utilities to remain in service.
- B. Coordination with Electric Utility Company:
 - 1. Comply with utility company requirements for new or modified electric service. If a meter is required to complete the Work, arrange installation with utility company.
 - 2. Comply with the utility company requirements for the incoming electric service. Pay the utility company's charges in connection with the installation of the incoming service.
- C. Coordination with Gas Utility Company:
 - 1. Comply with utility company's requirements for new or modified gas service. If a meter is required to complete the Work, arrange installation with the utility's Energy Services Department.
 - 2. Comply with the gas utility company requirements including inspection for the incoming gas service. Pay the utility company's charges in connection with the installation and inspection of the incoming service.
- D. Coordination with Telecommunications Organization:
 - 1. Contact the onsite telecommunications coordinator at the facility and arrange for the removal and relocation of existing telephone/telecommunication equipment.
- E. Utility Work Within State Highway Right-Of-Way:
 - 1. Utility Work, either overhead or underground, within the boundaries of the state highway right-of-way, shall conform to procedures set forth in the following Department of Transportation publications:
 - a. "Department Rules and Regulations Governing the Accommodation of Utilities Within State Highway Right-of-Way" (Part 131 - Title 17 Transportation).
 - b. Manual of Administrative Procedures - "Issuance of Highway Work Permits" 7.12-2.

1.8 FIRE ALARM AND SECURITY WORK

- A. Work to install, modify, repair, or service Fire Alarm Systems and/or Security Systems shall be performed in accordance with the requirements of Article 6-D (Business of installing Security or Fire Alarm System) of the New York State General Business Law.
 - 1. Fire Alarm Work: New York State Fire Alarm License is required for installation.

PART- 2 PRODUCTS (NOT USED)

PART- 3 EXECUTION (NOT USED)

END OF SECTION 01 4100

PART- 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary sanitary facilities.
- B. Temporary Controls: Barriers, enclosures, and fencing.
- C. Security requirements.
- D. Waste removal facilities and services.
- E. Project identification sign.
- F. Field offices.
- G. Construction trailers.

1.2 RELATED REQUIREMENTS

- A. Section 01 5100 - Temporary Utilities.
- B. Section 01 5500 - Vehicular Access and Parking.

1.3 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- B. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.

1.4 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. NUMBER OF EMPLOYEES MINIMUM NUMBER OF FACILITIES
- C. 20 or less1 toilet
- D. 20 or more1 toilet and 1 urinal per 40 employees
- E. 200 or more1 toilet and 1 urinal per 50 employees
- F. Maintain daily in clean and sanitary condition.

1.5 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.
- D. Provide temporary dust barriers to prevent the spread of dust from the work areas. Construct the dust barriers of wood framing sheathed with 6 mil polyethylene film. Secure the dust barriers in place without damaging existing construction.
- E. Scaffolding, Hoist, and Equipment Barriers: Provide temporary fence enclosures as required to prevent unauthorized persons from coming in contact with ground supported scaffolding, hoists, and equipment.
- F. All materials for use in this project shall be stored in a safe and secure manner and location, either within a lockable construction trailer, lockable containers, or within a lockable chain link fenced area.

1.6 FENCING

- A. Construction: Commercial grade chain link fence.
- B. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks. Provide and maintain full height screening on all temporary construction fencing.

1.7 INTERIOR ENCLOSURES

- A. Provide temporary partitions and ceilings as indicated or as required, to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.
- B. Construction: Framing and reinforced polyethylene sheet materials with closed joints and sealed edges at intersections with existing surfaces:
- C. Provide other methods, such as negative pressure exhaust air to prevent the migration of construction dust to occupied areas.

1.8 PROTECTION OF WORK AND EXISTING PROPERTY

- A. Protect installed Work and existing construction and finishes during performance of the Work.
- B. Building is to remain watertight throughout construction through the use of permanent or temporary means.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at wall projections, jambs, sills, and soffits of openings.

- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, and movement of heavy objects by covering them with durable sheet materials.
- F. Protect smoke detectors from airborne dust and debris.
 - 1. At the beginning of each workday, provide protective coverings over smoke detectors in areas where airborne dust and debris will be generated by the Work.
 - 2. At the end of the workday, clean the areas in which the smoke detectors are located by whatever means necessary to assure that airborne dust and debris will not contaminate the smoke detectors, then remove protective coverings.
 - 3. Provide signs, instructions and alternate methods for reporting a fire during the periods that the smoke detectors are covered.
 - 4. Notify the Owner's Representative and have procedures approved.
- G. Prohibit traffic or storage upon waterproofed and roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- H. Protect existing trees and plants during performance of the Work unless otherwise indicated. Box trees and plants within the grading limit lines. Do not deposit excavated materials or store building materials around trees or plants. Do not attach guy wires to trees.
- I. Prohibit traffic from landscaped areas.

1.9 FIRE PREVENTION

- A. Take precautions necessary to prevent fires.
- B. Fuel for cutting and heating torches shall be gas only and shall be contained in Underwriters Laboratory approved containers.
- C. Furnish and maintain a currently inspected 20-pound capacity multi-class A B C fire extinguisher in the immediate vicinity where welding tools or torches are in use.
- D. Furnish and maintain a currently inspected fire extinguisher of the appropriate class and size whenever the temporary storage of materials changes that areas classification of fire load or life safety.
- E. Do not use flammable liquids, other than those specified, within a building without written approval from the Director's Representative.
- F. Tarpaulins shall be flameproof and shall be securely anchored when attached to scaffolding or when used to enclose any portion of a building.
- G. Hot work permits are to be filled out as required for scopes of work that utilize torches or welders.

1.10 ACCESS ROADS

- A. Routes of ingress and egress on the premises to the location of the Work shall coordinated with the logistics and phasing plan and as directed.

- B. Keep designated access roads clear of dirt and debris resulting from the Work.
- C. Provide means of removing mud from vehicle wheels before entering paved roads.
- D. General Site, access roads, staging and work areas snow removal will be by the Prime Contractor. Snow removal in areas outside of the construction zone will be the responsibility of the Owner.

1.11 PARKING

- A. Keep designated parking areas clear of dirt and debris resulting from the Work.
- B. Remove ignition key from unattended vehicles and lock doors.

1.12 SECURITY

- A. The Contractors are responsible for the security of their own equipment, materials and tools and project site.

1.13 WASTE REMOVAL

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- B. Provide containers with lids. Remove trash from site periodically.
- C. If materials are to be recycled or re-used on the project they must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.
- E. Clean up and containerize the rubbish (refuse, debris, waste materials, and removed materials and equipment) resulting from the Work at the end of each workday and leave work areas broom clean, except where more stringent cleaning is specified. Locate containerized rubbish where directed.
- F. Remove rubbish from property at least once a week and more often if the rubbish presents a hazard. Properly dispose of rubbish.
- G. Burning of rubbish will not be permitted.

1.14 RELOCATION AND REMOVALS

- A. Should a change in location of any construction facilities and temporary controls be necessary in order to progress the Work properly, remove and relocate such items as directed.
- B. Remove the construction facilities and temporary controls when they are no longer required. Restore permanent facilities used for or connected to temporary facilities to their original condition or better.

1.15 PROJECT IDENTIFICATION

- A. Project Identification and Temporary Signs: Contractor is to provide (2) 4' x 8' project identification signs. Install sign where directed by the Construction Manager to inform public and persons seeking entrance to the Project. Do not permit installation of unauthorized signs.
1. Engage an experienced signage vendor to apply graphics provided by the Owner and Construction Manager for the Project identification sign. Project Identification sign to be printed in color for text and graphics.
 2. Graphics may include logos, as well as, a color graphic depiction of the subject project.
 3. Text may include names, titles and addresses of all or some of the identified parties or individuals.
 4. Prepare temporary signs as required to provide directional information to construction personnel and visitors.
 5. Construct signs of exterior-type Grade B-B high-density concrete form overlay plywood in sizes and thicknesses indicated. Support on posts or framing of preservative-treated wood or steel.
 6. No other signs are allowed without Owner permission except those required by law.

1.16 TEMPORARY FIELD OFFICES AND STORAGE SHEDS

- A. The Prime Contractor shall provide a field office and is responsible for the coordination of additional trailers and storage with their subcontractors and the Construction Manager.

PART- 2 PRODUCTS

2.1 TEMPORARY FIELD OFFICES

- A. General:
1. Portable or mobile buildings, or buildings constructed with floors raised above ground, securely fixed to foundations, with steps and landings at entrance doors.
 2. Construction: Structurally sound, secure, weather tight enclosures for office and storage spaces. Maintain during progress of work; remove at completion of work or as directed by Owner's Representative.
 3. Temperature transmission resistance of floors, walls and ceilings: Compatible with occupancy and storage requirements
 4. Exterior materials: Weather resistant, finished in color acceptable to Owner.
 5. Interior materials in offices: Sheet type materials for walls and ceilings, pre-finished or painted, resilient floors and bases.
 6. Fire extinguishers: Appropriate type fire extinguisher at each office and each storage area. (minimum 2).
 7. Interior Materials in storage shed: As required to provide specified conditions for storage of products.

PART- 3 EXECUTION

3.1 CONSTRUCTION TRAILERS

A. General:

1. The trailer will be located within the staging area in a location to be approved by the Construction Manager. A trailer must comply with tie down roll over protection. The trailer is to be identified by signage denoting the Contractor by name. No other site signage is permitted.
2. The Contractor is responsible for his own site trailer, its cleanliness and maintenance. The Owner, Owner's Representative, or Architect take no responsibility for maintenance and safety or security of any trailer or storage facility.
3. The Contractor is responsible for snow removal for that trailer if such removal is necessary.
4. Temporary Electric to the trailer will be coordinated, installed and paid for by the Contractor. Payment for such work will be the responsibility of the contractor.

B. Site Preparation

1. The Contractor shall fill and grade sites for temporary structures to provide drainage away from buildings in keeping with notes on the site plan.

C. Installation and Setup:

1. The Contractor shall install office spaces ready for occupancy 15 days after date fixed in Notice to Proceed.
2. Employee residential occupancy: Not allowed on Owner's property.
3. The Contractor will be responsible to set up, block, level and secure construction trailer. Provide steps and platforms at each entry location.

D. Maintenance and Cleaning:

1. Clean up and policing of the job area will be the responsibility of each prime contractor. Said clean-up will take place daily. If the Contractor does not clean and maintain their area and the area of general construction, the owner shall have the right to direct another Contractor to clean the area and back charge the offending contractor.

E. Removal:

1. At completion of work, each Contractor shall remove buildings, foundations, utility services, and debris. The Contractor shall restore areas as noted in the site section of the plans and specs or as outlined in this section.

3.2 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated. If not indicated, return grade to pre-construction condition. Coordinate with the Construction Manager.

- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing facilities used during construction to original condition.
- E. Refer to Division 02 for surface restoration and repair requirements.

END OF SECTION 01 5000

PART- 1 **GENERAL**

1.1 CIRCULATION

- A. The Prime Contractor shall maintain vehicular and pedestrian traffic safety throughout the construction project. The Prime Contractor shall furnish all equipment, materials and labor necessary to provide safe and uninterrupted pedestrian and vehicular circulation (as required) during the duration of the project, within the immediate and adjoining areas of the project limits as it pertains to the scope of work.

1.2 MATERIALS

- A. Materials required for maintaining pedestrian and vehicular safety include but are not limited to construction fencing and supports, wooden barriers, warning signs and temporary asphalt.

1.3 TRENCHING

- A. Any trenching or other work which interrupts the pedestrian or vehicular passages shall be temporarily bridged by a wood or steel platform with safety railings and must be constructed in a manner which will accommodate wheelchair use. All surfaces must be stable and have a non-slip texture.

1.4 CONTRACTOR REQUIREMENTS

- A. It shall be the Prime Contractor's responsibility to establish and maintain safe pedestrian passage and to make any modifications to such routes as may be requested by the CM, Owner or AHJ, during the duration of this contract. Any temporary pedestrian or vehicular road closures must be approved by the CM prior to the permitting process. The Prime Contractor shall be responsible for any permitting required by the AHJ at no additional cost to the Owner.

PART- 2 **PRODUCTS (NOT USED)**

PART- 3 **EXECUTION (NOT USED)**

END OF SECTION 01 5010

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether it is clearly or explicitly shown.

1.2 DEFINITIONS

- A. General Explanation: A substantial amount of specification language constitutes definitions for terms found in other contract documents, including drawings which must be recognized as diagrammatic in nature and not completely descriptive of requirements indicated thereon. Certain terms used in contract documents are defined generally in this article. Definitions and explanations contained in this section are not necessarily complete, but are general for the work to the extent that they are not stated more explicitly in another element of the contract documents.
- B. General Requirements: The provisions or requirements of Division-1 sections apply to entire work of Contract and, where so indicated, to other elements which are included in project.
- C. Indicated: The term "Indicated" is a cross reference to details, notes or schedules on drawings, to other paragraphs or schedules in the specifications, and to similar means of recording requirements in contract documents. Where terms such as "shown", "note", "scheduled", and "specified" are used in lieu of "indicated", it is for the purpose of helping the reader locate cross-reference, and no limitation of location is intended except as specifically noted.
- D. Directed, Requested, Etc.: Where not otherwise explained, terms such as "directed", "requested", "authorized", "selected", "approved", "required", "accepted", and "permitted" mean "directed by Architect", "requested by Architect", etc. However, no such implied meaning will be interpreted to extend Architect's responsibility into Contractor's area of construction supervision.
- E. "Approve": Where used in conjunction with the Architect's or Engineer's response to submittals, requests, applications, inquires, report and claims by the Contractor, the meaning of term "Approved" will be held to the limitations of the Architect's responsibilities and duties as specified in the general and special conditions. In no case, will Approval by the Architect be interpreted as an assurance to the Contract that the requirements of the Contract Documents have been fulfilled.

- F. Furnish: Except as otherwise defined in greater detail, the term "furnish" is used to mean supply and deliver to project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.
- G. Install: Except as otherwise defined in greater detail, the term "install" is used to describe operations at project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations, as applicable in each instance.
- H. "Replace": remove designated, damaged, rejected, defective, unacceptable, or non-conforming work from the project and providing new work meeting the requirements of the contract documents in place thereof.
- I. The term "Specifications" and "Project Manual" are interchangeable.
- J. "Concealed": where exposed in connection with insulation, painting of piping, conduits, ducts and accessories, shall mean that they are hidden from sight, as in trenches chases and shafts, furred paces, walls, slabs, or hung ceilings: also, where they are not hidden from sight in the following locations: in partly excavated spaces or crawl spaces, or in-service tunnels and used solely for repairs or maintenance.
- K. "Exposed": where used in connection with insulation, painting of piping, piping, conduit, ducts, accessories, shall mean that they are not "concealed" as defined herein above.
- L. "Piping": includes in addition to pipe, also fittings, valves, hangers, and other accessories that comprise the system.
- M. "Testing Laboratory": An independent entity engaged to perform specific inspections or tests of the work, either at the project site or elsewhere; and to report, and (if required) interpret the results of those inspections or tests.
- N. "Project Site": The space available to Contractor for the performance of the work, either exclusively or in conjunction with others performing other work as part of the project. The extent of the project site is noted on the drawings, and may, or may not be identical with the description of the land upon which the project is to be build.
- O. "Typical": The term "typical" is a cross reference to details, notes or schedules on the drawings or specifications which is shown in one location but is representative of similar work required in other locations.
- P. "Not in Contract (NIC)": Work to be performed by Owner or under separate contact.
- Q. "Owners Representative": Architect, or other person formally authorized by Owner to make decisions regarding the project.
- R. Provide: Except as otherwise defined in greater detail, the term "provide" means furnish and install, complete and ready for intended use, as applicable in each instance.

- S. Installer: The entity (person or firm) engaged by Contractor or its subcontractor or sub-subcontractor for performance of a particular unit of work at project site, including installation, erection, application and similar required operations. It is a general requirement that such entities (Installers) be experts in operations they are engaged to perform.
- T. Or Equal: The Architect shall be the sole determination of the equality of manufacturers.
- U. Minimum Quality/Quantity: In every instance, quality level or quantity shown or specified is intended as minimum for the work to be performed or provided. Except as otherwise specifically indicated, actual work may either comply exactly with that minimum (within specified tolerances), or may exceed that minimum within reasonable limits. In complying with requirements, indicated numeric values are either minimums or maximums as noted or as appropriate for context of requirements. Refer instances of uncertainty to Architect for decision before proceeding.
- V. Abbreviations: The language of specifications and other contract documents is of the abbreviated type in certain instances, and implies words and meanings which will be appropriately interpreted. Actual word abbreviations of a self-explanatory nature have been included in texts. Specific abbreviations have been established, principally for lengthy technical terminology and primarily in conjunction with coordination of specification requirements with notations on drawings and in schedules. These are frequently defined in the section at first instance of use. Trade association names and titles of general standards are frequently abbreviated. Singular words will be interpreted as plural and plural words will be interpreted as singular where applicable and where full context of the contract documents so indicates.

1.3 INDUSTRY STANDARDS

- A. General Applicability of Standards: Applicable standards of the construction industry have the same force and effect (and are made a part of contract documents by reference) as if copied directly into contract documents, or as if published copies were bound herewith.
- B. Publication Dates: Except as otherwise indicated, where compliance with an industry standard is required, comply with standard in effect as of date of contract documents.
- C. Copies of Standards: Provide where needed for proper performance of the work; obtain directly from publication sources.
- D. Abbreviations and Names: The following acronyms or abbreviations as referenced in contract documents are defined to mean the associated names. Both names and addresses are subject to change, and are believed to be, but are not assured to be, accurate and up to date as of date of contract documents.
 - 1. ACI American Concrete Institute
Box 19150 Redford Stat.; Detroit, MI 48219; 313-532-2600
 - 2. ADC Air Diffusion Council
435 N. Michigan Ave.; Chicago, IL 60611; 312-527-5494

3. AGA American Gas Association
1515 Wilson Blvd.; Arlington, VA 22209; 703-841-8400
4. AIA American Institute of Architects
1735 New York Ave., NW; Washington, DC 20006; 202-626-7474
5. AISC American Institute of Steel Construction
400 N. Michigan Ave.; Chicago, IL 60611; 312-670-2400
6. AMCA Air Movement and Control Association
30 W. University Dr.; Arlington Heights, IL 60004; 312-394-0150
7. ANSI American National Standards Institute
1430 Broadway; New York, NY 10018; 212-354-3300
8. ARI Air Conditioning and Refrigeration Institute
1815 N. Fort Myer Dr.; Arlington, VA 22209; 703-524-8800
9. ASHRAE American Society of Heating, Refrigerating & Air Conditioning Engineers
1791 Tullie Circle NE; Atlanta, GA 30329; 404-636-8400
10. ASME American Society of Mechanical Engineers
345 E. 45th Street; New York, NY 10017; 212-744-7722
11. ASPE American Society of Plumbing Engineers
15233 Ventura Blvd.; Sherman Oaks, CA 91403; 213-783-4845
12. ASSE American Society of Sanitary Engineering
P.O. Box 9712; Bay Village, OH 44140; 216-835-3040
13. ASTM American Society for Testing and Materials
1916 Race St.; Philadelphia, PA 19103; 215-299-5400
14. AWI American Woodworking Institute
13924 Braddock Rd., Suite 100, Centreville, VA 22022; 703-222 -1100
15. AWS American Welding Society
550 LeJune Rd., Miami, FL 33135; 305-642-7090
16. AWWA American Water Works Association
6666 W. Quincy Ave.; Denver, CO 80235; 303-794-7711
17. CISPI Cast Iron Soil Pipe Institute
1499 Chain Bridge Rd.; McLean, VA 22101; 793-827-9177
18. CRSI Concrete Reinforcing Steel Institute
180 N. LaSalle St.; Chicago, IL 60601; 312-372-5059
19. CS Commercial Standard of NBS (U.S. Dept. of Commerce)

Government Printing Office, Washington, DC 20402

- 20. MCAA Mechanical Contractors Association of America
5530 Wisconsin Ave.; Washington, DC 20015; 202-654-7960
- 21. MSS Manufacturers' Standardization Society of the Valve and Fittings Industry
5203 Leesburg Pike; Falls Church, VA 22041; 702-998-7996
- 22. NEC National Electric Code
- 23. NECA National Electrical Contractors Association
7315 Wisconsin Ave.; Washington, DC 20037; 202-457-8400
- 24. NFPA National Fire Protection Association
470 Atlantic Ave.; Boston, MA 02210; 617-482-8755
- 25. NSF National Sanitation Foundation
3475 Plymouth Rd.; Ann Arbor, MI 48106; 313-587-2204
- 26. OSHA Occupational Safety Health Administration (US Dept. of Labor)
Government Printing Office; Washington, DC 20402
- 27. PDI Plumbing and Drainage Institute
5342 Blvd. Pl.; Indianapolis, IN 46208; 317-251-5298
- 28. SMACNA Sheet Metal & Air Conditioning Contractors' National Assoc.
- 29. UL Underwriters Laboratories
333 Pfingsten Rd.; Northbrook, IL 60062; 312-272-8800

1.4 PERMITS, LICENSES, AND CERTIFICATES

- A. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, certifications, judgments, and similar documents, correspondence and records established in conjunction with compliance with standards and regulations bearing upon performance of the work. It shall be the Contractors responsibility to obtain and pay for all permits.

1.5 TRADESPERSONS AND WORKMANSHIP STANDARDS

- A. General: The Prime Contractor shall instigate and maintain procedures to ensure that persons performing work are skilled and knowledgeable in methods and craftsmanship needed to produce superior quality levels for workmanship in completed work. Remove and replace work which does not comply with workmanship standards as specified and as recognized in the construction industry for applications indicated. Remove and replace other work damaged or deteriorated by faulty workmanship or its replacement.

1.6 GENERAL INSTALLATION PROVISIONS

- A. Manufacturer's Instructions: Where installations include manufactured products, comply with manufacturer's applicable instructions and recommendations for installation, to extent these are more explicit or more stringent than requirements indicated in contract documents.
 - B. Provide attachment and connection devices and methods for securing work properly as it is installed, true to line and level, and within recognized industry tolerances if not otherwise indicated. Allow for expansions and building movements. Provide uniform spacing and appearance in exposed work, organized for best possible visual effect. Refer questionable visual effect choices to Architect for final decision.
 - C. Mounting Heights: Where mounting heights are not indicated, mount individual units of work at industry recognized standard mounting heights for application indicated. Refer mounting height choices to Architect for final decision.
 - D. Fixture Locations: Where fixture locations are not dimensioned, refer to Architect for final decision.
- DO NOT SCALE DRAWINGS.**

1.7 ELECTRICAL CONNECTIONS

- A. The Contractor shall furnish and install the wiring except: (1) temperature control wiring; (2) equipment control wiring; and (3) interlock wiring, unless indicated otherwise herein. The Contractor shall furnish and install the power wiring complete from power source to motor or equipment junction box, including power wiring through starters, line voltage air and water thermostats, speed and timer switches, and other line voltage control devices. The Contractor shall provide starters and controls specified to be factory mounted and wired to mechanical equipment. The Contractor shall provide the starters that are not factory wired or mounted on mechanical equipment, unless indicated otherwise.
- B. The Contractor shall, regardless of voltage, furnish and install the temperature control wiring, and the interlock wiring, and equipment control wiring for the equipment that the Contractor furnishes, unless indicated otherwise herein. The Contractor shall furnish the starters to the Contractor.
- C. The Contractor shall perform the control wiring only where this work is indicated on the Electrical Drawings. Where an electrical control device (thermostat, switch, etc.) is indicated on both the Mechanical and Electrical Drawings, the Contractor shall mount the device and install the wiring.
- D. After circuits are energized and completed, the Contractor shall be responsible for the power wiring. The control wiring shall be the responsibility of the Contractor that installed the wiring.
- E. The Contractor shall provide the wiring to shut down the HVAC system in connection with the Fire Alarm System.

1.8 TRANSFER OF ELECTRONIC FILES

- A. Angerame Architects, P.C. will provide electronic files for the Contractor's use in the preparation of record drawings as related to the project, subject to a \$50.00 charge per drawing file and the following terms and conditions.
1. The Contractor shall submit a formal request for electronic drawing files on the Angerame Architects, P.C.
 2. Angerame Architects, P.C.'s electronic files will be exported from Architectural Desktop 2005 into DWG/DXF files that are compatible with Auto Cad as requested. Angerame Architects, P.C. makes no representation as to the compatibility of these files with the Contractor's hardware or the Contractor's software beyond the specific release of the referenced specifications.
 3. Data contained on these electronic files is part of Angerame Architects, P.C.'s instruments of service shall not be used by the Contractor or anyone else receiving data through or from the Contractor for any purpose other than as convenience in the preparation of shop drawings for the referenced project. Any other use or reuse by the Contractor or by others will be at the Contractor's sole risk and without the liability or legal exposure to Angerame Architects, P.C. The Contractor agrees to make no claims and hereby waive, to the fullest extent permitted by the law, any claim or cause of action of any nature against Angerame Architects, P.C., its officers, directors, employees, agents or sub-consultants which may arise out of or in connection with the Contractor's use of the electronic files.
 4. Furthermore, the Contractor shall, to the fullest extent permitted by law, indemnify and hold harmless, Angerame Architects, P.C. from claims, damages, losses and expenses, including attorney's fees arising out of or resulting from the Contractor's use of these electronic files.
 5. These electronic files are not contract documents. Significant difference may arise between these electronic files and corresponding hard copy contract documents due to addenda, change orders or other revisions. Angerame Architects, P.C. makes no representation regarding the accuracy or completeness of the electronic files the Contractor receives. In the event that a conflict arises between the signed contract documents prepared by Angerame Architects, P.C. and electronic files, the signed contract documents shall govern.
 6. The Contractor is responsible for determining if any conflicts exist. By the Contractor's use of these electronic files the Contractor is not relieved of the Contractor's duty to comply with the contract documents, including and without limitation, the need to check, confirm and coordinate all dimensions and details, take field measurements, field verify conditions and coordinate the Contractor's work with that of other contractors for the project.

1.9 ASBESTOS/LEAD FREE

- A. All building materials on this project shall be lead and asbestos free. If a product specified contains the above advise Architect immediately.

1.10 MOCK-UP AREAS

- A. Provide a mock-up room of each type of resident bathroom, and bedroom, new and existing, complete with gypsum board, walls, windows, swing doors, sliding door, outlets, switches, light fixtures, toilet accessories, vanity tops, wall finishes, plumbing fixtures, diffusers and grilles.
- B. Provide a mock-up of a typical resident wing corridor, at the resident room door, minimum of ten feet in length for both new and existing corridors. Corridor shall be complete with handrail, wall surface panels, trim, ceiling, bulletin board and memory boxes.
- C. The above is for the Owner to approve all built-in equipment and approve the complete room set-up.
- D. This work must be completed prior to the start of roughing-in the remaining rooms for mechanical/electrical.

PART- 2 (NOT USED)

PART- 3 (NOT USED)

END OF SECTION 01 5080

PART- 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary Utilities: Electricity, lighting, heat, ventilation, and water.

1.2 RELATED REQUIREMENTS

- A. Section 01 5000 - Temporary Facilities and Controls: temporary sanitary facilities required by law.

1.3 TEMPORARY ELECTRICITY

- A. Cost of Electricity Used: By Owner.
- B. Connect to Owner's existing power service.
 - 1. Do not disrupt Owner's need for continuous service.
 - 2. Exercise measures to conserve energy.
- C. Provide temporary electric feeder from existing building electrical service at location as required.
- D. Complement existing power service capacity and characteristics as required.
- E. Provide power outlets for construction operations, with branch wiring and distribution boxes located as required.
- F. Permanent convenience receptacles may be utilized during construction.
- G. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.
- H. Provide a 480-single phase – 120/208V single phase 45 KVA transformer to be used for temporary power from existing 480V distribution panels.
- I. Verify power sources with construction manager. Utilize distribution panels near the work site. Each phase of work will be serviced from different existing distribution panels.

1.4 TEMPORARY SUB-FEED FROM EXISTING BUILDING TO WORK AREAS

- A. Provide a temporary power from existing building panels to each construction area. Refer to phasing plans for requirements.
- B. Route temporary power through existing ceilings to work site.
- C. Verify power sources with construction manager. Utilize distribution panels near the work site. Each phase of work will be serviced from different existing distribution panels.
- D. Provide a 480-single phase – 120/208V single phase 45 KVA transformer to be used for temporary power from existing 480V distribution panels.
- E. Provide a main circuit breaker load center to service the temporary power called for.

1.5 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

- A. Provide adequate lighting levels to complete construction activities as well as providing safe ingress and egress throughout the construction area.
- B. Existing lighting levels in non-construction areas are to be maintained at all times.
- C. Provide lighting for temporary structures, walkways and other temporary construction in order to provide adequate lighting for safe pedestrian ingress and egress.

1.6 TEMPORARY HEAT FOR CONSTRUCTION PURPOSES

- A. Provide adequate temporary heat measures and thermal protection to complete construction activities as needed throughout the project schedule. Cost of temporary heat or equipment to maintain temperatures needed for a construction activity will not be an additional cost to the owner

1.7 TEMPORARY WATER SERVICE

- A. Cost of Water Used: By Owner.
- B. Provide and maintain suitable quality water service for construction operations at time of project mobilization.
- C. Connect to existing water source.
 - 1. Exercise measures to conserve water.

PART- 2 PRODUCTS - NOT USED

PART- 3 EXECUTION - NOT USED

END OF SECTION

PART- 1 GENERAL

1.1 SECTION INCLUDES

- A. Access roads.
- B. Parking.
- C. Existing pavements and parking areas.
- D. Permanent pavements and parking facilities.
- E. Construction parking controls.
- F. Haul routes.
- G. Maintenance.
- H. Removal, repair.
- I. Mud from site vehicles.

1.2 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary: access to site, work sequence, and occupancy.

PART- 2 PRODUCTS

2.1 MATERIALS

- A. Materials for Permanent Construction: As specified in product specification sections, including earthwork, paving base, and topping.

2.2 SIGNS, SIGNALS, AND DEVICES

- A. Stock Post Mounted and Wall Mounted Traffic Control and Informational Signs:
- B. Products:
 - 1. Brimar Industries, Inc.; www.safetysign.com.

PART- 3 EXECUTION

3.1 PREPARATION

- A. Clear areas, provide surface and storm drainage of road, parking, area premises, and adjacent areas.

3.2 ACCESS ROADS

- A. Provide unimpeded access for emergency vehicles. Maintain 20-foot width driveways with turning space between and around combustible materials.
- B. Provide and maintain access to fire hydrants free of obstructions.

3.3 PARKING

- A. There will be no Owner provided Prime and or Sub Contractor Parking on the project.

3.4 PERMANENT PAVEMENTS AND PARKING FACILITIES

- A. Prior to Substantial Completion the base for permanent roads and parking areas may be used for construction traffic.
- B. Avoid traffic loading beyond paving design capacity. Tracked vehicles not allowed.
- C. Contractors shall be responsible for the repair or replacement of existing or new permanent surfaces located within or adjacent to the contract limit lines damaged by the Contractor.

3.5 HAUL ROUTES

- A. Consult with authority having jurisdiction, establish public thoroughfares to be used for haul routes and site access.
- B. Confine construction traffic to designated haul routes.
- C. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.

3.6 MAINTENANCE

- A. Maintain traffic and parking areas in a sound condition free of excavated material, construction equipment, Products, mud, snow, and ice.
- B. Maintain existing paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.

3.7 REMOVAL, REPAIR

- A. Remove equipment and devices when no longer required.
- B. Repair damage caused by installation.

- C. Remove post settings to a depth of 2 feet.

3.8 MUD FROM SITE VEHICLES

- A. Provide means of removing mud from vehicle wheels before entering streets.

END OF SECTION 01 5500

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.

1.3 DEFINITIONS

- A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility (except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise]. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

- C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

1.4 SUBMITTALS

- A. Product List: Submit a list, in tabular form, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.
 - 1. Coordinate product list with Schedule and the Submittals Schedule.
 - 2. Form: Tabulate information for each product under the following column headings:
 - a. Specification Section number and title.
 - b. Generic name used in the Contract Documents.
 - c. Proprietary name, model number, and similar designations.
 - d. Manufacturer's name and address.
 - e. Supplier's name and address.
 - f. Installer's name and address.
 - g. Projected delivery date or time span of delivery period.
 - h. Identification of items that require early submittal approval for scheduled
- B. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use standard form.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified material or product cannot be provided.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Contractor and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.

- d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and Contractor.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
 - i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time.
 - j. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
 - k. Cost information, for substitution in comparison with product or method specified.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
- a. Form of Acceptance: Change Order.
 - b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.
- C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 1 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more selected, even if previously selected products were also options.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturers written instructions.
- B. Delivery and Handling:
 - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - 4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
 - 5. Store products to allow for inspection and measurement of quantity or counting of units.
 - 6. Store materials in a manner that will not endanger Project structure.
 - 7. Store products that are subject to damage by the elements, under cover in a weather tight enclosure above ground, with ventilation adequate to prevent condensation.
 - 8. Store cementitious products and materials on elevated platforms.
 - 9. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 - 10. Comply with product manufacturers written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 - 11. Protect stored products from damage and liquids from freezing.
 - 12. Provide a secure location and enclosure at Project site for storage of materials and equipment by Contractor's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 - 1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Contractor.

2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Contractor.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
 3. Refer to Divisions 2 through 16 Sections for specific content requirements and requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures."

PART-2 PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Architect reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 3. Where products are accompanied by the term "as selected," Architect will make selection.
 4. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
 5. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in Part 2 "Comparable Products" Article to obtain approval for use of an unnamed product.
- B. Product Selection Procedures:
1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.

3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that comply with requirements.
4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
5. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
6. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
7. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
8. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.
9. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches Contractor's sample. Contractor's decision will be final on whether a proposed product matches.
 - a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.
10. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.
11. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Contractor will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
12. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Contractor will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 PRODUCT SUBSTITUTIONS

- A. Conditions: If three manufacturers are not specified for a product, Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
1. Requested substitution offers Contractor a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Contractor must assume.
 2. Contractor's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Contractor, and similar considerations.
 3. Requested substitution does not require revisions to the Contract Documents (maximum two (2) reviews).
 4. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 5. Substitution request is fully documented and properly submitted.
 6. Requested substitution will not adversely affect Contractor's Construction Schedule.
 7. Requested substitution has received necessary approvals of authorities having jurisdiction.
 8. Requested substitution is compatible with other portions of the Work.
 9. Requested substitution has been coordinated with other portions of the Work.
 10. Requested substitution provides specified warranty.
 11. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
 12. The equipment or material must fit the space available for it in the building. No item will be considered if alteration of building structure or space is made necessary by a proposed substitution.
- B. In making request for substitution, Contractor represents:
1. Contractor shall provide a comparison chart to establish the substitute product is equal to the specified product. The chart shall highlight any and all comparable values as related to specified product type.
 2. The Contractor has personally investigated the proposed substitute product and determined that it is equal to or superior in all respects to the specified project.
 3. The Contractor will provide the same warranty for the substitution that is required for the specified product;

4. Certifies that the substitution will not result in a cost disadvantage to the Contractor; that all cost data presented is complete and that the Contractor waives all claims for additional costs related to the substitution which subsequently become apparent; and
 5. Will coordinate the installation of the substitution, if accepted, making such changes as may be required to make the Work complete in all respects.
 6. Contractor requesting substitution shall bear additional costs to all parties due to his substitution including Architect redesigns and costs; associated but under separate contract.
- C. Contractor's submittal and Contractor's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.

PART- 3 EXECUTION (NOT USED)

END OF SECTION 01 6000

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SECTION INCLUDES

- A. Requirements for Indoor-Emissions-Restricted products.
- B. Requirements for VOC-Content-Restricted products.

1.3 RELATED REQUIREMENTS

- A. Section 013000 for Submittal Procedures.

1.4 DEFINITIONS

- A. Indoor-Emissions-Restricted Products: All products in the following product categories, whether specified or not:
 - 1. Interior paints and coatings.
 - 2. Interior adhesives and sealants, including flooring adhesives.
 - 3. Flooring.
 - 4. Composite wood.
 - 5. Products making up wall and ceiling assemblies.
 - 6. Thermal and acoustical insulation.
- B. VOC-Content-Restricted Products: All products in the following product categories, whether specified or not:
 - 1. Interior paints and coatings.
 - 2. Interior adhesives and sealants, including flooring adhesives.

- C. Interior of Building: Anywhere inside the exterior weather barrier.
- D. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.
- E. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.
- F. Inherently Non-Emitting Materials: Products composed wholly of minerals or metals, unless they include organic-based surface coatings, binders, or sealants; and specifically, the following:
 - 1. Concrete.
 - 2. Clay brick.
 - 3. Metals that are plated, anodized, or powder-coated.
 - 4. Glass.
 - 5. Ceramics.
 - 6. Solid wood flooring that is unfinished and untreated.

1.5 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings; 2005 (Reapproved 2013).
- C. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board; 2007.
- D. SCAQMD 1113 - South Coast Air Quality Management District Rule No.1113; current edition.
- E. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition.

1.6 SUBMITTALS

- A. See Section 013300 for Submittal Procedures.
- B. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.

1.7 QUALITY ASSURANCE

- A. VOC Content Test Method: 40 CFR 59, Subpart D (EPA Method 24), or ASTM D3960, unless otherwise indicated.

1. Evidence of Compliance: Acceptable types of evidence are:
 - a. Report of laboratory testing performed in accordance with requirements.
- B. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

PART- 2 PRODUCTS

2.1 MATERIALS

- A. All Products: Comply with the most stringent of federal, State, and local requirements, or these specifications.
- B. VOC-Content-Restricted Products: VOC content not greater than required by the following:
 1. Adhesives, Including Flooring Adhesives: SCAQMD 1168 Rule.
 2. Joint Sealants: SCAQMD 1168 Rule.
 3. Paints and Coatings: Each color; most stringent of the following:
 - a. 40 CFR 59, Subpart D.
 - b. SCAQMD 1113 Rule.
 - c. CARB (SCM).

PART- 3 EXECUTION

3.1 FIELD QUALITY CONTROL

- A. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.
- B. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Construction Manager.

END OF SECTION 01 6116

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. General installation of products.
 - 2. Coordination of Contractor-installed products.
 - 3. Progress cleaning.
 - 4. Starting and adjusting.
 - 5. Protection of installed construction.
 - 6. Correction of the Work.

PART- 2 PRODUCTS (NOT USED)

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work. Before construction, verify the location and points of connection of utility services.

- B. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - a. Description of the Work.
 - b. List of detrimental conditions, including substrates.
 - c. List of unacceptable installation tolerances.
 - d. Recommended corrections.
 - 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

3.3 INSTALLATION

- A. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.

3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
 1. Allow for building movement, including thermal expansion and contraction.
 2. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.4 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
 1. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.
 2. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 1. Remove liquid spills promptly.

2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Vacuum clean interior building areas when ready to receive finish painting, and continue vacuum cleaning on an as-needed basis until building is ready for Substantial Completion or occupancy.
- J. Handle materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights.
- K. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.
- L. Excess concrete, block, mortar, or grout is the responsibility of the Contractor to remove from the site.

3.5 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section "Quality Requirements."

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Contractor shall be responsible for protection of all his work at the end of each working day.

- B. All equipment shall be covered and protected from dust, moisture or physical damage by others.
- C. All costs for this protection shall be borne by Contractor.
- D. Contractor shall make good all damage, which may occur to his work prior to the date of final acceptance by the Contractor.
- E. Protect finished surfaces, including jambs, wall corners, and soffits of openings used as passageways, through which equipment and materials are handled.
- F. Protect finished floor surfaces prior to allowing equipment or materials to be moved over such surfaces.
- G. Maintain finished surfaces clean, unmarred, and suitably protected until accepted by the Architect.
- H. In event of damage, promptly make replacements and repairs to the approval of the Architect and at no additional cost.
- I. Comply with manufacturers written instructions for temperature and relative humidity.

3.7 CORRECTION OF THE WORK

- A. All work shall be first-quality workmanship approved by the Contractor, executed by skilled labor forces.
- B. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 1 Section "Cutting and Patching."
- C. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- D. Restore permanent facilities used during construction to their specified condition.
- E. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- F. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- G. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 7000

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Project record document submittal.
 - 3. Operation and maintenance manual submittal.
 - 4. Submittal of warranties.
 - 5. Final cleaning.
- B. Multiple Prime Contracts: Provisions of this Section apply to the construction activities of each prime Contractor.
- C. Closeout requirements for specific construction activities are included herein.

1.3 PUNCH LIST PROCEDURES

- A. Construction Manager shall prepare a detailed, space-by-space, system-by-system punch list of work remaining to complete, repair, adjust, clean or otherwise leave the contract scope in a condition adhering to the contract documents and ready for the Owner's use.
- B. The Construction Manager's Punch list shall be reviewed on site with the Contractor for general content. At such time as the Construction Manager and Contractor agree that the work is near substantial completion and the Contractor's punch list is generally complete, the Architect shall proceed with completion of the punch list work.

- C. Upon completion of the Architect's punch list, the Contractor shall expeditiously proceed with completion of the work. Upon completion of all punch list items, the Contractor shall provide a copy of the punch list back to the Architect/Engineer with each item noted as the completed or the current status of the item. Upon receipt, the Architect/Engineer will schedule a final inspection.
- D. The Architect's punch list does not, at any time, determine the extent of work remaining under the contract, nor does the absence of any required item from the punch list relieve the Contractor of any responsibilities set forth under the contract documents. The responsibility for completeness of the requirements of the contract lies solely with the Contractor.

1.4 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.
 - 1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete.
 - 2. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
 - 3. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and the reasons the Work is not complete.
 - 4. Advise the Contractor of pending insurance changeover requirements.
 - 5. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.
 - 6. Obtain and submit releases enabling the Contractor unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 7. Submit record drawings, maintenance manuals, final project photographs, damage or settlement surveys, property surveys, and similar final record information.
 - 8. Deliver tools, spare parts, extra stock, and similar items.
 - 9. Make final changeover of permanent locks and transmit keys to the Contractor. Advise the Owner's personnel of changeover in security provisions.
 - 10. Complete startup testing of systems and instruction of the Owner's operation and maintenance personnel. Discontinue and remove temporary facilities from the site, along with mockups, construction tools, and similar elements.
 - 11. Complete final cleanup requirements, including touchup painting.
 - 12. Touch up and otherwise repair and restore marred, exposed finishes.

- B. Inspection Procedures: On receipt of a request for inspection, the Contractor will either proceed with inspection or advise the Contractor of unfilled requirements.
- C. The Contractor will repeat inspection when requested and assured that the Work is substantially complete.
- D. Results of the completed inspection will form the basis of requirements for final acceptance.
- E. If construction services of any contract are not completed within ninety (90) days of Substantial Completion of that contract, the Contractor shall be responsible for all Contractor costs incurred as a result of construction activities that extend beyond ninety (90) days of Substantial Completion.

1.5 FINAL ACCEPTANCE

- A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance, complete the following. List exceptions in the request.
 - 1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.
 - 2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
 - 3. Submit a certified copy of the Contractor's final inspection list of items to be completed or corrected, endorsed, and dated by the Construction Manager. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and shall be endorsed and dated by the Contractor.
 - 4. Submit consent of surety to final payment.
 - 5. Submit a final liquidated damages settlement statement.
 - 6. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
- B. Re-inspection Procedure: The Contractor will re-inspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Contractor.
 - 1. Upon completion of re-inspection, the Contractor will prepare a certificate of final acceptance. If the Work is incomplete, the Contractor will advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
 - 2. If necessary, re-inspection will be repeated as many times as is required for acceptance of the work by the Contractor. However, after the second re-inspection and all subsequent re-inspections the Contractor shall be responsible for all Contractor's costs incurred as a result of administering these re-inspections.

1.6 RECORD DOCUMENT SUBMITTALS

- A. General: Do not use record documents for construction purposes. Protect record documents from deterioration and loss in a secure, fire-resistant location. Provide access to record documents for the Contractor's reference during normal working hours.
- B. Certification: Before payment is authorized, Contractor shall certify on their letterhead stationery, in writing to the Contractor, as follows:
 - 1. "Contractor's Letterhead".
 - 2. Certification:

I hereby certify that all work of this contract has been fully completed in accordance with the requirements of the Contract Documents for this contract and that all materials installed are free of classified and/or regulated hazardous materials.

Signature of Officer of the Contractor

- C. Record Drawings: Maintain a clean, undamaged set of blue or black line whiteprints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark which drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
 - 1. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.
 - 2. Mark new information that is important to the Contractor but was not shown on Contract Drawings or Shop Drawings.
 - 3. Note related change-order numbers where applicable.
 - 4. Organize record drawing sheets into manageable sets. Bind sets with durable paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.
- D. Record Specifications: Maintain one complete copy of the Project Manual, including addenda. Include with the Project Manual one copy of other written construction documents, such as Change Orders and modifications issued in printed form during construction.
 - 1. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.
 - 2. Give particular attention to substitutions and selection of options and information on concealed construction that cannot otherwise be readily discerned later by direct observation.

3. Not related record drawing information and Product Data.
 4. Upon completion of the Work, submit record Specifications to the Contractor for their records.
- E. Record Product Data: Maintain one copy of each Product Data submittal. Not related Change Orders and markup of record drawings and Specifications.
1. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site and from the manufacturer's installation instructions and recommendations.
 2. Give particular attention to concealed products and portions of the Work that cannot otherwise be readily discerned later by direct observation.
 3. Upon completion of markup, submit complete set of record Product Data to the Contractor for their records.
- F. Record Sample Submitted: Immediately prior to Substantial Completion, the Contractor shall meet with the Contractor's personnel at the Project Site to determine which Samples are to be transmitted to the Contractor for record purposes. Comply with the Contractor's instructions regarding delivery to the Contractor's Sample storage area.
- G. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order. Identify miscellaneous records properly and bind or file, ready for continued use and reference. Submit to the Contractor for their records.
- H. Maintenance Manuals: Provide two (2) complete sets. Organize operation and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual, heavy-duty, 2-inch, 3-ring, D-ring style, view type, vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Include the following types of information:
1. Emergency instructions.
 2. Spare parts list.
 3. Copies of warranties.
 4. Wiring diagrams.
 5. Recommended "turn-around" cycles.
 6. Inspection procedures.
 7. Shop Drawings and Product Data.
 8. Fixture lamping schedule.

PART- 2 PRODUCTS

2.1 MATERIALS

- A. Cleaning Agent: Use cleaning materials and agents recommend by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
 - 1. Use cleaning products that comply with Green Seal's GS-37 or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART- 3 EXECUTION

3.1 CLOSEOUT PROCEDURES

- A. Operation and Maintenance Instructions: Arrange for each Installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. Provide instruction by manufacturer's representatives if installers are not experienced in operation and maintenance procedures. Include a detailed review of the following items:
 - B. Maintenance manuals.
 - C. Record documents.
 - D. Spare parts and materials.
 - E. Tools.
 - F. Lubricants.
 - G. Fuels.
 - H. Identification systems.
 - I. Control sequences.
 - J. Hazards.
 - K. Cleaning.
 - L. Warranties and bonds.
- M. Maintenance agreements and similar continuing commitments. As part of instruction for operating equipment, demonstrate the following procedures:
 - N. Startup.
 - O. Shutdown.
 - P. Emergency operations.
 - Q. Noise and vibration adjustments.
 - R. Safety procedures.
 - S. Economy and efficiency adjustments.
 - T. Effective energy utilization.

3.2 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
 - B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
 - a. Clean Project site, yard and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Sweep concrete floors broom clean in unoccupied spaces.
 - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap: clean according to manufacturer's recommendations if visible soil or stains remain.
 - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - k. Remove labels that are not permanent.
 - l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

- n. Replace disposable air filter and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
- o. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
- p. Leave Project clean and ready for occupancy.

3.3 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operation equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operation components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
 - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
 - 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restorations.
 - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
 - 3. Replace parts subject to operation conditions during construction that may impede operation or reduce longevity.
 - 4. Replace burned-out bulbs, bulbs noticeable dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 01 7100

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether it is clearly or explicitly shown.

1.2 DESCRIPTION

- A. Work specified in this Section consists of maintaining, annotating and delivering the final As-Built Drawings, Specifications and indexes as defined below. For Shop and Working Drawings refer to Section 01 3000, Submittals.
- B. Definitions
 - 1. As-Built Documents Schedule - List of As-Built Documents including but not limited to Contract Drawings and Contractor Shop Drawings the Contractor is to submit at milestones and final close-out according to Paragraphs 1.3 C. and D.
 - 2. Current Status Documents - A set of full-size reproducible Contract and Shop/Working Drawings and a copy of the Specifications marked and maintained by Contractor to show current As-Built status of construction in progress and current design status. When submitted, these shall be referred to as milestone or final as-built documents as appropriate.
 - 3. Contractor Furnished Drawings - Working Drawings and Shop Drawings produced by the Contractor which become a supplement to the Contract.
 - 4. Project Record Drawings - Contract Record Drawings that reflect actual completed field conditions of Work items depicted on Contractor's latest Contract, Shop and Working Drawings.
 - 5. Drawing Index - List of Contract Drawings and cross-referenced Contractor Shop Drawings, showing the latest drawing number, sheet number, revision number, title of Drawings, attachments, and if the Drawings are revised for final As-Built. The Contractor shall maintain and provide an index for the Contractor furnished drawings. The Contractor shall cross-reference on the Contract Drawing Index, Contractor Shop Drawings which are supplemental to the Contract Drawings.

1.3 QUALITY CONTROL

- A. Contractor quality control personnel shall perform the following:

1. Print legibly and clearly relevant construction changes/data on current print of Current Status Documents to a high standard of quality. Have Work done by a qualified engineer, designer or drafter.
2. Record additional construction information as requested by OWner on As-Built or Current Status Documents.

1.4 REFERENCE STANDARDS

- A. American National Standards Institute (ANSI)
 1. ANSI 14.4M Pictorial Drawings

1.5 SUBMITTALS

- A. Refer to Section 01 3000, Submittals, for submittal procedures.
- B. As-Built Documents Schedule - Within 10 days from acceptance of the Baseline Schedule, submit for acceptance a list of As-Built Contract Drawings to be submitted at completion of each Work milestone package.
 1. The schedule of As-Built documents should reflect the Work scheduled on the accepted Baseline Schedule.
 2. Identify As-Built documents listed in the schedule by drawing, sheet, detail numbers; description of drawing, and other related information that may be required by the Owner.
- C. The Owner will review monthly As-Built along with monthly payment requests. Current Status Documents showing as-built design and construction progress to be kept at Contractor's field office at all times (unless otherwise specified). In the event record documents are not maintained, Owner may defer monthly payment.
- D. Final Close-out Documents - Upon requesting final inspection or within 10 days prior to acceptance, submit remaining As-Built Contract and Shop/Working Drawings, the latest revision of the Drawing Indexes and any previously submitted as-built documents that have been revised.

PART- 2 PRODUCTS

2.1 DOCUMENTS

- A. As-Built Drawings - One D-size (24 inches by 36 inches) set of the latest revisions of Contract Drawings marked in black ink original and one in PDF format to show changes and deviations from the last revision of Drawings and Contractor Shop Drawings that represent As-Built condition submitted at milestone completions and final contract completion.
- B. Drawing Index – Electronic List of Contract Drawings, cross-referenced to Contractor Shop Drawings, showing the latest drawing number, sheet number, revision number, title of Drawings, attachments, and if the Drawing is revised for final As-Built (indicate AB if drawing was revised to show as-built condition). List of Contractor furnished (Shop) Drawings that are supplemental to the Contract Drawings.

- C. As-Built Documents Schedule – Electronic List of As-Built Drawings including Contractor Shop Drawings that Contractor has scheduled to update monthly.

2.2 MEETINGS

- A. Upon receipt of the As-Built Documents Schedule from the Contractor, the Owner may call a meeting with the: Owner, others and the Contractor. Owner will decide with the contract team input, which Contract and Shop Drawings are to be:
 - 1. As-built for project record.
 - 2. Cross-referenced and indexed.

PART- 3 EXECUTION

3.1 SAFE KEEPING OF FIELD DOCUMENTS

- A. During times when the contract documents are not being updated, store drawings and indexes in a fire resistant locked cabinet or provide off-site backup to prevent inadvertent destruction of documents.

3.2 MARKING CURRENT STATUS DOCUMENTS

- A. Stamp each page of Drawings of the Current Status Documents "CURRENT STATUS." Lettering on stamp: 1/2 inch and 1/4 inch for Drawings and Specifications respectively.
- B. Legibly record construction progress information on a weekly basis. Information to include reference of Change Order, Change Notice, RFI responses, Non- Conformance Reports, shop drawings and other related information. Attach to the current status Contract Drawing any markups or sketches received from Metro as a result of design modifications or RFIs. Pertinent information must be shown on the Contract Drawing. Do not cover up Work unless relevant information has been recorded.
- C. Clearly identify Change Order revision by Change Order numbers. Where more than one change is made in an area of a drawing, clearly identify the changes graphically by marking a copy of the preceding changes. Insert these copies into set of Current Status Documents on top of preceding record in a manner to preclude losing or damaging document.
- D. Mark changes. Mark in black ink and bubble the changes on reproducibles.
- E. When a new revision of a document is issued, stamp the superseded document "SUPERSEDED" and keep in Current Status Document set for future reference of previous mark-ups and for use for production of As-Built Drawings. The Contractor need not transfer the data recorded on superseded drawings onto the new revision but shall list all revisions on the drawing index.

3.3 MARKING FOR FINAL AS-BUILT CONDITION

- A. Mark and stamp "AS-BUILT" latest revisions of the Contract Drawings and Specifications for the As-Built condition. Lettering on stamp: 1/2 inch and 1/4 inch high for Drawings and Specifications respectively.

Clearly define revisions in minimum of 1/8 inch letter on a reproducible copy of Drawings and on photocopy of Specifications.

- B. Use bubbles to define extent of the change.
- C. Mark As-Built conditions to the extent they deviate from contract requirements on a reproducible of the latest revision of the Contract Drawings or Specifications. Specific information required on each category of Drawings is specified. If drawing does not facilitate such changes, furnish a Shop Drawing showing the details and cross- reference each drawing.
- D. Mark Drawings not changed by As-Built conditions with the word "UNCHANGED" above the "AS-BUILT" label.

3.4 REQUIRED INFORMATION ON AS-BUILT DRAWINGS

- A. Provide as-built measurements with reference to datums used for dimensioning on appropriate contract drawings. For underground utilities, measure and record exposed existing and installed lines and conduits. Locate by offset and elevation the centerline and the top elevation of the line at each grade break with surveying equipment. Locations of appurtenances of the line such as the valves, tees, bends etc. may be located in relation to offset lines and elevation. **Accuracy shall be to within 0.5 feet horizontally and to within 0.1 feet vertically.** Coordinate this Work to the satisfaction of utility owners.

3.5 CONTRACTOR FURNISHED DRAWINGS

- A. Contractor Furnished Drawings - Drawings provided by Contractor and used for construction of permanent facilities. Prepare drawings to a high standard of quality, as specified, or other relevant lower tier standards defining equal drafting quality for microfilming. **Contractor furnished drawings include as-built drawings.**
- B. Produce drawings on D size (24 inches by 36 inches). Provide company logo on drawing and have drawing complete with drafter's name, full signature and date.
- C. Drawing numbers will be distinct to avoid duplication with Contract Drawings. Do subsequent revisions to these drawings. Include bubbles, triangles and description of the revision in the revision block and if initiated by Contractor.
- D. Include these drawings in the Current Status Documents. Update for changes as specified in other parts of these Specifications.
- E. Revise these drawings to show the As-Built conditions as indicated.
- F. Upon completion of construction or as directed by the Metro, submit updated Drawing Index and revised original reproducible of these drawings (see Definitions).

END OF SECTION 01 7200

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether it is clearly or explicitly shown.

1.2 DESCRIPTION

- A. Purpose of Manuals:
 - 1. Operation and maintenance manuals will be used for training of, and use by, Owner's personnel in operation and maintenance of mechanical and electrical systems and equipment. A separate manual or chapter within a manual shall be prepared for each class of equipment or system.
 - 2. For additional requirements refer to various specification Sections.
- B. Required Manuals: Manuals are required for all systems and equipment.
- C. Content of Manuals: Each manual or chapter shall include:
 - 1. Table of Contents.
 - 2. Description of system or equipment.
 - 3. Operating sequence and procedures.
 - 4. Safety instructions.
 - 5. Maintenance instructions and requirements, including preventative and corrective maintenance.
 - 6. Spare parts list.
- D. Shop Drawings: Shop Drawings of the system or equipment as installed shall accompany each manual.

E. Copies of Manuals:

1. Submit 3 copies of manuals to Contractor for review.

F. Instructions of Owner's Personnel:

1. Fully instruct Owner's designated operating and maintenance personnel in operating, adjustments and maintenance of all mechanical and electrical systems and equipment as required by respective and pertinent sections, after all final inspection, tests and repairs have been completed.
2. Operating and maintenance manuals shall constitute the basis of instructions. Contents of manual shall be reviewed in full detail, explaining all aspects of operations and maintenance.
3. Prepare and include additional data when need for such data becomes apparent during instruction and training sessions.
4. Training sessions shall be jointly arranged with Owner during Contractor's normal week and daily hours. The Owner shall have the responsibility of scheduling its shift work personnel accordingly.
5. Owner and Contractor shall coordinate and cooperate to keep training sessions to a reasonable minimum.
6. Contractor shall video tape session and turn tape over to Contractor.

1.3 INSTRUCTIONS FOR MAINTENANCE OF SURFACES

- A. Purpose: To instruct Owner's maintenance personnel in proper methods and materials to use in the proper care of all exposed surfaces.

B. Content:

1. Recommended cleaning materials.
2. Recommended preventative maintenance.
3. Recommended methods and procedures.

C. Copies:

1. Submit 3 copies of Instructions for Maintenance to Contractor for acceptance prior to final payment.

PART- 2 NOT USED

PART- 3 NOT USED

END OF SECTION 01 7300

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether it is clearly or explicitly shown.

1.2 GENERAL

- A. The Contractor is solely responsible for any and all claims for job injuries, and shall hold the Owner, Architect and their assigns harmless from litigation.
- B. The Contractor shall provide the necessary safeguards to prevent accidents, to avoid all necessary hazards and protect the public, the staff, the work and property at all times, including Saturdays, Sundays, holidays and other times when no work is being done.
- C. The Contractor shall erect, maintain, and remove appropriate barriers or other devices, as required by the conditions of the work for the protection of users of the project area, the protection of the work being done, or the containment of dust and debris. All such barriers or devices shall be provided in conformance with all applicable codes, laws and regulations, including OSHA.

1.3 SUMMARY

- A. This Section requires compliance with applicable Safety codes, standards and regulations, including but not limited to OSHA, Building Code of New York State, Fire Code of New York State, and Facility Regulations.

1.4 RELATED WORK SPECIFIED ELSEWHERE

- A. Regulatory Requirements: Section 014100.

1.5 DEFINITIONS AND ABBREVIATIONS

- A. OSHA: Occupational Safety and Health Administration.
- B. BCNYS: Building Code of New York State.
- C. EBCNYS: Existing Building Code of New York State.
- D. FCNYS: Fire Code of New York State.
- E. NFPA: National Fire Protection Association.

- F. NFPA 70E: National Fire Protection Association Standard for Electrical Safety in the Workplace.

1.6 APPLICABLE PUBLICATIONS

- A. Latest publications listed below form part of this Article to extent referenced. Publications are referenced in text by basic designations only.

- B. American Society of Safety Engineers (ASSE):

A10.1-2011.....Pre-Project & Pre-Task Safety and Health Planning
A10.34-2012.....Protection of the Public on or Adjacent to Construction Sites
A10.38-2013.....Basic Elements of an Employer's Program to Provide a Safe and Healthful
Work Environment American National Standard Construction and
Demolition Operations

- C. American Society for Testing and Materials (ASTM):

E84-2013.....Surface Burning Characteristics of Building Materials

- D. The Facilities Guidelines Institute (FGI):

FGI Guidelines-2014 Guidelines for Design and Construction of Healthcare Facilities

- E. National Fire Protection Association (NFPA):

10-2013Standard for Portable Fire Extinguishers
30-2012Flammable and Combustible Liquids Code
51B-2014.....Standard for Fire Prevention During Welding, Cutting and Other Hot Work
70-2014National Electrical Code
70B-2013.....Recommended Practice for Electrical Equipment Maintenance
70E-2015Standard for Electrical Safety in the Workplace
99-2012Health Care Facilities Code
241-2013Standard for Safeguarding Construction, Alteration, and Demolition
Operations

- F. The Joint Commission (TJC)

TJC ManualComprehensive Accreditation and Certification Manual

- G. U.S. Occupational Safety and Health Administration (OSHA):

29 CFR 1904Reporting and Recording Injuries & Illnesses
29 CFR 1910Safety and Health Regulations for General Industry
29 CFR 1926Safety and Health Regulations for Construction Industry
CPL 2-0.124Multi-Employer Citation Policy

1.7 SUBMITTALS

- A. Provide a SITE SPECIFIC SAFETY PLAN (aka Construction Safety & Health Plan) no later than 15 days after approval of the Contract by the Comptroller.
- B. The plan must include at a minimum:
 - 1. Written in English by a qualified person who is employed by the Prime Contractor articulating the specific work and hazards pertaining to the contract (model language can be found in ASSE A10.33).
 - 2. Address both the Prime Contractors and the subcontractors work operations.
 - 3. Provide a copy of current corporate/company Safety and Health Policy Statement, detailing commitment to providing a safe and healthful workplace for all employees. The Contractor's written safety program goals, objectives, and accident experience goals for this contract should be provided.
 - 4. Provide the following:
 - a. A statement of the employer's ultimate responsibility for the implementation of his SOH program;
 - b. Identification and accountability of personnel responsible for safety at both corporate and project level. Contracts specifically requiring safety or industrial hygiene personnel shall include a copy of their resumes.
 - c. The names of Competent and/or Qualified Person(s) and proof of competency/qualification to meet specific OSHA Competent/Qualified Person(s) requirements must be attached.;
 - d. Requirements that no work shall be performed unless a designated competent person is present on the job site;
 - e. Requirements for pre-task Activity Hazard Analysis (AHAs);
 - f. Lines of authority;
 - g. Policies and procedures regarding noncompliance with safety requirements (to include disciplinary actions for violation of safety requirements) should be identified;
 - 5. If applicable, provide procedures for coordinating SOH activities with other employers on the job site:
 - a. Identification of subcontractors and suppliers (if known);
 - b. Safety responsibilities of subcontractors and suppliers.
 - 6. A program providing 100% hard hats and safety glasses, as well as other personal protective equipment (PPE), i.e. dust protection, noise protection, safety vests, etc.

7. A program for assuring employees have proper work attire, i.e. substantial sole safety toed footwear, long pants, shirts with minimum 4" sleeves, etc.
8. A 100% 6-foot conventional fall protection program which provides full body harnesses, lanyards, and guardrails when applicable.
9. A program for training employees.
10. A program for Confined Space, including procedures for entry, when applicable.
11. A program for High Hazard Assessment including procedures for all high hazard work activities, i.e. critical lifts involving cranes or material handling equipment, scaffolding, demolition, excavations, hot work activities, steel erection, and roofing. A pre-task meeting is required to verify all hazards will be addressed.
12. A list of the names of all competent and/or qualified persons, including their qualifications, for each activity requiring a competent person, i.e. excavations, scaffolding, rigging, fall protection, etc.
13. The name and contact information of the Company Safety Representative.
14. A program for project safety inspections, with a minimum of one documented safety inspection per week during the course of construction. Submit copies of all resultant inspection reports to the Director's Representative on a weekly basis.
15. Accident/Incident Investigation & Reporting. The Contractor shall conduct mishap investigations of all Moderate and Major as well as all High Visibility Incidents.

The Accident notification requirements are:

- a. Full accident/injury reports **required** within 24 hours for:
 - i. Any type of accident.
 - ii. Property damage.
 - iii. Near misses.
 - iv. Environmental spills.
 - v. Bomb threats.
 - vi. Public demonstration.
- b. Results of the accident investigations and recommendations for preventive action shall be documented within five (5) work days of the incident

16. Plans (Programs, Procedures) Required. Based on a risk assessment of contracted activities and on mandatory OSHA compliance programs, the Contractor shall address all applicable occupational, patient, and public safety risks in site-specific compliance and accident prevention plans. These Plans shall include but are not be limited to procedures for addressing the risks associates with the following:

- a. Emergency response;
- b. Contingency for severe weather;
- c. Fire Prevention;
- d. Medical Support;
- e. Posting of emergency telephone numbers;
- f. Prevention of alcohol and drug abuse;
- g. Site sanitation (housekeeping, drinking water, toilets);
- h. Night operations and lighting;
- i. Hazard communication program;
- j. Welding/Cutting "Hot" work;
- k. Electrical Safe Work Practices (Electrical LOTO/NFPA 70E);
- l. General Electrical Safety;
- m. Hazardous energy control (Machine LOTO);
- n. Site-Specific Fall Protection & Prevention;
- o. Excavation/trenching;
- p. Asbestos abatement;
- q. Lead abatement;
- r. Crane Critical lift;
- s. Respiratory protection;
- t. Health hazard control program;
- u. Radiation Safety Program;
- v. Abrasive blasting;
- w. Heat/Cold Stress Monitoring;

- x. Crystalline Silica Monitoring (Assessment);
 - y. Demolition plan (to include engineering survey);
 - z. Formwork and shoring erection and removal;
 - aa. Precast Concrete;
 - bb. Public (Mandatory compliance with ANSI/ASSE A10.34-2012).
- 17. A program for providing potable water and sanitary toilet services for all employees.
- 18. A program for record keeping per OSHA 1904.
- 19. A Glove Policy that requires the use of appropriate hand protection based on the activity. The plan shall also include a policy that gloves are to be worn 100% of the time with level 4 being the minimum level.
- C. Provide safety orientation training for each employee prior to their starting work on site. This orientation shall include but not be limited to; Fitness for Duty (drug and alcohol policies), training on general safety hazards, site specific safety policies and procedures, personal protective equipment, injury reporting and protocols, emergency evacuation and preferred medical providers, and, HAZCOM (GHS Harmonization). Provide documentation of all safety orientation training for each new employee on the site, including all subcontractors, to the Director's Representative.
- D. Provide copies of all employee training and certifications related to the safe performance of activities, i.e. OSHA 10 hour certifications, forklift training, powder actuated tool training, aerial lift training, etc., to the Director's Representative.
- E. Provide an Emergency Action and Evacuation Plan, including Fire Protection and Emergency Response, when applicable.
- F. Accident Reporting: the Director's Representative shall be immediately notified of any and all accidents. A copy of a written accident report shall be furnished to the Director's Representative within 24 hours of incidents.
- G. Where Work or related staging, storage, or temporary use of areas outside the boundaries of state property are required, comply with the rules, regulations and all applicable safety codes of the applicable municipality.

1.8 "SITE SAFETY AND HEALTH OFFICER" (SSHO) AND "COMPETENT PERSON" (CP):

- A. The Prime Contractor shall designate a minimum of one SSHO at each project site that will be identified as the SSHO to administer the Contractor's safety program and government-accepted Accident Prevention Plan. Each subcontractor shall designate a minimum of one CP in compliance with 29 CFR 1926.20 (b)(2) that will be identified as a CP to administer their individual safety programs.

- B. Further, all specialized Competent Persons for the work crews will be supplied by the respective contractor as required by 29 CFR 1926 (i.e. Asbestos, Electrical, Cranes, & Derricks, Demolition, Fall Protection, Fire Safety/Life Safety, Ladder, Rigging, Scaffolds, and Trenches/Excavations).
- C. These Competent Persons can have collateral duties as the subcontractor's superintendent and/or work crew lead persons as well as fill more than one specialized CP role (i.e. Asbestos, Electrical, Cranes, & Derricks, Demolition, Fall Protection, Fire Safety/Life Safety, Ladder, Rigging, Scaffolds, and Trenches/Excavations). //However, the SSHO has be a separate qualified individual from the Prime Contractor's Superintendent and/or Quality Control Manager with duties only as the SSHO//
- D. The SSHO or an equally qualified Designated Representative/alternate will maintain a presence on the site during construction operations in accordance with FAR Clause 52.236-6: *Superintendence by the Contractor*. CPs will maintain presence during their construction activities in accordance with above mentioned clause. A listing of the designated SSHO and all known CPs shall be submitted prior to the start of work as part of the APP with the training documentation and/or AHA as listed in Section 1.8 below.
- E. The repeated presence of uncontrolled hazards during a contractor's work operations will result in the designated CP as being deemed incompetent and result in the required removal of the employee in accordance with FAR Clause 52.236-5: Material and Workmanship, Paragraph (c).

1.9 TRAINING:

- A. The designated Prime Contractor SSHO must meet the requirements of all applicable OSHA standards and be capable (through training, experience, and qualifications) of ensuring that the requirements of 29 CFR 1926.16 and other appropriate Federal, State and local requirements are met for the project. As a minimum the SSHO must have completed the OSHA 30-hour Construction Safety class and have five (5) years of construction industry safety experience or three (3) years if he/she possesses a Certified Safety Professional (CSP) or certified Construction Safety and Health Technician (CSHT) certification or have a safety and health degree from an accredited university or college.
- B. All designated CPs shall have completed the OSHA 30-hour Construction Safety course within the past 5 years.
- C. In addition to the OSHA 30 Hour Construction Safety Course, all CPs with high hazard work operations such as operations involving asbestos, electrical, cranes, demolition, work at heights/fall protection, fire safety/life safety, ladder, rigging, scaffolds, and trenches/excavations shall have a specialized formal course in the hazard recognition & control associated with those high hazard work operations. Documented "repeat" deficiencies in the execution of safety requirements will require retaking the requisite formal course.
- D. All other construction workers shall have the OSHA 10-hour Construction Safety Outreach course and any necessary safety training to be able to identify hazards within their work environment.
- E. Submit training records associated with the above training requirements to the // Resident Engineer // Project Manager // and Facility Safety // Manager // Officer // or Contracting Officer Representative // or Government Designated Authority // for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES 15 [fifteen] calendar days prior to the date of the preconstruction conference for acceptance.

- F. Prior to any worker for the contractor or subcontractors beginning work, they shall undergo a safety briefing provided by the SSHO or his/her designated representative. As a minimum, this briefing shall include information on the site-specific hazards, construction limits, VAMC safety guidelines, means of egress, break areas, work hours, locations of restrooms, use of VAMC equipment, emergency procedures, accident reporting etc... Documentation shall be provided to the Resident Engineer that individuals have undergone contractor's safety briefing.
- G. Ongoing safety training will be accomplished in the form of weekly documented safety meeting.

1.10 STOP WORK ACTIVITY AUTHORITY

- A. All Albany County and/or their direct representatives have the authority to stop a work activity that exposes any Contractor employees, consultants, or other visitors to potentially serious injury and/or illness. The responsible Contractor shall immediately cease work, perform an assessment of the activity that is exposing employees to any Immediately Dangerous to Life or Health (IDLH) conditions, and take action necessary to satisfactorily address the unsafe condition(s) at no cost to the County. The activity may only resume when the Owners representative or respective Contractor's Safety Representative verify corrective measures have been satisfactorily completed. Any related impact to time of completion shall be considered within the Contractor's control.
- B. No Work, other than mobilization, shall commence until the Site-Specific Safety Plan is approved.

PART- 2 PRODUCTS (NOT USED)

PART- 3 EXECUTION (NOT USED)

END OF SECTION 01 7310

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether it is clearly or explicitly shown.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Rubbish Removal: Section 01 5000.

1.3 PROJECT CONDITIONS

- A. The Contractor shall be responsible for removals and cutting and patching, unless specifically noted in the drawings or specifications.
- B. Existing Conditions: Do not disturb existing structures, construction, materials or equipment unless required by the Contract.
 - 1. Do not cut, drill or remove structural members such as joists, beams or columns supporting construction that is to remain unless expressly required by the Contract Documents.

PART- 2 PRODUCTS

2.1 MATERIALS

- A. Match the appearance, performance, and structure of existing corresponding materials as closely as practicable, unless otherwise indicated.

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Prior to cutting, drilling or removal, investigate both sides of the surface involved. Determine the exact location of structural members.
- B. If unforeseen obstructions are encountered, take precautions necessary to prevent damage and obtain instructions from the Owner's Representative before proceeding with the Work.

3.2 PREPARATION

- A. Provide temporary shoring and other supports necessary to prevent settlement or other damage to existing construction that is to remain.
- B. Prepare existing surfaces properly to receive and, where required, bond with the Work.

3.3 REMOVALS, CUTTING, AND ALTERING

- A. In addition to the items that are scheduled for removal on the Drawings, remove existing construction superseded by the Work except items such as pipes, conduits, recessed boxes, and ducts that are built into existing construction that is to remain. Cut off and conceal such items at face of remaining construction. Provide cover plates on recessed boxes.
- B. Remove and alter existing construction as required to install and connect the Work to adjacent construction in an approved manner.
- C. Cut and alter existing materials as required to perform the Work. Limit cutting to the smallest amount necessary. Core drill round holes and saw cut other openings where possible.
- D. Perform cutting, drilling, and removals in a manner that will prevent damage to construction which is to remain.

3.4 PATCHING

- A. Patch existing construction and finishes defaced, damaged, or left incomplete due to alterations and removals. Patching, except as otherwise indicated, shall be limited to the areas which have been cut or altered. Finish patched surfaces to match existing adjacent surfaces as closely as practicable.
- B. Perform patching around items penetrating existing construction in a manner that will maintain the water and fire resistive capability of the existing construction.
- C. Paint patched areas and cover plates to match existing adjacent surfaces as closely as practicable using same type of paint. Painting, except as otherwise indicated, shall be limited to the areas that have been patched.
- D. Where surfaces exposed by removals are to remain as exposed surfaces, paint such areas to match existing adjacent surfaces as closely as practicable using same type of paint.

3.5 REINSTALLATION

- A. Where reinstallation of removed items is indicated, reinstall them to a condition equal to or better than their condition before removal.

END OF SECTION 01 7329

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
- B. Salvaging nonhazardous demolition and construction waste.
- C. Recycling nonhazardous demolition and construction waste.
- D. Disposing of nonhazardous demolition and construction waste
- E. Related Requirements:
- F. Section 01 5000 Temporary Facilities and Controls for environmental protection measures during construction
- G. Section 02 4116 "Structure Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements.
- H. Section 021100 "Site Clearing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.
- I. Section 042000 "Masonry Veneer" for disposal requirements for masonry waste.

1.3 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

- D. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Develop waste management plan that results in end of Project rates for salvage/recycling of 75 percent by weight of total waste generated by the Work.
- B. Each Contract shall prepare and submit a Construction Waste Management Plan (CWM) to the Director's Representative for approval. The CWM Plan shall outline the provisions to be implemented to recycle and salvage demolition and construction waste generated during the project.
- C. Upon approval of the CWM Plan by the Director's Representative, it shall be implemented throughout the duration of the project, and documented in accordance with the SUBMITTALS Article below.
- D. The Construction Waste Management Plan shall include, but not be limited to, the following components:
 - 1. Listing of Targeted Materials: Develop a list of the waste materials from the Project that will be targeted for reuse, salvage, or recycling. The following materials shall be accounted for (materials that will not be recycled shall be indicated as such):
 - a. Cardboard, paper, packaging.
 - b. Acoustical Ceiling Tiles.
 - c. Clean dimensional wood, palette wood.
 - d. Beverage containers.
 - e. Land clearing debris.
 - f. Concrete.
 - g. Stone.
 - h. Concrete Masonry Units (CMU).
 - i. Asphalt.
 - j. Metals from banding, stud trim, ductwork, piping, rebar, roofing, windows, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
 - k. Gypsum board.
 - l. Carpet and pad.
 - m. Paint.
 - n. Asphalt roofing shingles if applicable for any existing building demolition.
 - o. Rigid Foam.
 - p. Glass.
 - q. Plastics.
 - r. Woods.

2. Landfill Information: Provide the name of the landfill(s) where trash will be disposed of and the applicable landfill tipping fee(s).
3. Sorting Method: Provide a description of the proposed means of sorting and transporting the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site for off-site sorting).
4. Packaging Waste: Provide an estimate of packaging materials generated, and note whether suppliers will eliminate or take back packaging.
5. Recycling facilities: Provide the name of the recycling facilities(s) where materials will be sent for recycling, how it will be recycled, and the applicable fee(s).
6. Additional Information: Include any additional information deemed relevant to describe the scope and intent of the CWM Plan to the Director's Representative.
7. Re-Used materials/Equipment: Materials or equipment to be removed from the site or turned over to the State which are classified as recycled materials shall be documented. Documentation shall include the materials turned over, weight or quantity of materials/equipment and a letter on company letterhead indicating the intended use of items.
8. Subcontractor Requirements: Construction Waste Management and recycling requirements shall be incorporated into all Subcontractor's contracts.

1.5 ACTION SUBMITTALS

A. Submittal Requirements:

1. A copy of the Construction Waste Management Plan, as defined in the PERFORMANCE REQUIREMENTS Article above shall be submitted within 30 days of date established from the Notice of Award.
2. In conjunction with payment applications, contractors shall submit a monthly Waste Management submission. This submission shall include waste receipts for the payment period and a completed Waste Management Form for the same payment period.
3. Calculations and supporting documentation to demonstrate end-of-project recycling rates meeting the requirements of the Construction Waste Management Plan. The process for recording and assembling documentation shall be as follows:
 - a. Record and document the total weight (in tons) of all demolition and construction waste materials sent to the landfill. Monthly Waste Management Reporting Forms (sample included at the end of this Section identified as Exhibit "A") shall be used as the basis for determining the total amount of waste landfilled for the project. The monthly reporting forms shall specify:
 - i. The number of dumpsters or other containers sent to the landfill for that month.

- ii. The volume (in cubic yards) of each dumpster or container sent to the landfill for that month.
- iii. The type of waste contained in each dumpster or container.
- iv. The weight of the waste in each dumpster or container. If the weight of the waste is not directly measured for each dumpster or container, the following Solid Waste Conversion Factors shall be used to convert the volume of waste to weight:

Solid Weight Conversion Factors	
Mixed Waste	350 lbs/cubic yard
Wood	300 lbs/cubic yard
Cardboard	100 lbs/cubic yard
Gypsum Board	500 lbs/cubic yard
Rubble	1,400 lbs/cubic yard
Steel	1,000 lbs/cubic yard

- v. Identification of the landfill. In addition, provide the name of the landfill that will be accepting the materials. Receipts or other proof of facility reception of materials is required.
- b. Record and document the total weight (in tons) of all demolition and construction waste materials recycled or salvaged. Monthly Waste Management Reporting Forms shall be used as the basis for determining the total amount of waste recycled or salvaged for the project. The monthly reporting forms shall specify:
- i. The number of dumpsters or other containers of recycled or salvaged materials for that month.
 - ii. The volume (in cubic yards) of each dumpster or container of recycled or salvaged materials for that month.
 - iii. The type of recycled or salvaged material contained in each dumpster or container.
 - iv. The weight of the recycled or salvaged material in each dumpster or container. If the weight of the material is not directly measured for each dumpster or container, the Solid Waste Conversion Factors listed for landfill waste above shall be used, where applicable, to convert the volume of material to weight. For materials not contained in the Solid Waste Conversion Factors above propose a conversion factor for review by the Director's Representative.
 - v. In addition, provide the name of the receiving facilities/companies that will be purchasing or accepting the recycled or salvaged materials. Receipts or other proof of facility reception of materials is required.

- vi. For materials separated for recycling off-site, establish a method for tracking the weight of the recycled material. The method shall be included in the CWM Plan for the Director's Representative review and approval.
- c. Calculate the end-of-project recycling rate percentage by dividing the recycled and salvaged waste (in tons) by the total waste generated (recycled, salvaged, and landfilled waste – also in tons), and multiplying by 100.
- d. For materials turned over to others for reuse, provide documentation on company letterhead indicating the material(s), the quantity (either by weight or units), the date and the intended reuse of the product.

PART- 2 PRODUCTS (NOT USED)

PART- 3 EXECUTION

3.1 PLAN IMPLEMENTATION

- A. The Contractor for Construction Work shall be responsible for the provision of containers and the removal of all waste, non-returned surplus materials, and rubbish from the site in accordance with the Waste Management Plan. The Contractor for Construction Work shall oversee and document the results of the Plan. The Prime Contractors shall be responsible for collecting, sorting, and depositing in designated areas, their waste, non-returned surplus materials, and rubbish, as per the Waste Management Plan.
- B. Instruction. The Contractor for Construction Work shall provide on-site instruction of appropriate separation, handling and recycling, salvage, reuse and return methods to be used by all parties in appropriate stages of the Project.
- C. Separation Facilities: The Contractor for Construction Work shall lay out a specific area(s) to facilitate separation of materials for potential recycling, salvage, reuse and return. Each potential material shall be collected and stored to avoid being mixed with other materials. Recycling and waste bin areas are to be kept neat and clean, and clearly marked.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 - 2. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 MEETINGS

- A. Conduct Construction Waste Management meetings. Meetings shall include Subcontractors affected by the CWM Plan. At a minimum, waste management goals and issues shall be discussed at the following meetings:
 - 1. Pre-construction meeting.
 - 2. Regular job-site meetings.
- B. Any non-compliant practices in the field will be addressed at regular job-site meetings.

3.3 MONTHLY WASTE MANAGEMENT REPORTING FORMS

- A. Monthly Waste Management Reporting Forms, as required in the SUBMITTALS Article above, shall be submitted to the Director's Representative for review throughout the duration of the project.

3.4 SALVAGING DEMOLITION WASTE

- A. Salvaged Items for Reuse in the Work:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until installation.
 - 4. Protect items from damage during transport and storage.
 - 5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- B. Salvaged Items for Sale and Donation: Not permitted on Project site.
- C. Salvaged Items for Owner's Use:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to Owner's storage area on-site designated by Owner.
 - 5. Protect items from damage during transport and storage.

3.5 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

END OF SECTION 01 7419

ALBANY COUNTY SHAKER PLACE REHABILITATION
& NURSING CENTER CAFÉ RENOVATION
ALBANY, NEW YORK

SECTION 01 7419
CONSTRUCTION WASTE
MANAGEMENT AND DISPOSAL

Albany County Shaker Place & DPW New Vehicle Storage Facility (Exhibit "A")
Contractor C&D Waste Management Form
For Waste Generated On-Site

Company: _____

CONTACT: _____

Phone: _____

Material Description (Include packaging waste if applicable)	Total Weight	% Reused on-site	% Recycled off-site	% Sent to landfill	Material Recipient

Recycled Material: Material that would otherwise be destined for landfill but is diverted from the waste stream, reintroduced as material feedstock and reprocessed into new end products.

Reused Material: Materials that can be reused in their original form without any reprocessing.

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 DESCRIPTION

- A. Warranties shall include:
 - 1. One-year warranty as required by General Conditions beginning at Substantial Completion.
 - 2. Extended warranties required by various specification Sections.
- B. Contractor shall review warranties for acceptance prior to final payment.

PART- 2 NOT USED

PART- 3 NOT USED

END OF SECTION 01 7500

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings, and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
- B. Demonstration of operation of systems, subsystems, and equipment.
- C. Training in operation and maintenance of systems, subsystems, and equipment.
- D. Demonstration and training videotapes.
- E. Unit Price for Instruction Time: Length of instruction time will be measured by actual time spent performing demonstration and training in required location. No payment will be made for time spent assembling educational materials, setting up, or cleaning up.

1.3 SUBMITTALS

- A. Instruction Program: Submit two copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
- B. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed project names and addresses, names, and addresses of architects and owners, and other information specified.
- C. Attendance Record: For each training module, submit list of participants and length of instruction time.
- D. Demonstration and Training Videos: Submit one copy at the end of each training module.
- E. Identification: On each copy, provide an applied label with the following information:
- F. Name of Project.
- G. Name and address of photographer.
- H. Name of Contractor.
- I. Name of Contractor.

- J. Date videotape was recorded.

1.4 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 1 Section "Quality Requirements," experienced in operation and maintenance procedures and training.
- C. Photographer Qualifications: A professional photographer who is experienced photographing construction projects.

1.5 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Contractor.

PART- 2 PRODUCTS

2.1 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections, and as follows:
 - 1. Equipment, including food-service equipment.
 - 2. Fire-protection systems, including fire alarm.
 - 3. Intrusion detection systems.
 - 4. Heat generation, including boilers, feed water equipment, and pumps.
 - 5. Refrigeration systems, including chillers, cooling towers, condensers, pumps and distribution piping.
 - 6. HVAC systems, including air-handling equipment, air distribution systems and terminal equipment and devices.
 - 7. HVAC instrumentation and controls.
 - 8. Floor finish maintenance.

9. Electrical service and distribution, including transformers, switchboards, panel boards, uninterruptible power supplies, and motor controls.
 10. Packaged engine generators, including transfer switches.
 11. Lighting equipment and controls.
 12. Communication systems, including intercommunication, surveillance, clocks and programming, and voice and data equipment.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:
1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.
 - g. Limiting conditions.
 - h. Performance curves.
 2. Documentation: Review the following items in detail:
 - a. Operations manuals.
 - b. Maintenance manuals.
 - c. Identification systems.
 - d. Maintenance service agreements and similar continuing commitments.
 3. Emergencies: Include the following, as applicable:
 - a. Instructions on meaning of warnings, trouble indications, and error messages.
 - b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.
 4. Operations: Include the following, as applicable:
 - a. Startup procedures.

- b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.
 - k. Seasonal and weekend operating instructions.
 - l. Required sequences for electric or electronic systems.
 - m. Special operating instructions and procedures.
5. Adjustments: Include the following:
- a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
6. Troubleshooting: Include the following:
- a. Diagnostic instructions.
 - b. Test and inspection procedures.
7. Maintenance: Include the following:
- a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning.
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
8. Repairs: Include the following:
- a. Diagnosis instructions.

- b. Repair instructions.
- c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
- d. Instructions for identifying parts and components.
- e. Review of spare parts needed for operation and maintenance.

PART- 3 EXECUTION

3.1 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Contractor for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 - 1. Schedule training with Contractor with at least seven days' advance notice.
- D. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.3 VIDEOS

- A. Demonstration and Training Videos: Record instruction of Owner's personnel in the operation and maintenance of equipment and systems. Photographer shall select vantage points to best show equipment, systems and procedures demonstrated. Minimum recording time shall be one hour. Video shall be provided to the owner in both digital format and on DVD.

END OF SECTION 01 8200

COUNTY OF ALBANY

REQUEST FOR BIDS SHAKER PLACE NURSING AND REHABILITATION CENTER



RFB #2024-150

SHAKER PLACE CAFÉ PROJECT

VOLUME 2

**ALBANY COUNTY DEPARTMENT OF GENERAL SERVICES
PURCHASING DIVISION
PAMELA O NEILL, PURCHASING AGENT
112 STATE STREET, ROOM 1000
ALBANY, NY 12207**

VOLUME 2

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**ALBANY COUNTY SHAKER PLACE REHABILITATION
& NURSING CENTER CAFÉ RENOVATION
ALBANY, NEW YORK**

October 6, 2023

OWNER

County of Albany
Shaker Place Nursing Home
Albany, New York

ARCHITECT

Angerame Architects, P.C.
30 Essex Street
Albany, New York 12206
(518) 454-9300

STRUCTURAL ENGINEER

MRH Engineering, P.C.
20 Bayberry Drive
Queensbury, New York 12804
(518) 792-4042

**MECHANICAL/PLUMBING/
ELECTRICAL ENGINEER**

Engineered Solutions
646 Plank Road, #104
Clifton Park, New York 12065
(518) 280-2410

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. Fibrous Reinforcement: Section 032101.
- B. Vapor Retarder Under Slabs on Grade: Section 072600.

1.02 REFERENCES

- A. Except as shown or specified otherwise, the Work of this Section shall conform to the requirements of Specifications for Structural Concrete for Buildings ACI 301-16 of the American Concrete Institute.

1.03 DEFINITIONS (Amendments to ACI 301, Section 1.2):

- A. Exposed Construction: Exposed to view.

1.04 SUBMITTALS

- A. Submittals Package: Submit product data for design mix(es) and materials for concrete specified below at the same time as a package.
- B. Shop Drawings: Placing drawings for bar reinforcement.
- C. Product Data:
 - 1. Concrete design mix(es) with name and location of batching plant.
 - 2. Portland Cement: Brand and manufacturer's name.
 - 3. Fly Ash: Name and location of source, and DOT test numbers.
 - 4. Air-entraining Admixture: Brand and manufacturer's name.
 - 5. Water-reducing Admixture: Brand and manufacturer's name.
 - 6. Aggregates: Name and location of source, and DOT test numbers.
 - 7. Lightweight Coarse Aggregate: Brand and manufacturer's name
 - 8. Chemical Hardener (Dustproofing): Brand and manufacturer's name, and application instructions.
 - 9. Chemical Curing and Anti-Spalling Compound: Brand and manufacturer's name, and application instructions.
 - 10. Bonding Agent (Adhesive): Brand and manufacturer's name, and preparation and application instructions.
 - 11. Expansion Joint Filler: Brand and manufacturer's name.
 - 12. Emery Aggregate: Brand and manufacturer's name, and application instructions.

- D. Samples:
 - 1. Fabric Reinforcement: 8 inches square.
 - 2. Bar Supports: Full size.
- E. Quality Control Submittals:
 - 1. Certificates: Affidavit required under Quality Assurance Article.

1.05 QUALITY ASSURANCE

- A. Concrete batching plant shall be currently approved as a concrete supplier by the New York State Department of Transportation.
- B. Fly ash supplier shall be currently approved as a fly ash supplier by the New York State Department of Transportation.
- C. Certifications: Affidavit by the bar reinforcement manufacturer certifying that bar material meets the contract requirements.
 - 1. Submit evidence consisting of certification of source of material, copies of purchase orders and manufacturer's certifications. For stock material, submit copies of latest mill or purchase orders for material replacement.
 - a. Documentation to confirm compliance with General Conditions Article 25.4 Domestic Steel.
 - 2. Fabricator's and Erector's Qualifications Data: Name and experience of fabricator and erector.
- D. The Contractor agrees, that if the value of this contract exceeds \$100,000 all structural steel, reinforcing steel and other major steel items to be incorporated in the Work of this Contract shall be produced and made in whole or substantial part in the United States, its territories or possessions.
- E. Source Quality Control: The Director reserves the right to inspect and approve the following items, at his own discretion, either with his own forces or with a designated inspection agency:
 - 1. Batching and mixing facilities and equipment.
 - 2. Sources of materials.

1.06 STORAGE

- A. Store materials so as to insure the preservation of their quality and fitness for the Work. Materials, even though accepted prior to storage, are subject to inspection and shall meet the requirements of the Contract before their use in the Work.

PART 2 PRODUCTS

2.01 MATERIALS (Amendments to ACI 301, Section 4, for Normal Weight Concrete and Section 7, for Lightweight Concrete):

- A. Water-reducing Admixture: ASTM C 494, Type A, and on the New York State Department of Transportation's current "Approved List".
- B. Fly Ash (Pozzolans): ASTM C 618, including Table 1A (except for footnote A), Class F except that loss on ignition shall not exceed 4.0 percent.
- C. Chemical Curing and Anti-Spalling Compound: ASTM C-309, Type 1D, Class B, with a minimum 18 percent total solids content. No thinning of material allowed.
 - 1. SureCure Emulsion, Kaufman Products, Inc. 3811 Curtis Avenue, Baltimore, MD 21226, (800) 637-6372.
 - 2. Cure & Seal 25 percent (J-22UV) by Dayton Superior Corp., 1125 Byers Rd., Miamisburg, OH 45342, (800) 745-3700.
 - 3. MasterKure CC 200 WB by Master Builders/ BASF Building Systems, 23700 Chagrin Blvd., Cleveland, OH 44122, (800) 628-9990.
- D. Chemical Hardener (Dustproofing): Colorless aqueous solution of magnesium-zinc fluosilicate. Approved products include:
 - 1. MasterKure HD 300WB by Master Builders/ BASF Building Systems, 23700 Chagrin Blvd., Cleveland, OH 44122, (800) 628-9990.
 - 2. Surfhard by The Euclid Chemical Co., 19218 Redwood Rd., Cleveland, OH 44110, (216) 531-9222.
 - 3. Liqui-Hard by W.R. Meadows, Inc., PO Box 543, Elgin, IL 60121, (847) 683-4500.
 - 4. FluoHard by L & M Construction Chemicals, Inc., 14851 Calhoun Rd., Omaha, NE 68152, (402) 453-6600.
 - 5. Armortop by Anti Hydro International, Inc., 265 Badger Ave., Newark, NJ 07108, (800) 777-1773.
 - 6. Diamond by Kaufman Products, Inc., 3811 Curtis Avenue, Baltimore, MD 21226, (800) 637-6372.
 - 7. Basis of Design: "Euco Diamond Hard" by The Euclid Chemical Co
- E. Type 1 Expansion Joint Filler: Preformed, resilient, non-extruding cork units; ASTM D 1752, Type II.
- H. Chamfer Strips: Wood, metal, PVC or rubber; one inch chamfer.
- I. Epoxy Bonding Agent (Adhesive): 100 percent solids epoxy-resin-base bonding compound, complying with ASTM C 881, Types I, II, IV and V, Grade 2 (horizontal areas) or Grade 3 (overhead/vertical areas), and Class B (40-60 degrees Fahrenheit) or Class C (60 degree Fahrenheit and above).
 - 1. SurePoxy HM Series by Kaufman Products, Inc., 3811 Curtis Avenue, Baltimore, MD 21226, (800) 637-6372.
 - 2. Sikadur Hi-Mod 32 by Sika Corporation, 201 Polito Avenue, Lyndhurst, NJ 07071, (800) 933-7452.
 - 3. MasterEmaco ADH 327 RS by Master Builders/ BASF Building

Systems, 23700 Chagrin Blvd., Cleveland, OH 44122, (800)628-9990.

- J. Emery Aggregate: Natural emery, crushed, polyhedral in shape, with not more than 10 percent flat or elongated pieces, properly screened, graded and packaged in the manufacturer's plant, and delivered to the site in sealed, labeled packages. Approved products include:
1. Emerundum by Anti Hydro International, Inc., 265 Badger Ave., Newark, NJ 07108, (800) 777-1773.
 2. Non-Slip Aggregate by Setcon Industries, Inc., 5 Mathews Ave., Riverdale, NJ 07457-1020, (201) 283-0500.
 3. MasterTop 120SR by Master Builders/ BASF Building Systems, 23700 Chagrin Blvd., Cleveland, OH 44122, (800) 628-9990.

2.02 PROPORTIONING (Amendments to ACI 301, Sections 4 & 7):

- A. Compressive Strength: As required by ACI 318-14 Table 19.3.2.1. "Requirements for concrete by exposure class".
- B. Weight: Normal, except as indicated below:
1. Lightweight Concrete (for floor fills): Air-dry unit weight between 95 and 115 lb/cu ft.
- C. Durability: Concrete shall be air-entrained. Design air content shall be according to ACI 318-14 Table 19.3.2.1 "Requirements for concrete by exposure class", and ACI 318-14 Table 19.3.3.1 "Total air content for concrete exposed to cycles of freezing and thawing", with an allowable tolerance of plus or minus 1.5 percent for total air content. Entrained air shall be provided by use of an approved air-entraining admixture. Air-entrained cement shall not be used.
- D. Slump: Maximum 4 inches; minimum 1 inch before the addition of any water-reducing admixtures or high-range water-reducing admixtures (superplasticizers) at the Site.
- E. Admixtures: Do not use admixtures in concrete unless specified or approved in writing by the Director.
- F. Selection of Proportions: Concrete proportions shall be established on the basis of previous field experience or laboratory trial batches, unless otherwise approved in writing by the Director.
1. Optional Material: Fly ash may be substituted for (Portland) cement in normal weight concrete up to a maximum of 15 percent by weight of the required minimum (Portland) cement. If fly ash is incorporated in a concrete design mix, make necessary adjustments to the design mix to compensate for the use of fly ash as a partial replacement for (Portland) cement.
 - a. Adjustments shall include the required increase in air-entraining admixture to provide the specified air content.

- b. Lower early strength of the concrete shall be considered in deciding when to remove formwork.

2.03 REINFORCEMENT (Amendments to ACI 301, Section 3):

- A. Bar Reinforcement: ASTM A 615, Grade 60, deformed steel bars.
- B. Fabric Reinforcement: ASTM A 185, welded wire fabric, fabricated into flat sheets unless otherwise indicated.
- C. Bar Supports: Galvanized steel or AISI Type 430 stainless steel, and without plastic tips.
- D. Tie Wire: Black annealed wire, 16-1/2 gage or heavier.

2.04 JOINTS AND EMBEDDED ITEMS (Amendments to ACI 301, Section 5.3.2.6):

- A. Obtain bond at construction joints by the use of bonding agent (adhesive) in accordance w/section 5.2.1.7 or the use of cement grout.

2.05 PRODUCTION (Amendments to ACI 301, Section 5):

- A. Provide ready-mixed concrete, either central-mixed or truck-mixed.

PART 3 EXECUTION

3.01 EXAMINATION AND PREPARATION

- A. Do not use items of aluminum for mixing, chuting, conveying, forming or finishing concrete, except magnesium alloy tools may be used for finishing.
- B. Keep excavations free of water. Do not deposit concrete in water.
- C. Hardened concrete, reinforcement, forms, and earth which will be in contact with fresh concrete shall be free from frost at the time of concrete placement.
- D. Prior to placement of concrete, remove all hardened concrete spillage and foreign materials from the space to be occupied by the concrete.

3.02 FORMWORK (Amendments to ACI 301, Section 2):

- A. The formwork shall be designed for loads, lateral pressure, and allowable stresses outlined in Chapter 4 - Design of "Guide to Formwork for Concrete" (ACI347-14).

- B. All formwork shall be removed after the concrete has sufficiently hardened, except in inaccessible spaces where approved.
- C. After the ends or end fasteners of form ties have been removed, the embedded portion of the ties shall terminate not less than 3/4 inch from the formed surfaces of concrete.

3.03 PLACING REINFORCEMENT (Amendments to ACI 301, Section 3):

- A. At the time concrete is placed, reinforcement shall be free of mud, oil, loose rust, loose mill scale, and other materials or coatings that may adversely affect or reduce the bond.

3.04 PLACING CONCRETE (Amendments to ACI 301, Section 5):

- A. Operation of truck mixers and agitators and discharge limitations shall conform to the requirements of ASTM C 94.
- B. Do not allow concrete to free fall more than 4 feet.

3.05 FINISHING FORMED SURFACES (Amendments to ACI 301, Section 5.3.3):

- A. Finish Schedule: Except where indicated otherwise on the Drawings, provide the finishes below:
 - 1. Rough Form Finish for concrete surfaces not exposed to view.
 - 2. Smooth Form Finish for concrete surfaces exposed to view.

3.06 FINISHING SLABS (Amendments to ACI 301, Section 5.3.4):

- A. Slabs On Grade: Provide key type joints unless otherwise shown. Tool exposed joints.
- B. Finish Schedule: Except where indicated otherwise on the Drawings, provide the finishes below:
 - 1. Floated Finish for:
 - a. Treads and platforms of exterior steps and stairs.
 - b. Slabs and fill over which waterproofing, roofing, vapor barrier, insulation, terrazzo, or resin bound flooring is required.
 - 2. Troweled Finish for:
 - a. Interior slabs that are to be exposed to view.
 - b. Slabs and fill over which resilient wood flooring, resilient tile or sheet flooring, carpet, or thin-film coating system is required.
 - c. Slabs and fill over which thin-set ceramic tile is required, except fine-broom finished surface.
 - d. Treads and platforms of interior steps and stairs.
 - 3. Broom or Belt Finish for:

- a. Exterior slabs. Texture, as approved by the Director's Representative.
 - 4. Scratched Finish for:
 - a. Surfaces to be covered with ceramic tile set in a bonded thick mortar bed, except screed to a Class B tolerance.
 - b. Surfaces to be covered with floor topping.
 - 5. Integral Emery Aggregate Surfacing with Floated Finish for:
 - a. Interior pedestrian ramps.
- C. Finishing, General: Provide monolithic finishes on concrete floors and slabs without the addition of mortar or other filler material. Finish surfaces in true planes, true to line, with particular care taken during screeding to maintain an excess of concrete in front of the screed so as to prevent low spots. Screed and darby concrete to true planes while plastic and before free water rises to the surface. Do not perform finishing operations during the time free water (bleeding) is on the surface.
- D. Integral Emery Aggregate Surfacing: Provide a nonslip "dry shake" finish with emery aggregate. Apply emery aggregate in accordance with the manufacturer's printed application instructions for a heavy duty nonslip surface, unless otherwise indicated.

3.07 CURING AND PROTECTION (Amendments to ACI 301, Section 5.3.6):

- A. Maintain concrete surfaces in a moist condition for at least 7 days after placing, except where otherwise indicated. Do not use curing compound.
 - 1. For surfaces of exterior slabs (on grade), apply chemical curing and anti-spalling compound in accordance with the recommendations of the manufacturer.

3.08 CHEMICAL HARDENER (DUSTPROOFING)

- A. Apply chemical hardener to all troweled finished interior floors which are to be left exposed.
- B. Do not apply chemical hardener until concrete has cured the number of days recommended in manufacturer's instructions.
- C. Prepare surfaces and apply chemical hardener in accordance with manufacturer's printed instructions and recommendations.

3.09 FIELD QUALITY CONTROL (Amendments to ACI 301, Section 1):

- A. Make available to the Director's Representatives whatever test samples are required to make tests. Furnish shipping boxes for compression test cylinders.

END OF SECTION 03 3001

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specifications, apply to this Section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section includes an underlayment that consists of a blend of Portland cement and other hydraulic cements that is used to level and smooth interior concrete, terrazzo, ceramic and quarry tile, epoxy coating systems and non-water-soluble adhesive residue on concrete.
- B. ARDEX K 40™ RAPID Rapid, High Flow Self-Leveling Underlayment
- C. Selected ARDEX Primer
- D. ARDEX ARDIFIX™ Low Viscosity Rigid Polyurethane Crack & Joint Repair
- E. ARDEX FEATHER FINISH® Self-Drying Cement Based Finish Underlayment
- F. ARDEX ARDISEAL™ Rapid Plus Semi-Rigid Joint Sealant
- G. Related Sections include the following:
- H. Section 03 30 00, Cast-In-Place Concrete
- I. Division 09 Flooring Sections

1.3 REFERENCES

- A. ASTM C109M, Compressive Strength Air-Cure Only
- B. ASTM E10M, Standard Test Method for Brinell Hardness
- C. ASTM F2170, Relative Humidity in Concrete Floor Slabs Using in situ Probes
- D. ASTM F710, Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used. Include manufacturer's Safety Data Sheets.

- B. Qualification Data: For Installer

1.5 QUALITY ASSURANCE

- A. Installation of the ARDEX product must be completed by a factory-trained applicator, such as an ARDEX LevelMaster® Elite, Choice Contractor or INSTALL Substrate Prep Certified Installer, using mixing equipment and tools approved by the manufacturer. Contact ARDEX Americas (724) 203-5000 for a list of recommended installers.
- B. Product must have hydraulic cement-based inorganic binder content as the primary binder which includes Portland cement per ASTM C150: Standard Specification for Portland cement and other specialty hydraulic cements. Gypsum-based products are not acceptable.
- C. Manufacturer Experience: Provide products of this section by companies which have successfully specialized in production of this type of products for not less than 10 years. Contact Manufacturer Representative prior to installation.

1.6 WARRANTY:

- A. ARDEX K 40™ RAPID installed as part of a floor system, shall be installed in conjunction with the recommended ARDEX Tile & Stone Installation Materials or WW HENRY Flooring Adhesive, as appropriate, to provide the ARDEX SystemOne comprehensive warranty, depending on the system installed.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver products in original packaging, labeled with product identification, manufacturer, batch number and shelf life.
- B. Store products in a dry area with temperature maintained between 50° and 85°F (10° and 29°C) and protect from direct sunlight.
- C. Handle products in accordance with manufacturer's printed recommendations.

1.8 PROJECT CONDITIONS

- A. Do not install material below 50°F (10°C) surface and air temperatures. These temperatures must also be maintained during and for 48 hours after the installation of products included in this section. Install quickly if substrate is warm and follow warm weather instructions available from the ARDEX Technical Service Department.

PART- 2 PRODUCTS

2.1 MATERIALS

- A. Material Name: ARDEX K 40 RAPID
- B. Substitution requests shall be considered in accordance with contract provisions and the performance requirements outlined in this document.

2.2 HYDRAULIC CEMENT UNDERLAYMENT

- A. Hydraulic Cement-based Self-Leveling Underlayment Acceptable Products:
- B. ARDEX K 40™ RAPID; manufactured by ARDEX Americas, USA, (724) 203-5000, www.ardexamericas.com
- C. Selected ARDEX Primer dependent on substrate, and absorbency of substrate and moisture control requirements. See ARDEX K 40 RAPID Technical Data sheet for further information.
- D. Performance and Physical Properties: Meet or exceed the following values for material cured at 73° F +/-3°F (23° C +/-3°C) and 50% +/-5% relative humidity:
- E. Mixing: Barrel Mix or Pump
- F. Flow Time: 10 minutes
- G. Walkable: 60 – 90 minutes
- H. Compressive Strength: 8,000 psi (562 kg/cm²) at 28 days, ASTM C109M
- I. Flexural Strength: 2,000 psi (140.6 kg/cm²) at 28 days, ASTM C348
- J. h. VOC: 0

2.3 CRACK AND JOINT REPAIR

- A. Low Viscosity Rigid Polyurethane Crack and Joint Repair; ARDEX ARDIFIX™; Manufactured by ARDEX Americas; USA; 724-203-5000, www.ardexamericas.com
- B. Semi-Rigid Joint Sealant; ARDEX ARDISEAL™ Rapid Plus Semi-Rigid Joint Sealant; Manufactured by ARDEX Americas; USA; 724-203-5000, www.ardexamericas.com

2.4 PATCH

- A. ARDEX FEATHER FINISH® Self-Drying Cement Based Finished Underlayment

PART- 3 EXECUTION

3.1 PREPARATION

- A. General: Prepare substrate in accordance with manufacturer's instructions.
 - 1. Shot blasting or other mechanical means must be used for Prop Pre. Sanding is not a sufficient means of cleaning or preparing concrete. Do not use acid etching, adhesive removers, solvents or sweeping compounds, as these are bond breakers.
 - 2. Handle and dispose of asbestos and other hazardous materials in accordance with prevailing regulations, which supersede the recommendations in this document.

3. All substrates must be sound, solid and thoroughly clean of all bond-breaking contaminants, including but not limited to overwatered or otherwise loose or weak material, unapproved sealers, unsuitable adhesive residues, and patching and leveling materials.
4. Depending on the selected moisture control system or primer, additional prep may be needed. Please see the technical data sheet.

B. Crack and Joint Preparation:

1. Moving Joints and Moving Cracks – Honor all moving joints and moving cracks up through the underlayment. A flexible sealing compound such as ARDEX ARDISEAL™ Rapid Plus Semi-Rigid Joint Sealant may be installed.
2. Saw Cuts, Dormant Control Joints and Dormant Cracks – Fill all dormant control joints and dormant cracks with ARDEX ARDIFIX™ Low Viscosity Rigid Polyurethane Crack & Joint Repair or ARDEX FEATHER FINISH® Self-Drying, Cement-Based Finish Underlayment as recommended by the manufacturer.
3. If a moisture control system will be installed, the crack and joint preparation recommendations will differ. Please see the technical data sheet.

3.2 APPLICATION

- A. Examine substrates and conditions under which materials will be installed. Do not proceed with installation until unsatisfactory conditions are corrected.
- B. Coordinate installation with adjacent work to ensure proper sequence of construction. Protect adjacent areas from contact due to mixing and handling of materials.
- C. Priming: Comply with manufacturer's printed instructions.
- D. Mixing: Comply with manufacturer's printed instructions. Pumping: Product can be pumped. Please contact the ARDEX Technical Service Department.
- E. Application: Comply with manufacturer's printed instructions.
- F. Curing: The cure time is dependent on the installed thickness and the selected finish flooring. See the Technical Data sheet for further information.

3.3 FIELD QUALITY CONTROL

- A. Where specified, field sampling of the ARDEX underlayment is to be done by taking an entire unopened bag of the product being installed to an independent testing facility to perform compressive strength testing in accordance with ASTM C 109/modified: air-cure only. There are no in situ test procedures for the evaluation of compressive strength.

3.4 PROTECTION

- A. Prior to the installation of the finish flooring, the surface of the underlayment should be protected from abuse by other trades by the use of plywood, Masonite or other suitable protection course.

END OF SECTION 03 5416

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings, and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section includes but is not limited to the following:
 - 1. Structural steel.
 - 2. Field-installed shear connectors.
 - 3. Grout.
- B. Related Requirements:
 - 1. Section 05 5000 "Metal Fabrications" for steel lintels and shelf angles not attached to structural-steel frame miscellaneous steel fabrications and other steel items not defined as structural steel.
 - 2. Section 053100 "Steel Decking" for field installation of shear connectors through deck.
 - 3. Section 09 9100 " Exterior and High Performance Paints and Coatings " and Section 09 9000 "Painting" for surface-preparation and priming requirements.

1.3 DEFINITIONS

- A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

1.4 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

- B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show fabrication of structural-steel components.
 - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 - 2. Include embedment Drawings.
 - 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
 - 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.
- C. Delegated-Design Submittal: For structural-steel connections indicated to comply with design loads, include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- C. Product Test Reports: For the following:
 - 1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
 - 2. Direct-tension indicators.
 - 3. Tension-control, high-strength, bolt-nut-washer assemblies.
 - 4. Shear stud connectors.
 - 5. Shop primers.
 - 6. Nonshrink grout.
- D. Survey of existing conditions, anchor bolt locations and leveling plate elevations..

1.7 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.
- B. Installer Qualifications: A AISC qualified installer having a minimum of 5 years of continuous documented experience with projects of similar scope and complexity..
- C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- D. Comply with applicable provisions of the following specifications and documents:
 - 1. AISC 303.
 - 2. AISC 360.
 - 3. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
 - 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
- B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
 - 1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
 - 2. Clean and relubricate bolts and nuts that become dry or rusty before use.
 - 3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

PART-2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Connections: Provide details of connections required by the Contract Documents to be selected or completed by structural-steel fabricator, including comprehensive engineering analysis by a qualified professional engineer, to withstand loads indicated and comply with other information and restrictions indicated.
 - 1. Select and complete connections using schematic details indicated and AISC 360.

2. Use Allowable Stress Design; data are given at service-load level.

2.2 STRUCTURAL-STEEL MATERIALS

- A. W-Shapes: ASTM A 992/A 992M.
- B. Channels, Angless: ASTM A 36/A 36M.
- C. Plate and Bar: ASTM A 36/A 36M.
- D. Cold-Formed Hollow Structural Sections: ASTM A 500/A 500M, Grade B, structural tubing.
- E. Steel Pipe: ASTM A 53/A 53M, Type E or Type S, Grade B.
 1. Weight Class: Standard weight unless noted otherwise.
 2. Finish: Black except where indicated to be galvanized.
- F. Welding Electrodes: Comply with AWS requirements.

2.3 BOLTS, CONNECTORS, AND ANCHORS

- A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers; all with plain finish.
 1. Direct-Tension Indicators: ASTM F 959, Type 325, compressible-washer type with plain finish.
- B. Zinc-Coated High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade DH heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers.
 1. Finish: Hot-dip zinc coating.
 2. Direct-Tension Indicators: ASTM F 959, Type 325, compressible-washer type with mechanically deposited zinc coating finish.
- C. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, heavy-hex or round head assemblies consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers.
 1. Finish: Plain .
- D. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.
- E. Headed Anchor Rods: ASTM F 1554, Grade 36, straight.
 1. Nuts: ASTM A 563 heavy-hex carbon steel.

2. Plate Washers: ASTM A 36/A 36M carbon steel.
 3. Washers: ASTM F 436, Type 1, hardened carbon steel.
 4. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.
- F. Threaded Rods: ASTM A 36/A 36M.
1. Nuts: ASTM A 563 heavy-hex carbon steel.
 2. Washers: ASTM A 36/A 36M carbon steel.
 3. Finish: Plain unless noted otherwise.
- G. Eye Bolts and Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1030.
- H. Sleeve Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1018.

2.4 REPAIR PAINT

- A. Galvanizing Repair Paint: MPI#18, MPI#19, or SSPC-Paint 20.

2.5 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.6 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," and to AISC 360.
1. Camber structural-steel members where indicated.
 2. Fabricate beams with rolling camber up.
 3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.
 4. Mark and match-mark materials for field assembly.
 5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.

- C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 3, "Power Tool Cleaning."
- F. Steel Wall-Opening Framing: Select true and straight members for fabricating steel wall-opening framing to be attached to structural-steel frame. Straighten as required to provide uniform, square, and true members in completed wall framing. Build up welded framing, weld exposed joints continuously, and grind smooth.
- G. Welded Door Frames: Build up welded door frames attached to structural-steel frame. Weld exposed joints continuously and grind smooth. Plug-weld fixed steel bar stops to frames. Secure removable stops to frames with countersunk machine screws, uniformly spaced not more than 10 inches o.c. unless otherwise indicated.
- H. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.
 - 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 - 2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
 - 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.7 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened unless noted otherwise. Slip critical at braced frames and members with reversed loading unless noted otherwise.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - 1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

2.8 SHOP PRIMING

- A. Shop prime the following steel surfaces:
 - 1. Exterior surfaces including steel associated with canopies and steel roof top dunnage.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

1. SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
 2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

2.9 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.
 1. Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.
 2. Galvanize lintels shelf angles and welded door frames attached to structural-steel frame and located in exterior walls.

2.10 SOURCE QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform shop tests and inspections.
 1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
- B. Bolted Connections: Inspect shop-bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- C. Welded Connections: Visually inspect shop-welded connections according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
 1. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
 2. Ultrasonic Inspection: ASTM E 164.
- D. In addition to visual inspection, test and inspect shop-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
 1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
 2. Conduct tests according to requirements in AWS D1.1/D1.1M on additional shear connectors if weld fracture occurs on shear connectors already tested.

- E. Prepare test and inspection reports.

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
 - 1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- B. Proceed with fabrication and erection only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.
 - 1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
- B. Baseplates, Bearing Plates, and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 - 1. Set plates for structural members on setting nuts as detailed.
 - 2. Weld plate washers to top of baseplate.
 - 3. Snug-tighten anchor rods after supported members have been positioned and plumbed.
 - 4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- C. Maintain erection tolerances of structural steel within AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

- D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of structure.
 - 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- E. Splice members only where indicated.
- F. Do not use thermal cutting during erection.
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.
- H. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened unless noted otherwise. Slip critical at braced frames and members with reversed loading unless noted otherwise.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - 1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
 - 2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
 - 3. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," for mill material.

3.5 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
 - 1. Verify structural-steel materials and inspect steel frame joint details.
 - 2. Verify weld materials and inspect welds.

3. Verify connection materials and inspect high-strength bolted connections.
- B. Bolted Connections: Inspect and test bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- C. Welded Connections: Visually inspect field welds according to AWS D1.1/D1.1M.
 1. In addition to visual inspection, test and inspect field welds according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
 - a. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
 - b. Ultrasonic Inspection: ASTM E 164.

3.6 REPAIRS AND PROTECTION

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780/A 780M.
- B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
- C. Touchup Painting: Cleaning and touchup painting are specified in Section 09 9100 "Exterior and High Performance Paints and Coatings" and Section 09 9000 "Painting."

END OF SECTION 05 1200

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specifications, apply to this Section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. Section Includes:
- B. Roof deck.
- C. Related Requirements:
- D. Section 03 3000 "Cast-in-Place Concrete" for normal-weight and lightweight structural concrete fill over steel deck.
- E. Section 05 1200 "Structural Steel Framing" for shop- and field-welded shear connectors.
- F. Section 05 5000 "Metal Fabrications" for framing deck openings with miscellaneous steel shapes.

1.3 SUBMITTALS

- A. Product Data: For each type of deck, accessory, and product indicated.
- B. Shop Drawings:
- C. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.
- D. Welding certificates.
- E. Product Certificates: For each type of steel deck.
- F. Product Test Reports: For tests performed by a qualified testing agency, indicating that each of the following complies with requirements:
- G. Power-actuated mechanical fasteners.
- H. Acoustical roof deck.
- I. Field quality-control reports.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
- B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."
- C. FM Global Listing: Provide steel roof deck evaluated by FM Global and listed in its "Approval Guide, Building Materials" for Class 1 fire rating and Class 1-90 windstorm ratings.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.
- C. Protect and ventilate acoustical cellular roof deck with factory-installed insulation to maintain insulation free of moisture.

PART- 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."
- B. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 ROOF DECK

- A. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:
 - B. Galvanized-Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33 G60 zinc coating.
 - C. Deck Profile: As indicated.
- A. Profile Depth: As indicated
- B. Design Uncoated-Steel Thickness: As indicated
- C. Span Condition: Double span.
- D. Side Laps: Overlapped

2.3 ACCESSORIES

- A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- A. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- B. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.
- C. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.
- D. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- E. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi, of same material and finish as deck, and of thickness and profile recommended by SDI Publication No. 31 for overhang and slab depth.
- F. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck unless otherwise indicated.
- G. Piercing Hanger Tabs: Piercing steel sheet hanger attachment devices for use with floor deck.
- H. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, 0.0598 inch thick, with factory- punched hole of 3/8-inch minimum diameter.
- I. Flat Sump Plates: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck. For drains, cut holes in the field.
- J. Galvanizing Repair Paint: ASTM A 780/A 780M
- K. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- A. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.

- A. Install temporary shoring before placing deck panels if required to meet deflection limitations.
- B. Locate deck bundles to prevent overloading of supporting members.
- C. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
- D. Align cellular deck panels over full length of cell runs and align cells at ends of abutting panels.
- E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
- H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
- I. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

3.3 ROOF-DECK INSTALLATION

- A. Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches long, and as follows:
 - 1. Weld Diameter: 5/8 inch, nominal.
 - 2. Weld Spacing: Weld edge and interior ribs of deck units with a minimum of two welds per deck unit at each support. Space welds 12 inches apart in the field of roof and 6 inches apart in roof corners and perimeter.
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of one-half of the span or 18 inches, and as follows:
 - 1. Mechanically fasten with self-drilling, No. 10 diameter or larger, carbon-steel screws.
 - 2. Mechanically clinch or button punch.
 - 3. Fasten with a minimum of 1-1/2-inch-long welds.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:
 - 1. End Joints: Lapped 2 inches minimum.
- D. Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and weld or [mechanically fasten flanges to top of deck. Space attachment not more than 12 inches apart with at least one attachment at each corner.

1. Install reinforcing channels or zees in ribs to span between supports and weld or mechanically fasten.
- E. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld or mechanically fasten to substrate to provide a complete deck installation.
1. Weld cover plates at changes in direction of roof-deck panels unless otherwise indicated.
- F. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive according to manufacturer's written instructions to ensure complete closure.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Field welds will be subject to inspection.
- C. Prepare test and inspection reports.

3.5 PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780/A 780M and manufacturer's written instructions.

END OF SECTION 05 3100

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings, and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section includes but is not limited to the following:
 - 1. Loose bearing and leveling plates.
 - 2. Loose steel lintels and angles.
 - 3. Miscellaneous accessories as shown on architectural drawings.

1.3 DEFINITIONS

- A. Definitions in ASTM E 985 for railing-related terms apply to this section.

1.4 SUBMITTALS

- A. General: Submit the following in accordance with Condition of Contract and Division-1 Specification Sections.
- B. Product data for products used in miscellaneous metal fabrications.
- C. Shop drawings detailing fabrication and erection of each metal fabrication indicated.

1.5 QUALITY ASSURANCE

- A. Codes and Standards: Comply with the provisions of the following codes, standards and specifications, except as otherwise shown and specified:
 - 1. AISC "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings", including "Commentary of the AISC Specifications".
 - 2. AISC "Specifications for the Design of Cold-Formed Steel Structured Members."
 - 3. AWS "Structural Welding Code".

- B. Qualifications for Welding Work: Qualify welding processes and welding operators in accordance with AWS "Standard Qualifications Procedures".

1.6 PROJECT CONDITIONS

- A. Field Measurements: Check actual locations of walls and other construction to which metal fabrications must fit, by accurate field measurements before fabrication; show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of Work.

PART- 2 PRODUCTS

2.1 FERROUS METALS

- A. Metal Surfaces, General: For metal fabrications exposed to view upon completion of the Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, rolled trade names, roughness, and, for steel sheet, variation in flatness exceeding those permitted by reference standards for stretcher-level sheet.
- B. Steel Plates, Shapes and Bars: ASTM A 36.
- C. Steel Pipe: ASTM A 53; finish type, and weight class as follows:
 - 1. Galvanized finish to receive paint for exterior installation and high moisture areas.
 - 2. Type S, Grade B, standard weight (schedule 40), unless otherwise indicated.
- D. Malleable Iron Castings: ASTM A 47, Grade 32510.
- E. Fasteners: Use fasteners of same basic metal. Do not use metals that are corrosive or incompatible with metals joined.
- F. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as support rails, unless otherwise indicated.
- G. Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for the metal alloy to be welded.

2.2 GROUT AND ANCHORING CEMENT

- A. Non-shrink Nonmetallic Grout: Premixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with CE CRDC 621. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.
- B. Non-shrink Non-metallic Grout:
 - 1. "Kemset"; Chem-Masters Corp.
 - 2. "Cyrstex"; L&M Construction Chemicals, Inc.

3. "Five Star Grout"; United States Grout.
4. "Masterflow 713"; Master Builders, Inc.
5. "SonogROUT"; Sonneborn Building Product Div., Rexnord Chemical Products, Inc.

2.3 FASTENERS

- A. General: Provide zinc-coated fasteners for exterior use or when built into exterior walls. Select fasteners for the type, grade and class required.
- B. Bolts and Nuts: Regular hexagon head type, ASTM A 307, Grade A.
- C. Lag Bolts: Square head type, FS FF-B-561.
- D. Machine Screws: Cadmium plated steel, FS FF-S-92.
- E. Wood Screws: Flat head carbon steel, FS FF-S-111.
- F. Plain Washers: Round, carbon steel, FS FF-W-92.
- G. Drilled-In Expansion Anchors: Expansion anchors complying with FS FF-S-325, Group VIII (anchors, expansion, [non-drilling], Type I (internally threaded tubular expansion anchor); and machine bolts complying with FS FF-B-575, Grade 5.
- H. Toggle Bolts: Tumble-wing type, FS FF-B-588, type, calls and style as required.
- I. Lock Washers: Helical spring type carbon steel, FS FF-W-84,

2.4 PAINT

- A. Shop Primer for Ferrous Metal: Manufacturer's or Fabricator's standard, fast-curing, lead-free universal modified alkyd primer selected for good resistance to normal atmospheric corrosion, for compatibility with finish paint systems indicated, and for capability to provide a sound foundation for field-applied topcoats despite prolonged exposure; complying with performance requirements of FS TT-P-645.
- B. Galvanizing: ASTM A 123 for fabricated and unfabricated steel products made of uncoated rolled, pressed and forged steel shapes, plates and bars.
- C. Galvanizing Repair Paint: High zinc dust content paint for re-galvanizing welds in galvanized steel, with dry film containing not less than 94% zinc dust by weight, and complying with DOD-P-21935 or SSPC-Paint-20.
- D. Miscellaneous Framing and Supports: Provide miscellaneous steel framing and support which are not a part of the structural steel framework, shown or specified in Section 051200 and/or 051213, and are required to complete the work.
- E. Fabricate miscellaneous units to sizes, shapes and profiles shown or, if not shown, of the required dimensions to receive adjacent grating, plates, doors, or other work to be retained by the framing. Except as otherwise shown, fabricate from structural steel shapes and plates and steel bars of all welded construction using mitered corners, welded brackets and splice plates and a minimum number of joints for field connection. Cut, drill and tap units to receive hardware and similar items to be anchored to the work.

2.5 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required.

2.6 MISCELLANEOUS FRAMING AND SUPPORT

- A. General: Provide steel framing and supports for applications indicated or which are not a part of structural steel framework, as required to complete work.
- B. Fabricate units to sizes, shapes and profiles indicated and required to receive adjacent other construction retained by framing and supports. Fabricate from structural steel shapes, plates and steel bars of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware, hangers, and similar items.

2.7 FINISHES, GENERAL

- A. Comply with NAAMM "Metal Finishes Manual" for recommendations relative to application and designation of finishes.
- B. Finish metal fabrications after assembly.

2.8 STEEL AND IRON FINISHES

- A. Exterior Galvanizing: For those items indicated for galvanizing, apply zinc coating by the hot-dip process compliance with the following requirements.
 - 1. ASTM A 153, for galvanizing iron and steel hardware.
 - 2. ASTM A 123, for galvanizing both fabricated and unfabricated iron and steel products made of uncoated rolled, pressed, and forged shapes, plates, bars, and strip 0.0299" thick and heavier.
 - 3. Interiors (Primer Zone 1A): SSPC-SP3 "Power Tool Cleaning."
- B. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finish or to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with requirements of SSPC-PA1 "Paint Application Specification No. 1" for shop painting.

PART- 3 EXECUTION

3.1 PREPARATION

- A. Coordinate and furnish anchorage's setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, including concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.
- B. Center nosing's or tread widths with noses flush with riser faces and tread surfaces.

- C. Set sleeves in concrete with tops flush with finish surface elevations; protect sleeves from water and concrete entry.

3.2 FABRICATION, GENERAL

- A. Fabricator shall design connections to properly transmit total reactions, moments, and axial forces either indicated on Drawings or reasonably inferred from information provided.
- B. Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication.
- C. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
- D. Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints, and overstressing of welds and fasteners. Base design calculations on actual surface temperatures of metals due to both solar heat gain and nighttime sky heat loss.
- E. Shear and punch metals clearly and accurately. Remove bars.
- F. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- G. Remove sharp or rough areas on exposed traffic surface.
- H. Weld corners and seams continuously, to comply with AWS recommendations and the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.
- I. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersink) screws or bolts. Locate joints where least conspicuous.
- J. Provide for anchorage of type indicated or required, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.
- K. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- L. Cut, reinforce, drill and up miscellaneous metal work as indicated to receive finish hardware screws, and similar items. Countersink all fasteners.

- M. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

3.3 INSTALLATION, GENERAL

- A. Comply with requirements of manufacturer.
- B. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.
- C. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true and free of rack; and measured from established lines and level.
- D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.
- E. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.
- F. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work, and the following:
- G. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
- H. Obtain fusion without undercut or overlap.
- I. Remove welding flux immediately.
- J. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.
- K. Manufacturer Items: Install units as recommended by manufacturer with all required accessories.

3.4 ADJUSTING AND CLEANING

- A. Touch-up Painting: Cleaning and touch-up painting of field welds, bolted connections and abraded areas of the shop paint on miscellaneous metal is specified in Division 9 Section "Painting" of these specifications.
- B. For galvanized surfaces, clean welds, bolted connections, and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

END OF SECTION 05 5000

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings, and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. Section Includes: Framing with dimension lumber.
 - 1. Installation of all doors and frames.
 - 2. Installation of finish hardware.
 - 3. Installation of specialty items.
 - 4. Temporary work.
- B. Related Requirements:
 - 1. Section 061600 "Sheathing."

1.3 DEFINITIONS

- A. Exposed Framing: Framing not concealed by other construction.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
- B. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.

- C. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
- D. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
- E. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
- F. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.5 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.
- B. Evaluation Reports: For the following, from ICC-ES:
 - 1. Wood-preservative-treated wood.
 - 2. Fire-retardant-treated wood.
 - 3. Power-driven fasteners.
 - 4. Powder-actuated fasteners.
 - 5. Expansion anchors.
 - 6. Metal framing anchors.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

PART- 2 PRODUCTS: NOT USED

PART- 3 EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set rough carpentry to required levels and lines, with member's plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- B. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view.
- D. Metal Framing Anchors: Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- E. Do not splice structural members between supports unless otherwise indicated.
- F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
- G. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.
- H. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:
 - 1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
 - 2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal-thickness.
 - 3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq.ft. and to solidly fill space below partitions.
 - 4. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet o.c.

- I. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- J. Comply with AWPAM4 for applying field treatment to cut surfaces of preservative-treated lumber.
- K. Use inorganic boron for items that are continuously protected from liquid water. Use copper naphthenate for items not continuously protected from liquid water.
- L. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. NESNER-272 for power-driven fasteners. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
- M. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 TEMPORARY WORK

- A. Provide temporary ladders for access to all floors and provide rubbish chutes in locations as required.
- B. Provide tread protection at all concrete steps, stairs and platforms; install temporary handrails as required to make stairs safe and at all openings to vertical shafts exterior or penetrations through floor slabs.
- C. Provide door jamb protection at all exterior door frames used for material ingress or egress; provide temporary batten doors as required to make building secure and weathertight.
- D. Provide temporary closures at windows, exterior scaffolding, etc., as required to make building weather-tight and capable of maintaining required minimum working temperatures during cold weather construction.
- E. All items of temporary construction to be of sound material and erected in such a manner as to prevent damage to underlying or adjacent surfaces, and to adequately protect personnel and property.
- F. Provide all necessary barricades and safeguards required to protect or separate construction areas from public areas.
- G. Upon completion of the project, remove all temporary work and repair any damages to permanent installation.

3.3 DOORS AND FRAMES

- A. Receive, handle, store, erect, and brace metal door frames scheduled for installation in walls and partitions, interior and exterior. All frames to be erected plumb and square, set at a proper height above rough or finish floor. Secure to concrete openings with expansion bolts or power actuated fasteners. Install spreaders at midpoint of frame to prevent bow of jambs.
- B. Receive, handle, store, and erect all hollow metal doors throughout the building. Hang doors in accordance with approved door and finish hardware schedules.

3.4 FINISH HARDWARE

- A. Receive, handle, store and apply all items of finish hardware, including thresholds, and weather-stripping throughout the building. All items of finish hardware will arrive on the job properly marked and packaged to minimize the on-the-job sorting and distribution. Store in one designated room, use items in proper locations as there will be no "swapping" of hardware items.
- B. Install all items plumb and true to insure smooth and proper operations of doors. Maintain precautions to prevent marring of adjacent surfaces or finish of hardware both during application and in subsequent operations.
- C. Check all pressed steel frames and metal doors for reinforcing at surface applied hardware specified in Section 087000. DO NOT INSTALL DOORS IF SPECIFIED REINFORCING IS MISSING.
- D. Arrange with painter to seal all door bottoms before hanging doors, if not completed at factory.
- E. All other items of this section are to be installed in accordance with accepted practices of the industry, details on drawings or manufacturer's recommendations.
- F. All other items not specified in other section of work:
 - 1. Installation shall be completed in a neat, secure manner using attachments supplied with accessories and in strict accordance with manufacturer's instructions. Coordinate installation of required blocking.
- G. Construct corners and intersections with not less than 3 studs. Install miscellaneous blocking and framing as shown and as required for support of facing materials, fixtures, specialty items, and trim.
 - 1. Install continuous horizontal blocking row at mid-height of single-story partitions over 8' high and at midpoint of multi-story partitions, using 2" thick members of width as wall or partitions.
- H. Frame openings with multiple studs and headers. Install nailed header members of thickness equal to width of studs. Set headers on edge and support on jamb studs.

3.5 INSTALLATION OF CONSTRUCTION PANELS

- A. General: Comply with applicable recommendations contained in From NO. E30, "APA Design/Construction Guide - Residential and Commercial," for type of construction panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
 - 1. Plywood Backing Panels: Screw to supports 12" o.c., or ramset to concrete wall. Install panels in all telephone closet/rooms - on all walls over 18" wide

3.6 PROTECTION

- A. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06 1000

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. Section Includes:
- B. Wood, nails, bolts, screws, framing anchors and other rough hardware, and other items needed, and perform rough carpentry for the construction shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- C. Furnish and install wood furring.
- D. Furnish and install blocking for:
- E. Wood blocking for installation of custom or manufactured casework.
- F. Toilet accessories furnished and/or installed by other Sections.
- G. Wood blocking in conjunction with drywall partitions wall mounted items and equipment.
- H. Wood blocking for grab bars, handrails and related wall mounted items.
- I. Other locations where wood blocking is indicated on the Drawings.
- J. Furnish and install all wood nailers in connection with roofing work including rooftop equipment bases and support curbs.
- K. Furnish and install plywood backing panels at electrical and telecommunications closets.
- L. Furnish and install wood blocking and plywood for TV wall brackets.
- M. Concealed steel bracket supports.
- N. Related Requirements:
- O. Division 08 Section "Hollow Metal Frames"

1.3 REFERENCES

- A. Dimension Lumber: Lumber of 2 inches' nominal or greater but less than 5 inches' nominal in least dimension.
- B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
- C. NeLMA: Northeastern Lumber Manufacturers' Association.
- D. NHLA: National Hardwood Lumber Association.
- E. NLGA: National Lumber Grades Authority.
- F. SPIB: The Southern Pine Inspection Bureau.
- G. WCLIB: West Coast Lumber Inspection Bureau.
- H. WWPA: Western Wood Products Association.
- I. FM Global:
- J. FM Global Property Loss Prevention Data Sheets 1-49 (FM Global 1-49), Perimeter Flashing, September 2000 revision.

1.4 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
- B. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
- C. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
- D. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
- E. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
- F. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.5 QUALITY ASSURANCE

- A. Single-Source Responsibility for Fire-Retardant-Treated Wood: Obtain each type of fire-retardant treated wood product from one source and by a single producer.
- B. Single-Source Responsibility for Preservative-Treated Wood: Obtain each type of preservative-treated wood product from one source and by a single producer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.
- B. Load and unload material in a manner that prevents damage or breakage.
- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect, at no change in Contract Sum.

PART- 2 PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Certified Wood: Lumber and plywood shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
- B. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
- C. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
- D. Provide dressed lumber, S4S, unless otherwise indicated.
- E. General: Provide miscellaneous lumber and panels indicated for support or attachment of other construction, as follows:
- F. Grades of Lumber and Species:
- G. Wood Bucks, Blocking: Eastern Spruce No. 2 common; Southern Pine No. 2 common; Douglas Fir No. 2 common.
- H. Plywood subtools: APA Rated underlayment; Group 1, Exposure (Fire retardant treated).1, ¾" thickness, unless otherwise noted.

- I. Plywood panels for electrical, security and telecommunications panels: APA graded BD INT, (touch sanded), $\frac{3}{4}$ inch thick (Fire retardant treated).
- J. Plywood for TV wall bracket: APA Rated B-D, Group 2, Exposure 1, $\frac{3}{4}$ inch thick unless noted otherwise. (Fire retardant treated).
- K. Plywood for parapets: APA Rated Sheathing, Exposure 1, $\frac{3}{4}$ inch thickness, unless noted otherwise.
- L. Blockings concealed within walls: As indicated on drawings or as required for secure installation. (Fire retardant treated)
- M. For blocking and nailers used for attachment of other items, select and cut lumber to eliminate knots or other defects.
- N. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWP A U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.
- B. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- D. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- E. Application: Treat items indicated on Drawings, and the following:
- F. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
- G. Wood sills, sleepers, blocking, and similar concealed members in contact with masonry or concrete.
- H. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
- C. Use treatment that does not promote corrosion of metal fasteners.
- D. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
- E. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
- F. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
- G. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.

2.4 WOOD BACKING SYSTEM

- A. Provide backing system: Clark Dietrich, Danback Flexible wood back system or equal.
- B. Material: $\frac{3}{4}$ " CDX Doug Fir Dricon fire-retardant treated wood.
- C. Dimensions: 5-1/8" x 48" (130mm x 1219mm)

2.5 CONSTRUCTION PANELS FOR BACKING

- A. Plywood Backing Panels: For mounting electrical or telephone equipment, provide fire-retardant treated plywood panels with grade designation, APA C-D PLUGGED EXPOSURE 1, in thickness indicated, or if not otherwise indicated, not less than $\frac{3}{4}$ inch.

2.6 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
 - 2. Where carpentry is pressure-preservative treated, provide fasteners of Type 304 stainless steel.
- B. Rough Hardware: Furnish and install all rough hardware
 - 1. Steel Items: Comply with ASTM A7 or ASTM A36.
 - 2. Nails, Brads, and Staples: ASTM F 1667.

3. Power-Driven Fasteners: NES NER-272.
4. Wood Screws: ASME B18.6.1.
5. Screws for Fastening to Metal Framing: ASTM C 954, length as recommended by screw manufacturer for material being fastened.
6. Lag Bolts: ASME B18.2.1.
7. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.
8. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

2.7 CONCEALED STEEL BRACKET SUPPORTS

- A. Manufactured by A+M Hardware Inc, model EC-24' and C-24" or equal

PART- 3 EXECUTION

3.1 INSTALLATION, GENERAL

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.
- B. Selection of lumber pieces
 1. Carefully select the members.
 2. Select individual pieces so that knots and obvious defects will not interfere with placing bolts or proper nailing and will allow making of proper connections.
 3. Cut out and discard defects which render a piece unable to serve its intended function.
 4. Lumber may be rejected by the Architect, whether or not it has been installed, for excessive warp, twist, bow, crook, mildew, fungus, or mold; as well as for improper cutting and fitting
- C. Stockpile materials sufficiently in advance of need to assure their availability in a timely manner for this Work.
- D. Do not permit materials not complying with the provisions of this Section to be brought onto or stored at the job site.

- E. Promptly remove non-complying materials from the job site and replace with materials meeting the requirements of this Section.
- F. Comply with preservative treated material manufacturer's product data, including product technical bulletins, product catalog installation instruction and product carton instructions for installation.
 - 1. ACQ treated wood scraps and cut-offs should be disposed of in a non-hazardous material lined landfill in accordance with local, state and federal regulations.
- G. Set carpentry to required levels and lines, with member's plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit.
- H. Prevent direct contact between ACQ preservative treated material and aluminum. Maintain minimum of 1/4-inch space between treated wood and aluminum building components using polyethylene or nylon spacers, or maintain separation using minimum 10-mil. thick polyethylene film.
- I. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view.
- J. Metal Framing Anchors: Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- K. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- L. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
 - 1. Use inorganic boron for items that are continuously protected from liquid water.
 - 2. Use copper naphthenate for items not continuously protected from liquid water.

3.2 PLYWOOD SUBSTOOLS FOR EXTERIOR

- A. Install plywood substools required for the installation of laminated plastic window stools. Install substools to framing, using countersunk flathead screws for metal framing and common nails for wood framing. Shim as required to assure a leveled top surface.

3.3 INSTALLATION OF WOOD SPREADERS AT DOORS FRAMES

- A. During the installation of pressed metal door frames, after the steel spreader bar has been removed, install 2 x 4 wood spreaders at door opening, carefully dimensioned to permit square, true installation of door frames and doors.
- B. Spreaders shall remain in place until doors are installed.

3.4 ALIGNMENT

- A. On framing members to receive a finished surface, align the finish subsurface to vary not more than 1/8" from the plane of surfaces of adjacent furring and framing members.

3.5 INSTALLATION – ROOF NAILERS AND BLOCKING

- A. Provide anchorage for nailers as required for roof and edging in accordance with the requirements of Factory Mutual Loss Prevention Data Bulletin # 1-49 and as indicated on Contract Drawings.
- B. Secure roof nailers and blocking as indicated on the Drawings.
- C. Ensure finished height of nailers is same as top surface of roof insulation within 1/4-inch.

3.6 CONCEALED STEEL BRACKETS

- A. Install as recommended by manufacturer

3.7 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06 1053

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. The extent of Architectural Woodwork is shown on the drawings and specified herein including, but not limited to, the following:
- B. Fabrication and delivery to the site of all casework.
- C. Plastic laminate Counters, and casework.
- D. Interior wood casework to receive painted finish.
- E. Casework hardware.
- F. Interior Trim Work.
- G. Interior wood columns.
- H. Wood Cabinets and casework.

1.3 SUBMITTALS

- A. Shop Drawings: Submit shop drawings on all items of architectural woodwork as called for in the Supplementary Conditions. Details shall be drawn in related or dimensional position with sections shown at full or quarter size.
- B. Brochures: Submit manufacturer's descriptive literature of specialty items not manufactured by the architectural woodworker but included as part of his work.
- C. Samples: Submit three samples of each species, cut and finish for woodwork which is to receive a transparent finish. Submit 18" long samples full member width and thickness (6" wide if plywood) finished - as specified on one face, on edge and one end. Submit three 12" square samples of each type and surface finish of plastic laminate. Samples will be reviewed by the Architect for appearance

only. Compliance with other requirements is the exclusive responsibility of the Contractor. Cabinet hardware; one unit of each type.

- D. Submit two copies of certificates signed by the mill or woodwork shop, certifying that the architectural woodwork complies with the Quality Standard and Grade and other requirements as specified.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of woodwork.
- B. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards."
- C. Solid Polymer Allowable Tolerances:
- D. Variation in sheet dimension. 2%.
- E. Variation in sheet thickness, 10%.
- F. Location of openings, 1/8"
- G. Variation in overall component size, 1/8".

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. LEED Submittals:
- C. Product Data for Credit EQ 4.4:
- D. For each composite-wood product used, documentation indicating that the bonding agent contains no urea formaldehyde.
- E. For each adhesive used, documentation indicating that the adhesive contains no urea formaldehyde.
- F. Certificates for Credit MR 7: Chain-of-custody certificates certifying that products specified to be made from certified wood comply with forest certification requirements. Include evidence that mill is certified for chain of custody by an FSC-accredited certification body.
- G. Include statement indicating costs for each certified wood product.
- H. Woodwork Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.6 SUBMITTALS

- A. Product data for each type of product and process specified in this section and incorporated into items of architectural woodwork during fabrication, finishing and installation, including cabinet hardware.
- B. Shop drawings showing location of each item, dimensioned plans and elevations, large-scale details, attachment devices and other components.
- C. Samples for initial selection purposes of the following in form of manufacturer's color charts consisting of actual units or sections of units showing full range colors, textures and patterns available for each type of material indicated.
- D. Plastic laminate.
- E. Factory-applied finishes.
- F. Solid Surface materials.

1.7 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Protect woodwork during transit, delivery, storage and handling to prevent damage, soiling and deterioration.
- B. Do not deliver woodwork, until painting, wet work, grinding and similar operations which could damage, soil, or deteriorate woodwork have been completed in installation areas. If, due to unforeseen circumstances, woodwork must be stored in other than installation areas, store only in areas which meet the requirements specified for installation areas.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install work until building is enclosed, wet-work is completed and nominally dry, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Do not deliver millwork materials until relative humidity in the building can be maintained between 30 percent and 50 percent maximum.
- C. The Installer must examine the substrate and the conditions under which the work under this section is to be performed, and notify the Contractor in writing of any unsatisfactory conditions. Do not proceed with work under this section until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
- D. Do not install trim or casework that has not been back primed as specified.
- E. Do not install composite interior molding until interior temperature conditions can be maintained at 60 deg F minimum and 80 deg F maximum.

- F. Field Measurements: Where woodwork is indicated to be fitted to other construction, check actual dimensions of other construction by accurate field measurements before manufacturing woodwork; show recorded measurements on final shop drawings. Coordinate manufacturing schedule with construction progress to avoid delay of work, where field measurements cannot be made without delaying of work, guarantee dimensions, and proceed with manufacture of woodwork without field measurements. Coordinate other construction to ensure that actual dimensions correspond to guaranteed dimensions.

PART- 2 PRODUCTS

2.1 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural plastic-laminate cabinets indicated for construction, finishes, installation, and other requirements.
- B. Provide certificates form AWI certification program indicating that woodwork, including installation, complies with requirements of grades specified.
- C. Grade: Custom.
- D. Type of Construction: Frameless.
- E. Cabinet, Door, and Draw Front Interface Style: Flush overlay.
- F. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by woodworking quality standard.
- G. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- H. Lab Designs.
 - I. Formica Corporation – "Premium FX".
 - J. Wilsonart Americas – "Commercial Collection".
- K. Laminate Cladding for Exposed Surfaces:
 - L. Horizontal Surfaces: Grade HGL.
 - M. Post-Formed Surfaces: Grade HGP.
 - N. Vertical Surfaces: Grade VGS.
- O. Door and Drawer Edge Banding: Color matched PVC.
- P. Pattern Direction: As indicated.

- Q. Pattern and Color: To be determined at later date.
- R. Materials for Semi-Exposed Surfaces:
- S. Surfaces Other Than Drawer Bodies: Thermoset decorative panels.
- T. Draw Sides and Backs: Thermoset decorative panels with PVC or polyester edge banding.
- U. Draw Bottoms: Thermoset decorative panels.
- V. Dust Panels: 1/4-inch plywood or tempered hardboard above compartments and draws unless located directly under tops.
- W. Solid-Surfacing Material Countertops: Homogeneous solid sheets of filled plastic resin comply with ISSFA-2.
- X. Manufacturers:
- Y. Avonite Surfaces – Acrylic Solid Surface.
- Z. Dupont Corian.
- AA. Formica Solid Surface.
- BB. Wilsonart Americas.
- CC. Edge Treatments: Double Eased Edges.
- DD. Backsplashes: Height as indicated; Coved Backsplash (1/2")
- EE. Pattern and Color: To be determined at a later date.
- FF. Solid-Surfacing-Material integral sinks:
- GG. Mounting: Seamed undermount.
- HH. Color: As selected from manufacturers full range. Provide samples for selection.
- II. Model Number: (Basis-of-Design Product model number by Dupont Polymers; Corian, unless otherwise noted):
- JJ. Sink: Model 810, 16 1/2" X 13 1/8" X 5 3/8" (accessible).

2.2 FIRE-RETARDANT-TREATED MATERIALS

- A. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Comply with performance requirements of AWPA C20 (lumber) and AWPA C27 (plywood). Use Exterior Type or Interior Type A. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Kiln-dry material after treatment.

- B. Fire-Retardant Particleboard: Panels made from softwood particles and fire-retardant chemicals mixed together at time of panel manufacture with flame-spread index of 25 or less and smoke-developed index of 25 or less per ASTM E 84.
- C. Fire-Retardant Fiberboard: ANSI A208.2 medium-density fiberboard panels made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at time of panel manufacture with flame spread index of 25 or less and smoke-developed index of 200 or less per ASTM E 84.

2.3 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural woodwork, except for items specified in Division 08 Section "Door Hardware (Scheduled by Describing Products)."
- B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, self-closing.
- C. Bar Pulls: Liberty 4", Stainless Steel bar pull, # P13456L-SS-U1
- D. Door Pulls: Richelieu, Aluminum, #31007596, 4 - 1/8" long.
- E. Catches: Push-in magnetic catches, BHMA A156.9, B03131
- F. Drawer Slides: BHMA A156.9, B05091.
- G. Heavy Duty (Grade 1HD-100 and Grade 1HD-200): Side mounted; full extension type; zinc-plated steel ball-bearing slides.
- H. Box Drawer Slides: Grade 1; for drawers, not more than 6 inches high and 24 inches wide.
- I. File Drawer Slides: Grade 1HD-200; for drawers, more than 6 inches high or 24 inches wide.
- J. Pencil Drawer Slides: Grade 1; for drawers, not more than 3 inches high and 24 inches wide.
- K. Door Locks: BHMA A156.11, E07121.
- L. Provide "Cam" style lock at each cabinet box
- M. Manufacturer: National Cabinet Lock (or approved equal).
- N. Model #: NL-C8000 series.
- O. Drawer Locks: BHMA A156.11, E07041.
- P. Provide "Cam" style lock at each cabinet box
- Q. Manufacturer: National Cabinet Lock or approved equal
- R. Model #: NL-C8000 series
- S. Push Fit Fastener

- T. Provide Push Fit fasteners as required
- U. Manufacturer: Hafele
- V. Model # Hespa frame component AS.
- W. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
- X. Satin Stainless Steel: BHMA 630.
- Y. Grommets for Cable Passage through Countertops: 2 ½" (verify with owner) molded plastic grommets and matching plastic caps with slot for wire passage.

2.4 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.

2.5 FABRICATION

- A. GENERAL: Complete fabrication to maximum extent possible before shipment to Project site. Where necessary for fitting at site, provide allowance for scribing, trimming, and fitting.
- B. Interior Woodwork Grade: Premium.
- C. Shop cut openings to maximum extent possible. Sand edges of cutouts to remove splinters and burrs. Seal edges of openings in countertops with a coat of varnish.
- D. Interior Standing and Running Trim:
- E. For transparent-finished trim items wider than available lumber, use veneered construction. Do not glue for width.
- F. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.
- G. Assemble casings in plant except where limitations of access to place of installation require field assembly.
- H. Plastic-Laminate-Faced Architectural Cabinets:
- I. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural plastic-laminate cabinets indicated for construction, finishes, installations, and other requirements.
 - a. Provide certificates from AWI certification program indicating that woodwork, including installation, complies with requirements of grades specified.

- J. Grade: Custom
- K. Type of Construction: Frameless
- L. Cabinet, Door, and Drawer Front Interface Style: Flush overlay.
- M. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicates as required by woodwork quality standard.
 - a. Manufacturers: subject to compliance with requirements, provide products by one of the following:
 - i. Formica Corporation.
 - ii. Panolam Industries; Nevamar
 - iii. Panolam Industries; Pionite.
 - iv. Wilsonart International Holdings, Inc.
- N. Laminate Cladding for Exposed Surfaces:
 - a. Horizontal Surfaces: Grade HGL.
 - b. Post formed Surfaces: Grade HGP.
 - c. Vertical Surfaces: Grade VGS.
 - d. Door and Drawer Edge Banding: Color Matches PVC.
 - e. Pattern Direction: As indicated.
 - f. Pattern and Color: As shows in Drawings.
- O. Materials for Semi-Exposed Surfaces: (Kitchens).
 - a. Surfaces Other Than Drawer Bodies: Thermoset decorative panels.
 - b. Drawer Sides and Backs: Thermoset decorative panels with PVC or polyester edge banding.
 - c. Drawer Bottoms: Thermoset decorative panels.
- P. PVC Edge Banding: Polyvinyl chloride edge banding made from thermoplastic resin. Color as chosen from manufacturer's full range of color samples.
- Q. Dust Panels: 1/4 -inch plywood or tempered hardboard above compartments and drawers unless located directly under tops.

- R. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of expose laminate surfaces complying with the following requirements.
 - a. As Indicated by laminate manufacturer's designations.
- S. Plastic-Laminate Countertops/Shelves:
- T. High-Pressure Decorative Laminate Grade: HGS.
- U. Colors, Patterns, and Finishes: Refer to Finish Matrix.
- V. Edge Treatment: Vinyl edge banding to match adjacent laminate.
- W. Solid-Surfacing-Material Countertops:
- X. Solid-Surfacing-Material Thickness: 1/2 inch.
- Y. Colors, Patterns, and Finishes: As indicated on Finish Matrix or as selected by Architect from manufacturer's full range.
- Z. Fabricate tops in one piece with shop-applied backsplashes. Comply with solid surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.
- AA. Solid-Surfacing-Material Sinks:
- BB. Solid-Surfacing-Material Thickness: As indicated by manufacturer's designations.
- CC. Colors, Patterns, and Finishes: As indicated on Finish Matrix or as selected by Architect from manufacturer's full range.
- DD. Install integral sink bowls in countertops in shop.
- EE. Mounting: Seamed undermount.
- FF. Tackboard:
- GG. All-Natural Tacking surface by Claridge or equal.
- HH. Color by Architect from full color range.

2.6 SHOP FINISHING

- A. Finish architectural woodwork at fabrication shop. Defer only final touchup, cleaning, and polishing until after installation.
- B. Back priming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to back of paneling.
- C. Transparent Finish:

- D. Grade: Premium.
- E. AWI Finish System: Catalyzed vinyl.
- F. Staining: Match approved sample for color.
- G. Wash Coat for Stained Finish: Apply a wash-coat sealer to woodwork made from closed-grain wood before staining and finishing.
- H. Open-Grain Woods: After staining (if any), apply paste wood filler to open-grain woods and wipe off excess. Tint filler to match stained wood.
- I. Sheen: Semi-gloss, 46-60 gloss units measured on 60-degree gloss meter per ASTM D 523.

PART- 3 EXECUTION

3.1 GENERAL

- A. Only experience and capable foremen and an adequate crew of skilled mechanics experienced in erecting finish carpentry and millwork shall be employed.
- B. To permit fabricator of millwork to utilize his manufacturing process to best advantage, exact details of millwork construction are not always shown on drawings, but it is the intent of these specifications to secure a first-class finished product in all respects.
- C. Fabricate millwork completely at shop as far as possible, and deliver ready to set in largest units consistent with convenient erection.
- D. Work material in best manner, thoroughly blocked, mortised, tenoned, doweled and glued to require minimum use of nails or screws. All fastenings to be concealed.
- E. Provide all millwork with fine sandpaper finish ready for painting and finishing. No sanding across grain permitted.
- F. Round all exposed edges or corners of millwork on 1/16" radius unless otherwise shown on drawings.
- G. Seal all edges of MDF.

3.2 INSTALLATION

- A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas. Examine shop-fabricated work for completion and complete work as required, including removal of packing and back priming.
- B. Grade: Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.

- C. Install woodwork level, plumb, true, and straight to a tolerance of 1/8 in. Shim as required with concealed shims.
- D. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.
- F. Standing and Running Trim: Install with minimum number of joints possible, using full length pieces (from maximum length of lumber available) to greatest extent possible. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base if finished.
- G. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation.
- H. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c. with No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish. Provide decorative washers at cabinet interiors.
- I. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop. Calk space between backsplash and wall with sealant specified in Division 07 Section "Joint Sealants."

3.3 FINISHING

- A. For finishes of other millwork see Division 099000.

3.4 PROTECTION

- A. Cover casework with 4-mil polyethylene film, for protection against soiling and deterioration during remainder of construction period.

END OF SECTION 06 4000

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SECTION INCLUDES

- A. Provide solid surfacing fabrications including but not limited to following:
 - 1. Lavatory or laboratory tops with seamed bowls.
 - 2. Lavatory or laboratory tops with undermount bowls.
 - 3. Lavatory or laboratory tops with integral bowls.
 - 4. Vanity tops.
 - 5. Millwork counter tops with sinks and cove backsplashes.

1.3 RELATED SECTIONS:

- A. Following description of work is included for reference only and shall not be presumed complete:
 - 1. Waste management and disposal requirements: Section 01 7419, Waste Management and Disposal.
 - 2. Provision of finish carpentry and architectural woodwork: Section 06 4000, Architectural Woodwork.
 - 3. Provision of elastomeric joint sealants: Section 07 9200, Joint Sealants.
 - 4. Provision of tile work: Section 09 3000, Tiling.
 - 5. Provision of plumbing and plumbing fixtures: Division 22, Plumbing.

1.4 REFERENCES

- A. Abbreviations and Acronyms:

1. LEED®: Leadership in Energy and Environmental Design; www.cagbc.org.
2. MDF: Medium Density Fiberboard.
3. SCAQMD: South Coast Air Quality Management District; www.aqmd.gov.
4. VOC: Volatile Organic Compound.

B. Definitions:

1. Solid Surface: Non-porous, homogeneous material maintaining the same composition throughout the part with a composition of acrylic polymer, aluminum trihydrate filler and pigment.

1.5 REFERENCE STANDARDS:

- | | | |
|----|----------------------------------|--|
| A. | ANSI/NPA A208.2-09 | - Medium Density Fiberboard (MDF) For Interior Applications |
| B. | ASTM C920-14a | - Standard Specification for Elastomeric Joint Sealants |
| C. | ASTM D638-10 | - Standard Test Method for Tensile Properties of Plastics |
| D. | ASTM D785-08 | - Standard Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials |
| E. | ASTM D790-10 | - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials |
| F. | ASTM D5420-10 | - Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight (Gardner Impact) |
| G. | ASTM E84-14 | - Standard Test Method for Surface Burning Characteristics of Building Materials |
| H. | ASTM E228-11 | - Standard Test Method for Linear Thermal Expansion of Solid Materials with a Push-Rod Dilatometer |
| I. | ASTM G21-13 | - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi |
| J. | ASTM G22-76(96) | - Standard Practice for Determining Resistance of Plastics to Bacteria |
| K. | ASTM G155-13 | - Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials |
| L. | CSA B45.5-11/
IAPMO Z124-2011 | - Plastic Plumbing Fixtures |

- | | | |
|----|--|--|
| M. | NFPA 255-06 | - Standard Method of Test of Surface Burning Characteristics of Building Materials |
| N. | NSF/ANSI 51-07 | - Food Equipment Materials |
| O. | SCAQMD Rule 1168 | - Adhesive and Sealant Applications (amended January 2005) |
| P. | UL 723 | - Standard for Test for Surface Burning Characteristics of Building Materials |
| Q. | UL Environment/
GREENGUARD
UL 2818 | - Standard for Chemical Emissions for Building Materials,
- Finishes and Furnishings, Section 7.1 |
| R. | UL Environment/
GREENGUARD
UL 2818 | - Gold Standard for Chemical Emissions for Building Materials,
- Finishes and Furnishings, Section 7.1 and 7.2 |
| S. | UL 2824 | - GREENGUARD Certification Program, Method for Measuring Microbial Resistance from Various Sources Using Static Environmental Chambers |

1.6 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meetings: Arrange preinstallation meeting 1 week prior to commencing work with all parties associated with trade as designated in Contract Documents or as requested by Architect. Presided over by Contractor, include Architect who may attend, Subcontractor performing work of this trade, Owner's representative, testing company's representative and consultants of applicable discipline. Review Contract Documents for work included under this trade and determine complete understanding of requirements and responsibilities relative to work included, storage and handling of materials, materials to be used, installation of materials, sequence and quality control, Project staffing, restrictions on areas of work and other matters affecting construction, to permit compliance with intent of work of this Section.

1.7 SUBMITTALS

- A. Product Data: Indicate Product description including solid surface sheets, sinks, bowls and illustrating full range of standard colors, fabrication information and compliance with specified performance requirements. Submit Product data with resistance to list of chemicals.
- B. Shop Drawings: Submit Shop Drawings for work of this Section in accordance with Section 01 3000. Indicate plans, sections, dimensions, component sizes, edge details, thermosetting requirements, fabrication details, attachment provisions, sizes of furring, blocking, including concealed blocking and coordination requirements with adjacent work. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, waste receptacles and other items installed in solid surface.

- C. Coordination Drawings: Submit coordination drawings indicating plumbing and miscellaneous steel work indicating locations of wall rated or non-rated, blocking requirements, locations and recessed wall items and similar items.
- D. Samples: Submit samples in accordance with Section 01 3000. Submit minimum 6" x 6" samples. Cut sample and seam together for representation of inconspicuous seam. Indicate full range of color and pattern variation. Approved samples will be retained as standards for work.
- E. Test and Evaluation Reports: Submit flammability test reports.

1.8 CLOSEOUT SUBMITTALS

- A. Operational and Maintenance Data:
 - 1. Submit manufacturer's care and maintenance data, including repair and cleaning instructions. Include in Project closeout documents.
 - 2. Provide a commercial care and maintenance kit and video. Review maintenance procedures and warranty details with Owner upon completion.

1.9 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Installers: Provide work of this Section executed by competent installers with minimum 5 years experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.
- B. Mock-Ups:
 - 1. Prior to final approval of Shop Drawings, erect 1 full size mock-up of each component at Project site demonstrating quality of materials and execution for Architect review.
 - 2. Should mock-up not be approved, rework or remake until approval is secured. Remove rejected units from Project site.
 - 3. Approved mock-up will be used as standard for acceptance of subsequent work.
 - 4. Approved mock-ups may remain as part of finished work.

1.10 DELIVERY, STORAGE AND HANDLING

- A. Delivery and Acceptance Requirements: Deliver no components to Project site until areas are ready for installation.
- B. Storage and Handling Requirements:

1. Store components indoors prior to installation.
2. Handle materials to prevent damage to finished surfaces.

1.11 WARRANTY

- A. Manufacturer Warranty: Provide manufacturer's standard warranty for material only for period of 10 years against defects and/or deficiencies in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Architect and at no expense to Owner.

PART- 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer List: Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:
 1. Corian® by DuPont; www.corian.com
 2. Trinseo Aristech Surfaces, LLC., Avonite
 3. Wilsonart Contract; www.wilsonartcontract.com
- B. Substitution Limitations: This Specification is based on Avonite Products. Comparable Products from manufacturers listed herein will be accepted provided they meet requirements of this Specification.

2.2 MATERIALS

- A. Avonite
 1. Color: New Concrete, #7842.
- B. Performance/Design Criteria:

Property	Requirement (min or max)	Test Procedure
1. Solid Surface Based Products:		
a. Tensile Strength	6000 psi min	ASTM D638

b. Tensile Modulus	1.5 x 10 ⁶ psi min	ASTM D638
c. Tensile Elongation	0.4% min.	ASTM D638
d. Flexural Strength	10000 psi min	ASTM D790
e. Flexural Modulus	1.2 x 10 ⁶ psi min	ASTM D790
f. Hardness	>85-Rockwell "M" scale min.	ASTM D785
g. Thermal Expansion	2.2 x 10 ⁻⁵ in./in./°F	ASTM E228
h. Fungi and Bacteria	Does not support microbial growth	ASTM G21 & G22
i. Microbial Resistance	Highly resistant to mold growth	UL 2824
j. Ball Impact	No fracture - 1/2 lb. Ball: 6 mm slab - 36" drop 12 mm slab - 144" drop	NEMA LD 3, Method 3.8
k. Weatherability	ΔE*94<5 in 1,000 hrs	ASTM G155
l. Flammability		ASTM E84, NFPA 255 & UL 723

All Colors

	6 mm	12 mm	
m. Flame Spread	<25	<25	
n. Smoke Developed	<25	<25	
o. Class	A	A	NFPA 101®, Life Safety Code

C. Solid Surface Material:

1. Non-porous, homogeneous material maintaining the same composition throughout the part with a composition of acrylic polymer, aluminum trihydrate filler and pigment; not coated, laminated or of composite construction; meeting following criteria:
2. Flammability: Class 1 and A when tested to UL 723.
3. Food Equipment Material Compliance: Food Zone to NSF/ANSI 51.
 - a. Ensure material has minimum physical and performance properties specified under "Performance/Design Criteria".
 - b. Ensure superficial damage to a depth of 0.010" is repairable by sanding and polishing.

- D. Adhesive for Bonding to Other Products: One component silicone to ASTM C920.
- E. Sealant: A standard mildew-resistant, FDA/UL® [and NSF/ANSI 51 compliant in Food Zone area,] recognized silicone color matched sealant or clear silicone sealants.
- F. Sink/Bowl Mounting Hardware: Manufacturer's approved bowl clips, brass inserts and fasteners for attachment of undermount sinks/bowls.
- G. Heat Reflecting Tape: Manufacturer's standard aluminum foil tape, with required thickness, for use with cutouts near heat sources.
- H. Insulating Nomex® Fabric: Manufacturer's standard for use with conductive tape in insulating solid surface material from adjacent heat source.

2.3 COMPONENTS

- A. Window Sills: 1/2" thick solid surfacing material, adhesively joined with inconspicuous seams, edge details as indicated on Drawings. Color selected later by Architect from manufacturer's full color range.
- B. Counter Perimeter Frame: Ensure 1/2" [3/4"] thick, moisture resistant [cores for counter tops in wet areas having sinks or lavatories are 3/4" thick exterior grade plywood with waterproof adhesive, Fir or Poplar plywood, veneer core only.] [MDF core conforming to ANSI/NPA A208.2 balanced design, manufactured from recycled materials, meeting ANSI Standards for emissions, of minimum density of 48 lb/cu ft and surface character to match sample approved by Architect. Ensure fire retardant Product contains fire-retardant chemicals injected with raw materials during manufacturing and achieves a maximum flame-spread rating of 25 with a maximum smoke development of 200 when tested to ASTM E84.]
- C. Lavatory Tops with Seamed Bowls: 1/2" [3/4"] thick countertop of [solid polymer] [100% acrylic] [polyester-acrylic blend] solid surfacing material, cast to desired profiles and sizes having edge details as indicated on Drawings conforming to CSA B45.5/IAPMO Z124, complete with [seamed "S" undermount] bowl. Provide countertops complete with backsplashes of size shown on Drawings. Ensure countertop and backsplash is [] color; [single color] [maximum 2, 3 or 4 colors] [non-coved] [coved] as selected by Architect. Ensure [5] bowls are [] model.
- D. Lavatory Tops with Undermount Bowls: 1/2" [3/4"] thick countertop of [solid polymer] [100% acrylic] [polyester-acrylic blend] solid surfacing material, cast to desired profiles and sizes having edge details as indicated on Drawings conforming to CSA B45.5/IAPMO Z124, complete with [1] undermount bowl. Provide countertops complete with backsplashes of size shown on Drawings. Use undermount hardware according to manufacturer's instructions. Ensure vanity top and backsplash is [] color; [single color] [maximum 2, 3 or 4 colors] [non-coved] [coved] as selected by Architect. Ensure bowl[s] is/are [] model and [] color.
- E. Lavatory Tops with Integral Bowls: Molded countertop of solid polymer material [19-1/2"] [22"], complete with integrally molded bowl[s] of solid polymer material; edge details as indicated on Drawings. Provide with [non-coved] [coved] backsplash [and endsplashes] as shown on Drawings. Provide [] model and [] color.
- F. Fabrication:

1. Fabricate components in shop to greatest extent practical to sizes and shapes indicated, in accordance with approved Shop Drawings and solid polymer manufacturer requirements. Form joints between components using manufacturer's standard joint adhesive without conspicuous joints. Provide factory cutouts for plumbing fittings and bath accessories as indicated on Drawings.
2. Where indicated, thermoform corners and edges or other objects to shapes and sizes indicated on Drawings, prior to seaming and joining. Cut components larger than finished dimensions and sand edges to remove nicks and scratches. Heat entire component uniformly prior to forming.
3. Ensure no blistering, whitening and cracking of components during forming.
4. Fabricate backsplashes from solid surfacing material with optional radius cove where counter and backsplashes meet as indicated on Drawings. Backsplashes for most colors may be fabricated by traditional means discussed in K-25294 *Backsplashes*. Colors with metallic/mica particle or veined colors creating directional aesthetics (K-26833 *Directional Aesthetics*) may require the techniques in Technical Bulletin K-28235 *Thermoformed Backsplash*.
5. Fabricate joints between components using manufacturer's standard joint adhesive. Ensure joints are inconspicuous in appearance and without voids. Attach 50 mm (2") wide reinforcing strip of solid polymer material under each joint. Reinforcing strip of solid polymer material is not required when using DuPont™ Joint Adhesive 2.0.
6. Provide holes and cutouts for plumbing and bath accessories as indicated on Drawings.
7. Rout and finish component edges to a smooth, uniform finish. Rout cutouts, then sand edges smooth. Repair or reject defective or inaccurate work.
8. Finish: Ensure surfaces have uniform finish:
 - a. Matte, with a 60° gloss rating of 5 - 20.
9. Fabrication Tolerances:
 - a. Variation in Component Size: +/-1/8".
 - b. Location of Openings: +/-1/8" from indicated location.

PART- 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

1. Examine substrates and conditions, with fabricator present for compliance with requirements for installation tolerances and other conditions affecting performance of work. Proceed with installation only after unsatisfactory conditions have been corrected.

2. Verify actual site dimensions and location of adjacent materials prior to commencing work.
 3. Examine cabinets upon which counter tops are to be installed. Verify cabinets are level to within 1/8" in 10' - 0".
 4. Notify Architect in writing of any conditions which would be detrimental to installation.
- B. Evaluation and Assessment: Commencement of work implies acceptance of previously completed work.

3.2 INSTALLATION

- A. Install components plumb, level, rigid, scribed to adjacent finishes in accordance with reviewed Shop Drawings and Product installation details.
- B. Fabricate field joints using manufacturer's recommended adhesive, with joints being inconspicuous in finished work. Exposed joints/seams are not permitted. Keep components and hands clean when making joints. Reinforce field joints as specified herein. Cut and finish component edges with clean, sharp returns.
- C. Route radii and contours to template. Anchor securely to base component or other supports. Align adjacent components and form seams to comply with manufacturer's written recommendations using adhesive in color to match work. Carefully dress joints smooth, remove surface scratches and clean entire surface.
- D. Install countertops with no more than 1/8" sag, bow or other variation from a straight line.
- E. Adhere undermount/submount/bevel mount sinks/bowls to countertops using manufacturer's recommended adhesive and mounting hardware.
- F. Adhere topmount sinks/bowls to countertops using manufacturer recommended adhesives and color-coordinated silicone sealant. [Secure seam mount bowls and sinks to counter tops using color matched joint adhesive.]
- G. Seal between wall and components with joint sealant as specified herein and in Section 07 92 00, as applicable.
- H. Provide backsplashes and endsplashes as indicated on Drawings. Adhere to countertops using a standard color-coordinated silicone sealant. Adhere applied sidesplashes to countertops using a standard color-matched silicone sealant. Provide coved backsplashes and sidesplashes at walls and adjacent millwork. Fabricate radius cove at intersection of counters with backsplashes to dimensions shown on reviewed Shop Drawings. Adhere to countertops using manufacturer's standard color-coordinated joint adhesive.
- I. Keep components and hands clean during installation. Remove adhesives, sealants and other stains. Ensure components are clean on date of Substantial Completion of the Work.
- J. Coordinate connections of plumbing fixtures with Plumbing and Mechanical. Make plumbing connections to sinks in accordance with Plumbing and Mechanical.

3.3 REPAIR

- A. Repair minor imperfections and cracked seams and replace areas of severely damaged surfaces in accordance with manufacturer's "Technical Bulletins".

3.4 SITE QUALITY CONTROL

- A. Non-Conforming Work: Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Architect at no cost to Owner.

3.5 CLEANING

- A. Remove excess adhesive and sealant from visible surfaces.
- B. Clean surfaces in accordance with manufacturer's "Care and Maintenance Instructions".

3.6 PROTECTION

- A. Provide protective coverings to prevent physical damage or staining following installation for duration of Project.
- B. Protect surfaces from damage until date of Substantial Completion of the Work.

END OF SECTION 06 6116

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specifications, apply to this Section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section includes but is not limited to the following:
 - 1. Fireproofing for all beams and columns exposed and not enclosed in rated gypsum board walls or masonry.
 - a. Type 1 - Light Density Gypsum based cementitious fireproofing for concealed interior beams and columns.
 - b. Type 2 - Medium density Portland cement fireproofing for perimeter steel beams and columns.

1.3 SUBMITTALS

- A. Product data for each sprayed-on fireproofing product indicated.
- B. Certification by manufacturers that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).
- C. Thickness Schedule Indicating Building Elements to be protected with spray-applied fireproofing; extent of sprayed-on-fireproofing for each different construction and fire-resistance rating including the following:
 - 1. Applicable fire-resistive design designations of inspecting or testing agency acceptable to authorities having jurisdiction.
 - 2. Minimum thickness needed to achieve required fire-resistance ratings of structural components and assemblies.
 - 3. Test reports for sprayed-on-fireproofing from a qualified independent testing agency employed and paid by Contractor or manufacturer.

4. Provide reports indicating that physical Product certificates from fireproofing manufacturers that each sprayed-on fireproofing product indicated for Project complies with specified requirements including those for fire- test-response characteristics and compatibility with adhesives, primers, and other surface coatings on substrates indicated to receive fireproofing.

1.4 QUALITY ASSURANCE

- A. Single Source Responsibility: Obtain sprayed-on fireproofing materials from a single manufacturer for each different product required.
- B. Fire Performance Characteristics: Provide materials and construction which are identical to those tested for the following fire performance characteristics, per test method indicated, by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. See Drawings for UL System.
- C. Contractor shall have successfully completed three (3) projects with specified material.
- D. Installer Qualifications: Engage an experienced installer certified, licensed, or otherwise qualified by the sprayed-on fireproofing manufacturer as having the necessary experience, staff, and training to install manufacturer's sprayed-on fireproofing products. Contractor shall have successfully completed (3) projects with the specified materials.
- E. Provide fireproofing products containing no detectable asbestos as determined according to the method specified in 40 CFR Part 763, Subpart F, Appendix A, Section 1, Polarized Light Microscopy.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to project site in original, unopened packages with manufacturers' labels identifying products legible and intact. Include on labels name of products and manufacturers, date of manufacture and shelf life, where applicable. Also include UL labels for fire-resistance ratings applicable to project.
- B. Use materials with limited shelf life within period indicated. Remove from project site and discard any materials whose shelf life has expired.
- C. Store materials inside, under cover, above ground and in a manner to keep them dry until ready to use. Remove from project site and discard any materials that have been exposed to moisture or have otherwise deteriorated.

1.6 PROJECT CONDITIONS

- A. Environmental Conditions: Do not install sprayed-on fireproofing when ambient or substrate temperatures are 40 deg F (4.4 deg C) and falling, unless temporary protection and heat can be provided to maintain temperatures of both at or above this temperature level for 24 hours before, during and for 24 hours after application of sprayed fireproofing.

- B. Ventilation: Ventilate spray fireproofing by means of natural or, when this is inadequate, of forced air circulation during and after application until it dries thoroughly. Maintain minimum of four (4) air exchanges per hour.

1.7 SEQUENCING

- A. Sequence and coordinate application of sprayed-on fireproofing with other, related work specified in other sections to comply with the following requirements.
 - 1. Provide temporary enclosures to prevent deterioration of sprayed-on fireproofing for interior applications due to exposure to unfavorable environmental conditions.
 - 2. Avoid unnecessary exposure of sprayed-on fireproofing to abrasion and other damage likely to occur during construction operations subsequent to its application.
 - 3. Whenever possible, do not begin applying fireproofing until clips, hangers, supports, sleeves, and other items penetrating fireproofing are in place. When clips and hangers are installed after the application of the fireproofing material, patch the surrounding exposed steel and totally encapsulate the clip or hanger at a thickness equal to that being applied to the structural member.
 - 4. Defer installing ducts, piping, and other items that would interfere with applying fireproofing until fireproofing is installed.
 - 5. Do not install enclosing or concealing construction until after fireproofing has been applied, inspected, tested, and corrections have been made to any defective fireproofing.
 - 6. Protect permanently exposed walls or floors, or special surfaces.

1.8 WARRANTY

- A. General: The warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.
- B. Warranty: Submit a written warranty, executed by Contractor, and cosigned by installer, agreeing to repair or replace sprayed-on fireproofing that has failed within the specified warranty period. Failures include but are not limited to the following:
 - 1. Cracking, flaking, eroding in excess of specified requirements, peeling, and delaminating of sprayed-on fireproofing from substrates due to defective materials and workmanship within the specified warranty period.
 - 2. Not covered under the warranty are failures attributable to damage by occupants and Owner's maintenance personnel, exposure to environmental conditions other than those investigated and approved during fire-response testing, and to other causes not reasonably foreseeable under conditions of normal use.

3. Warranty Period: 2 years from date of Substantial Completion.

PART- 2 PRODUCTS

2.1 TYPE 1 CONCEALED SPRAYED-ON FIREPROOFING MATERIALS

- A. General: For concealed applications of sprayed-on fireproofing provide manufacturer's standard products complying with requirements indicated in this article or material composition and physical properties representative of installed products.
- B. Cementitious fireproofing consisting of factory-mixed, dry formulation of gypsum or Portland cement binders and lightweight mineral or synthetic aggregates mixed with water at Project site to form a slurry or mortar for conveyance and application.
- C. Provide Thickness based on Unrestrained Assemblies and designs.
- D. Products containing mineral wool fibers will not be considered for use on this project.
- E. Physical Properties: Minimum values, unless otherwise indicated or higher values required to attain designated fire-resistance ratings, measured per standard test methods referenced with each property listed below:
 1. Bond Strength: 2001bs. per sq. ft. average 150 lbs. per sq. ft. individual bond strength as determined per ASTM E 736 under the following conditions:
 2. Compressive Strength: 1440 psf as determined in the laboratory per ASTM E 761. Minimum sprayed-on fireproofing thickness tested shall be 0.75 inch and the minimum dry density shall be as specified, but not less than 15 pcf.
 3. Corrosion Resistance: No evidence of corrosion as determined per ASTM E 937.
 4. Deflection: No cracking, spalling, delamination or the like as determined per ASTM E 759.
 5. Effect of Impact on Bonding: No cracking, spalling, delamination or the like as determined per ASTM E 760.
 6. Air Erosion: Maximum weight loss of 0.005 grams per sq. ft. in 24 hours as determined per ASTM E 859. For laboratory tests, the minimum sprayed-on fireproofing thickness is 0.75 inch, the maximum dry density is 15 pcf, test specimens are not pre-purged by mechanically induced air velocities, and tests are terminated after 24 hours.
 7. Dry Density: 15 pcf for average and individual densities regardless of density indicated in referenced fire-resistive design, or greater if required to attain fire resistance ratings indicated, as determined per ASTM E 605 or Appendix A.

8. Thickness: Provide minimum average thickness required for fire-resistive design indicated, but not less than 1/2" for beams and columns, regardless of the thickness required by the given UL design assembly.
 9. Surface Burning Characteristics: Material shall exhibit the following surface burning characteristics when tested in accordance with ASTM E84: Flame Spread 0 Smoke Development 0.
 10. Resistance to Mold: The fireproofing material shall be formulated at the time of manufacturing with a mold inhibitor. Fireproofing shall be tested per ASTM G21 and shall show resistance to mold growth for a period of 21 days.
- F. Products: Subject to compliance with requirements, provide one of the following products only:
- G. Monokote Type MK-6, Construction Products Div., W.R. Grace & Co.-Conn. Or similar products meeting the performance requirements of this specification by the Pyrock Company, or Southwest Vermiculite.

2.2 AUXILIARY FIREPROOFING MATERIALS

- A. General: Provide auxiliary fireproofing materials that are compatible with sprayed-on fireproofing products and substrates, are approved for use indicated by manufacturer or sprayed-on fireproofing, and are approved by UL or other testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance rated designs indicated.
- B. Provide accessories to comply with manufacturer's recommendations and to meet fire resistance design and code requirements. Such accessories include, but are not limited to, any required or optional items such as Spatterkote SK-3; bonding agents, mechanical attachments; application aids such as metal lath, scrim, or netting; and Monokote Accelerator.

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, to determine if they are in satisfactory condition to receive sprayed-on fireproofing.
- B. Do not proceed with installation of fireproofing until satisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of substances which could impair bond of fireproofing, including oil, grease, rolling compounds, incompatible primers, and loose mill scale.

- B. Cover other work which might be damaged by fall-out or over spray of fireproofing materials during application. Provide temporary enclosure as required to confine spraying operations, protect the environment, and to ensure adequate ambient conditions for temperature and ventilation.
- C. Prior to application of fireproofing, a bonding agent, approved by fireproofing manufacturer, shall be applied to all concrete substrates to receive MK – 6.

3.3 INSTALLATION, GENERAL

- A. General: The application of spray fireproofing shall not commence until the roofing is completely installed and tight, and after roof traffic has ceased.
- B. Comply with fireproofing manufacturer's instructions for mixing materials, for application procedures and for types of equipment used to convey and spray-on fireproofing materials, as applicable to the particular conditions of installation and as required to achieve fire-resistance ratings indicated.
- C. Coat substrates with adhesive prior to application of fireproofing where required to achieve fire resistance ratings designated for each condition, unless greater thickness and densities are indicated.
- D. Spray textured finish with no further treatment.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: A qualified independent testing agency employed and paid by the Owner will perform field quality-control testing.
- B. Extent and Testing Methodology: Owner will provide qualified independent testing facility to test for:
 - 1. Bond Strength: ASTM E 736.
 - 2. Density: ASTM E 605.
 - 3. Thickness: ASTM E 605.
- C. Remove and replace fireproofing where test results indicate that it does not comply with specified requirements for cohesion and adhesion or for density or both.
- D. Apply additional fireproofing per manufacturer's directions where test results indicate that the thickness does not comply with specified requirements.

3.5 CLEANING, REPAIR, AND PROTECTION

- A. Cleaning: Immediately upon completion of spraying operations in each containable area of project, remove over-spray and fall-out of materials from surfaces of other work and clean exposed surfaces to remove evidence of soiling.

- B. Cure exposed cementitious fireproofing materials in compliance with fireproofing manufacturer's recommendations to prevent premature drying.
- C. Protect fireproofing according to the advice of fireproofing manufacturer and Installer from damage resulting from construction operations or other causes so that fireproofing will be without damage or deterioration at time of substantial completion.
- D. Coordinate installation of fireproofing with other work in order to minimize the need for other trades to cut or remove fireproofing. As other trades, successively complete installation of their work, maintain protection of structure afforded by fireproofing by patching any areas which have been removed or damaged prior to concealment of fireproofing by other work.
- E. Repair or replace work which has not been successfully protected.
- F. Floors shall be left in broom clean finish.

END OF SECTION 07 2500

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to this section.
- B. Refer to other sections of the specification, drawings, and details to determine type and extent of work there is affecting the work of this section, whether or not such work specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. Section Includes:
- B. Fully adhered thermoplastic polyolefin (TPO) sheet roofing system, including roofing insulation and protection board, where indicated on the Drawings, as specified herein, and as needed for a complete and proper installation.
- C. Removal of existing roof system in areas indicated to receive new roofing system and in other areas as required to complete the work.
- D. Vapor retarder
- E. Wood nailers for roofing attachment
- F. Roof insulation
- G. Flashings
- H. Manufacturer's pre-construction and final inspection as specified herein. These inspections are to be included; additional inspections, or work incurred as a result of the final inspection shall be without additional cost to the Owner.
- I. Related Requirements:
- J. Division 06 Section "Miscellaneous Rough Carpentry": Furnishing and installing wood blocking.
- K. Division 23 Mechanical Specifications.
- L. Disposal of demolition debris and construction waste is the responsibility of Contractor. Perform disposal in manner complying with all applicable federal, state, and local regulations.
- M. Comply with the published recommendations and instructions of the roofing membrane Manufacturer.

- N. Commencement of work by the Contractor shall constitute acknowledgement by the Contractor that this specification can be satisfactorily executed, under the project conditions and with all necessary prerequisites for warranty acceptance by roofing membrane Manufacturer.

1.3 DEFINITIONS

- A. Roofing Terminology: Definitions in the current editions of ASTM D1079 and NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to work of this Section.

1.4 QUALITY ASSURANCE

- A. The manufacturer's authorized technical representative shall provide a final inspection at the completion of the project to insure, that the project has been completed in accordance with the manufacturer's requirements. Upon approval and acceptance of the project, furnish to Owner, implemented manufacturer's warranty certification.
- B. Submit Manufacturer's field quality control reports of field inspections, including, revised "as-built" shop drawings and manufacturer's final punch list.
- C. All roofing shall be as described in this Section and shall be provided and approved by the roof system manufacturer. Any materials not manufactured or provided by manufacturer shall have written approval from the manufacturer stating the materials are acceptable and are compatible with the other materials and systems required.
- D. UL Listing: Provide labeled materials which have been tested and listed by UL in "Building Materials Directory" for application indicated, with "Class A" rated materials/system for roof slopes shown.
- E. Fire Performance Characteristics: Provide insulation materials which are identical to those whose fire performance characteristics, as listed for each material or assembly of which insulation is a part, have been determined by testing, per methods indicated below, by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.
- F. The roof system manufacturer's Technical Specifications shall be considered a part of this specification and should be used as a reference for specific application procedures and recommendations. Where a conflict does exist between the manufacturer's written specifications and those procedures specified in this Section, the more stringent requirements meeting the Manufacturer's minimum requirements for the provided warranty shall apply.

1.5 SUBMITTALS

- A. Product Data
- B. Provide membrane Manufacturer's printed data sufficient to show that all components of roofing system, including insulation and fasteners, comply with the specified requirements and with the membrane Manufacturer's requirements and recommendations for the system type specified; include data for each product used in conjunction with roofing membrane.

- C. Where UL or FM requirements are specified, provide documentation that shows that the roofing system to be installed is UL-Classified or FM-approved, as applicable. Include data itemizing the components of the classified or approved system.
- D. Installation Instructions
- E. Provide Manufacturer's instructions to Installer, marked up to show exactly how all components will be installed.
- F. Where instructions allow installation options, clearly indicate which option will be used.
- G. Shop Drawings
- H. Provide roof plan indicating orientation of steel deck (if applicable), and fastener and/or adhesive layouts.
- I. Provide the roof membrane Manufacturer's standard details customized for this project for all relevant conditions, including flashings, base tie-ins, roof edges, terminations, expansion joints, penetrations, and drains.
- J. Provide copy of Pre-Installation Notice to show that Manufacturer's required Pre-Installation Notice (PIN) has been accepted and approved by the Manufacturer.
- K. Submit samples of each product to be used. (optional)
- L. Specimen Warranty
- M. Closeout Submittals
- N. Executed Warranty
- O. Maintenance data

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products in Manufacturer's original containers, dry and undamaged, with seals and labels intact and legible. Label with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Discard and legally dispose of material that cannot be applied within its stated shelf life.
- C. Store materials clear of ground and moisture with weather protective covering.
- D. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
- E. Keep combustible materials away from ignition sources.

- F. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck and/or structural overloading.
- G. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

1.7 FIELD CONDITIONS

- A. Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed in accordance with Manufacturer's written instructions and warranty requirements.

1.8 WARRANTY

- A. Provide Elevate 20-year Red Shield™ Roofing System Limited Warranty covering membrane, roof insulation, and system accessories. Comply with all warranty procedures required by Manufacturer, including notifications, scheduling, and inspections.
- B. Limit of Liability: No dollar limitation (NDL).
- C. Scope of Coverage: Repair leaks in the roofing system caused by
 - D. Ordinary wear and tear
 - E. Normal exposure to the elements
 - F. Manufacturing defect in Elevate materials
 - G. Defective workmanship used to install these materials
 - H. Damage due to winds up to 80mph
 - I. Not Covered:
 - J. Damage due to winds in excess of 80mph
 - K. Damage due to hurricanes or tornadoes
 - L. Hail
 - M. Intentional damage
 - N. Unintentional damage due to normal rooftop inspections, maintenance, or service

PART- 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Firestone Building Products; ULTRAPLY TPO XR Adhered Membrane or a comparable product by one of the following:
- B. Firestone Building products.
- C. Carlisle SynTec Incorporated.
- D. Versico Inc.
- E. Source Limitations: Obtain components including roof insulation fasteners and accessories for roofing system from same manufacturer as membrane roofing manufacturer approved by membrane roofing manufacturer.
- F. Substitution requests shall be considered in accordance with contract provisions and the performance requirements outlined in this document.

2.2 ROOFING SYSTEM DESCRIPTION

- A. Roofing System
- B. Membrane: Thermoplastic polyolefin (TPO)
- C. Thickness: As specified elsewhere
- D. Membrane Attachment: Adhered
- E. Slope: ¼:12 (2%) by means of tapered insulation or along with structural slope if present.
- F. Comply with applicable local building code requirements.
- G. Provide assembly having Underwriters Laboratories, Inc. (UL) Class A Fire Hazard Classification
- H. Provide assembly complying with Factory Mutual Corporation (FM) Roof Assembly Classification, FM Data Sheets 1-28 and 1-29, and meeting minimum requirements of FM 1-90 wind uplift rating.
- I. Vapor Barrier over deck/deck cover:
- J. Membrane: High density polyethylene sheet with SBS modified bitumen adhesive
- K. Attachment: Self-adhering
- L. Insulation (composite):
- M. Total System R-Value: 48 or greater

- N. Maximum Board Thickness: 4"
- O. Use as many layers as necessary to achieve required R-value
- P. Stagger joints in adjacent layers
- Q. Base Layer: Polyisocyanurate foam board, non-composite
- R. Attachment: Low-rise polyurethane adhesive
- S. Top Layer: Polyisocyanurate foam board, composite
- T. Attachment: Low-rise polyurethane adhesive
- U. TPO Membrane Materials
- V. Roofing and Flashing Membrane: Flexible, heat weldable sheet composed of thermoplastic polyolefin polymer and ethylene propylene rubber; complying with ASTM D 6878, with polyester weft inserted reinforcement and the following additional characteristics:
- W. Thickness: 0.080" (match existing)
- X. Color: White (match existing)
- Y. Reinforcement: Polyester, weft-inserted scrim
- Z. Sheet Width: Use widest sheet practical for jobsite conditions to minimize field seams
- AA. Acceptable Product: UltraPly™ TPO Membrane by Elevate
- BB. Membrane Fasteners: Type and size as required by roof membrane Manufacturer for roofing system and warranty to be provided; use only fasteners furnished by roof membrane Manufacturer.
- CC. Curb and Parapet Flashing: Same material as membrane, with encapsulated edge which eliminates need for seam sealing the flashing-to-roof splice; precut to 18" (457 mm) wide; UltraPly™ TPO 18" Curb Flashing.
- DD. Formable Flashing: Non-reinforced, flexible, heat weldable sheet, composed of thermoplastic polyolefin polymer and ethylene propylene rubber, color to match roof membrane; UltraPly™ TPO Unsupported Flashing by Elevate.
- EE. Factory-formed Weldable Flashing Accessories: UltraPly™ TPO Flashing (various) by Elevate.
- FF. Self-Adhering Flashing Membrane: Unsupported (non-reinforced) TPO membrane factory laminated to white seam tape; UltraPly™ TPO QuickSeam™ Flashing by Elevate.
- GG. Factory-formed Self-Adhering Flashing Accessories: UltraPly™ TPO QuickSeam™ Flashing (various) by Elevate.

- HH. Bonding Adhesive: Formulated for compatibility with TPO membrane and wide variety of substrate materials; UltraPly™ Bonding Adhesive by Elevate.
- II. Seam Edge Treatment: Clear polymer-based sealant, formulated for sealing exposed edges of membrane; UltraPly™ TPO Cut Edge Sealant by Elevate.
- JJ. Pourable Sealer: One part polyurethane; White One-Part Pourable Sealer by Elevate.
- KK. Water Block Seal: Butyl rubber sealant for use between two surfaces, not exposed; Water Block Seal S-20 by Elevate
- LL. Metal Plates and Strips used for Fastening Membrane and Insulation: Steel with Galvalume coating; corrosion-resistance meeting FM 4470 criteria
- MM. Coated Metal Plates for Induction Welding (if applicable): UltraPly™ TPO InvisiWeld™ Plate by Elevate.
- NN. Termination Bars: Aluminum bars with integral caulk ledge; 1.3" (33 mm) wide by 0.10" (2.5 mm) thick; Termination Bar by Elevate
- OO. Roof Walkway Pads: TPO pad designed to provide protection from essential rooftop services and traffic and maintain the integrity of the existing roof surface; UltraPly™ TPO Walkway Pad by Elevate.
- PP. Yellow Safety Strip: A 5.5" (140 mm) by 100' long (30 m) strip and nominal 30 mil (0.76 mm) thick yellow TPO membrane laminated to a white, cured, seam tape, compatible with TPO and EPDM; QuickSeam™ Yellow Safety Strip by Elevate.
- QQ. Roof Insulation and Cover Boards
- RR. Polyisocyanurate Board Insulation: Closed cell polyisocyanurate foam with glass reinforced mat laminated to facers, complying with ASTM C 1289 Type II Class 1, with the following additional characteristics:
 - SS. Thickness: As indicated elsewhere
 - TT. Size: 48" by 48" nominal
 - UU. R-Value (LTTR) per inch (25 mm): min. 6.2R at 40 °F (4.4 °C) and min. 5.7R at 75 °F (23.9 °C)
 - VV. Compressive Strength: 20 psi (138 kPa)
 - WW. Ozone Depletion Potential: Zero; made without CFC or HCFC blowing agents
 - XX. Acceptable Product: ISOGARD GL polyiso board insulation by Elevate.
 - YY. Composite Insulation: closed cell polyiso foam core laminated to ½" (13 mm) high density ISOGARD HD board:
 - ZZ. Thickness: As indicated elsewhere
- AAA. Size: 48" by 48" nominal

- BBB. Compressive Strength: 20 psi (138 kPa) core with 80 psi (552 kPa) board
- CCC. Ozone Depletion Potential: Zero; made without CFC or HCFC blowing agents
- DDD. Acceptable Product: ISOGARD™ HD Composite by Elevate
- EEE. Insulation Fasteners: Type and size as required by roof membrane Manufacturer for roofing system and warranty to be provided; use only fasteners furnished by roof membrane Manufacturer.
- FFF. Low Rise Foam Adhesive: Two-component, low-rise polyurethane adhesive designed to attach polyisocyanurate insulation to a variety of acceptable substrates; Twin Jet or I.S.O.Stick™ or I.S.O. Twin Pack™ or I.S.O.Spray™ R by Elevate
- GGG. Vapor Barrier
- HHH. Vapor Barrier Membrane: Comprised of SBS modified bitumen adhesive, factory-laminated to a tri-laminate woven, high-density polyethylene top surface. Release liner protecting adhesive. May be used as a temporary roof membrane for up to ninety (90) days.
 - III. Thickness: 0.0325" (0.826 mm) minimum, when tested in accordance with ASTM D 5147
- JJJ. Max Load at Break at 73 °F (23 °C): 64 lbf/in, MD (11 kN/m) 88 lbf/in, XMD (15 kN/m) when tested in accordance with ASTM D 5147
- KKK. Low Temperature Flexibility: -30 °F (-34 °C) when tested in accordance with ASTM D 5147
- LLL. Moisture Vapor Permeance, 0.02 Perms (0.92 Ng/Pa•s•m²) maximum, when tested in accordance with ASTM E 96
- MMM. Air Permeability: 0.00114 ft³/min•ft² (0.007 L/sec•m²) maximum, when tested in accordance with ASTM E 2178
- NNN. Acceptable Product: V-Force Vapor Barrier Membrane by Elevate.
- OOO. Metal Accessories
- PPP. Metal Roof Edging and Fascia: Continuous metal edge member serving as termination of roof membrane and retainer for metal fascia; watertight with no exposed fasteners; mounted to roof edge nailer
- QQQ. Wind Performance:
- RRR. Membrane Pull-Off Resistance: 100 lbs./ft (1460 N/m), minimum, when tested in accordance with ANSI/SPRI ES-1 Test Method RE-1, current edition
- SSS. Fascia Pull-Off Resistance: At least the minimum required when tested in accordance with ANSI/SPRI ES-1 Test Method RE-2, current edition
- TTT. Provide product listed in current Factory Mutual Research Corporation Approval Guide with at least FM 1-270 rating

- UUU. Description: Two-piece, 45° sloped galvanized steel sheet edge member securing top and bottom edges of formed metal fascia
- VVV. Fascia Face Height: 5" (127 mm)
- WWW. Edge Member Height Above Nailer: 1 ¼" (31 mm)
- XXX. Fascia Material and Finish: 24-gage, 0.024" (0.06 mm) galvanized steel with Kynar 500 finish in Manufacturer's standard color; matching concealed joint splice plates; factory-installed protective plastic film
- YYY. Length: minimum of 120" (3.048 m)
- ZZZ. Functional Characteristics: Fascia retainer supports while allowing for free thermal cycling of fascia
- AAAA. Acceptable Product: Appropriate Elevate pre-manufactured fascia system
- BBBB. Weldable Metal: Flexible non-reinforced thermoplastic polyolefin membrane factory laminated to hot-dipped galvanized steel, color to match roof membrane; UltraPly™ TPO Coated Metal
- CCCC. Aluminum Bar: Continuous 6063-T6 alloy aluminum extrusion with pre-punched slotted holes; miters welded; injection molded EPDM splices to allow thermal expansion
- DDDD. Anchor Bar Cleat: 20-gage, 0.036" (0.9 mm) G90 coated commercial type galvanized steel with pre-punched holes
- EEEE. Curved Applications: Factory modified
- FFFF. Fasteners: Factory-provided corrosion resistant fasteners, with drivers; no exposed fasteners permitted
- GGGG. Special Shaped Components: Provide factory-fabricated pieces necessary for complete installation, including miters, scuppers, and end caps; minimum 14" (355 mm) long legs on corner pieces
- HHHH. Scuppers: Welded watertight
 - IIII. Accessories: Provide matching brick wall cap, downspout, extenders, and other special fabrications as shown on the drawings
 - JJJJ. Parapet Copings: Formed metal coping with galvanized steel anchor/support cleats for capping any parapet wall; watertight, maintenance free, without exposed fasteners; butt type joints with concealed splice plates; mechanically fastened as indicated
- KKKK. Wind Performance:
 - LLLL. At least the minimum required when tested in accordance with ANSI/SPRI ES-1 Test Method RE-3, current edition.
- MMMM. Provide product listed in current Factory Mutual Research Corporation Approval Guide with at least FM 1-90 rating.

- NNNN. Description: Coping sections allowed to expand and contract freely while locked in place on anchor cleats by mechanical pressure from hardened stainless steel springs factory attached to anchor cleats; 8" (200 mm) wide splice plates with factory applied dual non-Curing sealant strips capable of providing watertight seal.
- OOOO. Material and Finish: 24-gage, 0.024" (0.06 mm) thick galvanized steel with Kynar 500 finish in Manufacturer's standard color; matching concealed joint splice plates; factory-installed protective plastic film.
- PPPP. Dimensions:
- QQQQ. Wall Width: As indicated on the drawings.
- RRRR. Piece Length: Minimum 144" (3.65 m).
- SSSS. Curved Application: Factory fabricated in true radius.
- TTTT. Anchor/Support Cleats: 20-gage, 0.036" (0.9 mm) thick pre-punched galvanized cleat with 12" (305 mm) wide stainless-steel spring mechanically locked to cleat at 72" (1.82 m) on center.
- UUUU. Special Shaped Components: Provide factory-fabricated pieces necessary for complete installation, including miters, corners, intersections, curves, pier caps, and end caps; minimum 14" (355 mm) long legs on corner, intersection, and end pieces.
- VVVV. Fasteners: Factory-furnished; electrolytically compatible; minimum pull out resistance of 240 lbs. (109 kg) for actual substrate used; no exposed fasteners.
- WWWW. Acceptable Product: Appropriate Elevate pre-manufactured coping system
- XXXX. Accessory Materials
- YYYY. Wood Nailers: PS 20-dimension lumber, Structural Grade No. 2 or better Southern Pine, Douglas Fir; or PS 1, APA Exterior Grade plywood; pressure preservative treated.
- ZZZZ. Width: as noted on drawings, nominal minimum, or as wide as the nailing flange of the roof accessory to be attached to it
- AAAAA. Thickness: Same as thickness of roof insulation

PART- 3 EXECUTION

3.1 GENERAL

- A. Install roofing, insulation, flashings, and accessories in accordance with roofing Manufacturer's published instructions and recommendations for the specified roofing system. Where Manufacturer provides no instructions or recommendations, follow good roofing practices and industry standards. Comply with federal, state, and local regulations.
- B. Obtain all relevant instructions and maintain copies at project site for duration of installation period.

- C. Do not start work until Pre-Installation Notice has been approved by Manufacturer as confirmation that this project qualifies for a Manufacturer's warranty.
- D. Perform work using competent and properly equipped personnel.
- E. Temporary closures, which ensure that moisture does not damage any completed section of the new roofing system, are the responsibility of the Applicator. Completion of flashings, terminations, and temporary closures shall be completed as required to provide a watertight condition.
- F. Install roofing membrane only when surfaces are clean, dry, smooth, and free of snow or ice; do not apply roofing membrane during inclement weather or when ambient conditions will not allow proper application; consult Manufacturer for recommended procedures during cold weather. Do not work with sealants and adhesives when material temperature is outside the range of 60 to 80 °F (15 to 25 °C).
- G. Protect adjacent construction, property, vehicles, and persons from damage related to roofing work; repair or restore damage caused by roofing work.
- H. Protect from spills and overspray from bitumen, adhesives, sealants, and coatings.
- I. Particularly protect metal, glass, plastic, and painted surfaces from bitumen, adhesives, and sealants within the range of wind-borne overspray.
- J. Protect finished areas of the roofing system from roofing related work traffic and traffic by other trades.
- K. Until ready for use, keep materials in their original containers as labeled by the Manufacturer.
- L. Consult membrane Manufacturer's instructions, container labels, and Safety Data Sheets (SDS) for specific safety instructions. Keep all adhesives, sealants, primers, and cleaning materials away from all sources of ignition.

3.2 EXAMINATION

- A. Examine roof deck to determine that it is sufficiently rigid to support installers and their mechanical equipment, and that deflection will not strain or rupture roof components or deform deck.
- B. Verify that surfaces and site conditions are ready to receive work. Correct defects in the substrate before commencing with roofing work. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
- C. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
- D. Examine roof substrate to verify that it is properly sloped to drains.
- E. Verify that the specifications and drawing details are workable and not in conflict with the roofing Manufacturer's recommendations and instructions; start of work constitutes acceptance of project conditions and requirements

3.3 PREPARATION

- A. Prior to proceeding, prepare roof surface so that it is clean, dry, and smooth, and free of sharp edges, fins, roughened surfaces, loose or foreign materials, oil, grease, and other materials that may damage the membrane.
- B. Fill all surface voids in the immediate substrate that are greater than 1/4" (6 mm) wide with fill material acceptable to membrane Manufacturer.
- C. Seal, grout, or tape deck joints, where needed, to prevent seepage into building.

3.4 VAPOR BARRIER INSTALLATION

- A. All substrates (except metal decks) must be primed prior to application. Use only primer supplied by membrane Manufacturer.
- B. Expanded Polystyrene, Extruded Polystyrene, Common Polyisocyanurate, Fiberglass, Wood Fiber, Perlite, and existing single-ply roofs are not acceptable substrates for SBS bitumen adhesive.
- C. Application can be made at ambient temperatures as low as 25 °F (-4 °C) as long as membrane has been stored in a heated area so that it will be between 50 °F (10 °C) and 100 °F (38 °C) at the time of application.
- D. Install with minimum 3" (76.2 mm) side laps and 6" (152.4 mm) end laps.
- E. Roll in with a 75 lb. (34 kg) roller to fully mate each roll to substrate, including all lap areas

3.5 INSULATION AND COVER BOARD INSTALLATION

- A. Install insulation in configuration and with attachment method(s) specified in PART 2, under Insulation.
- B. Install only as much insulation as can be covered with the completed roofing system before the end of the day's work or before the onset of inclement weather.
- C. Lay roof insulation in courses parallel to roof edges.
- D. Neatly and tightly fit insulation to all penetrations, projections, and nailers, with gaps not greater than 1/4" (6 mm). Fill gaps greater than 1/4" (6 mm) with acceptable insulation. Do not leave the roofing membrane unsupported over a space greater than 1/4" (6 mm).
- E. Mechanical Fastening: Using specified fasteners and insulation plates engage fasteners through insulation into deck to depth and in pattern required by Factory Mutual for specified FM Class and membrane Manufacturer, whichever is more stringent.
- F. Adhesive Attachment: Apply in accordance with membrane Manufacturer's instructions and recommendations; "walk-in" individual roof insulation boards to obtain maximum adhesive contact.

3.6 SINGLE-PLY MEMBRANE INSTALLATION

- A. Beginning at low point of roof, place membrane without stretching over substrate and allow to relax at least 30 minutes before attachment or splicing; in colder weather allow for longer relax time.
- B. Lay out the membrane pieces so that field and flashing splices are installed to shed water.
- C. Install membrane without wrinkles and without gaps or fishmouths in seams, and bond and test seams and laps in accordance with membrane Manufacturer's instructions and details.
- D. Adhered Membrane: Bond membrane sheet to substrate using membrane Manufacturer's recommended bonding material, application rate, and procedures.
- E. Edge Securement: Secure membrane at all locations where membrane terminates or goes through an angle change greater than 1:12 inches (8.3%) using mechanically fastened reinforced perimeter fastening strips, plates, or metal edging as indicated or as recommended by roofing Manufacturer. Exceptions: Round pipe penetrations less than 18" (460 mm) in diameter and square penetrations less than 4" (200 mm) square.
 - 1. Metal edging is not merely decorative; ensure anchorage of membrane as intended by roofing Manufacturer and compliant with IBC.

3.7 FLASHING AND ACCESSORIES INSTALLATION

- A. Install flashings, including laps, splices, joints, bonding, adhesion, and attachment, as required by membrane Manufacturer's recommendations and details.
- B. Metal Accessories: Install metal edgings, gravel stops, and copings in locations indicated on the drawings, with horizontal leg of edge member over membrane and flashing over metal onto membrane.
 - 1. Follow roofing Manufacturer's instructions.
 - 2. Use weldable TPO-coated metal where membrane-to-metal connections occur.
 - 3. Remove protective plastic surface film immediately before installation.
 - 4. Install water block sealant under the membrane anchorage leg.
 - 5. Flash with Manufacturer's recommended flashing sheet unless otherwise indicated.
 - 6. Where single application of flashing will not completely cover the metal flange, install additional piece of flashing to cover the metal edge.
 - 7. If the roof edge includes a gravel stop and sealant is not applied between the laps in the metal edging, install an additional piece of self-adhesive flashing membrane over the metal lap to the top of the gravel stop; apply seam edge treatment at the intersections of the two flashing sections.
 - 8. When the roof slope is greater than 1:12 (8.3%), apply seam edge treatment along the back edge of the flashing.

- C. Scuppers: Set TPO-coated metal scuppers in sealant and weld to membrane as recommended by Manufacturer.
- D. Roofing Expansion Joints: Install as shown on drawings and as recommended by roofing Manufacturer.
- E. Flashing at Walls, Curbs, and Other Vertical and Sloped Surfaces:
 - 1. Install weathertight flashing at all walls, curbs, parapets, skylights, and other vertical and sloped surfaces that the roofing membrane abuts to; extend flashing at least 8" (200 mm) above membrane surface.
 - 2. Use the longest practical flashing pieces.
 - 3. Evaluate the substrate and overlay and adjust installation procedure in accordance with membrane Manufacturer's recommendations.
 - 4. Complete the splice between flashing and the main roof sheet with specified splice adhesive before adhering flashing to the vertical surface.
 - 5. Provide termination directly to the vertical substrate as shown on roof drawings.
- F. Roof Drains:
 - 1. Taper insulation around drain to provide smooth transition from roof surface to drain. Use specified pre-manufactured tapered insulation with facer or suitable bonding surface to achieve slope; slope not to exceed Manufacturer's recommendations.
 - 2. Position membrane, then cut a hole for roof drain to allow $\frac{1}{2}$ " to $\frac{3}{4}$ " (12 to 19 mm) of membrane to extend inside clamping ring past drain bolts.
 - 3. Make round holes in membrane to align with clamping bolts; do not cut membrane back to bolt holes.
 - 4. Apply sealant on top of drain bowl where clamping ring seats below the membrane
 - 5. Install roof drain clamping ring and clamping bolts; tighten clamping bolts to achieve constant compression.
- G. Flashing at Penetrations: Flash all penetrations passing through the membrane; make flashing seals directly to the penetration.
- H. Pipes, Round Supports, and Similar Items: Flash with specified pre-molded pipe flashings wherever practical; otherwise use specified self-curing elastomeric flashing.
- I. Pipe Clusters and Unusual Shaped Penetrations: Provide penetration pocket at least 2" (50 mm) deep, with at least 1" (25 mm) clearance from penetration, sloped to shed water.
- J. Structural Steel Tubing: If corner radii are greater than $\frac{1}{4}$ " (6 mm) and longest side of tube does not exceed 12" (305 mm), flash as for pipes; otherwise, provide a standard curb with flashing.

- K. Flexible and Moving Penetrations: Provide weathertight gooseneck set in sealant and secured to deck, flashed as recommended by Manufacturer.

3.8 WALKWAY INSTALLATION

- A. Install walkways at access points to the roof, around rooftop equipment that may require maintenance, and where indicated on the drawings.
 - 1. Use specified walkway pads unless otherwise indicated.
 - 2. Walkway Pads: Adhere to the roofing membrane, spacing each pad at minimum of 1" (25 mm) and maximum of 3" (75 mm) from each other to allow for drainage.
 - 3. If installation of walkway pads over field fabricated splices or within 6" (150 mm) of a splice edge cannot be avoided, adhere another layer of flashing over the splice and extending beyond the walkway pad a minimum of 6" (150 mm) on either side.
 - 4. Prime the membrane, remove the release paper on the pad, press in place, and walk on pad to ensure proper adhesion.

3.9 FIELD QUALITY CONTROL

- A. Inspection by Manufacturer: Provide final inspection of the roofing system by a Technical Representative employed by roofing system Manufacturer specifically to inspect installation for warranty purposes (e.g., not a sales representative).
- B. Perform all corrections necessary for issuance of warranty.

3.10 CLEANING

- A. Clean all contaminants generated by roofing work from building and surrounding areas, including bitumen, adhesives, sealants, and coatings.
- B. Repair or replace building components and finished surfaces damaged or defaced due to the work of this section; comply with recommendations of Manufacturers of components and surfaces.
- C. Remove leftover materials, trash, debris, equipment from project site and surrounding areas.

3.11 PROTECTION

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Where construction traffic must continue over finished roof membrane, provide durable protection, and replace or repair damaged roofing to original condition.

- C. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- D. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07 5423

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Section, apply to work specified in this section.
- B. Refer to other sections of the specification, drawings, and detail to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 DEFINITIONS

- A. Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in fire rated wall and floor assemblies.

1.3 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

- A. Only tested firestop systems shall be used in specific locations as follows:
 - 1. Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.
 - 2. Blank openings through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.
 - 3. Openings and penetrations in fire-rated partitions or walls containing fire doors.
 - 4. Openings around structural members which penetrate floors or walls.

1.4 RELATED WORK OF OTHER SECTIONS

- A. Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - 1. Section 03 3000 - Cast-In-Place Concrete
 - 2. Section 07 8443 - Joint Firestopping
 - 3. Section 07 9000 - Sealants
 - 4. Section 09 2500 - Gypsum Drywall

5. Section 21 0000 - Fire Suppression
6. Section 22 0000 - Plumbing
7. Section 23 0000 - Heating, Ventilating, and Air Conditioning
8. Section 26 0000 - Electrical
9. Section 27 0000 - Communications

1.5 REFERENCES

- A. Test Requirements: ASTM E 814, "Standard Method of Fire Tests of Through Penetration Fire Stops"
- B. Test Requirements: UL 1479, "Fire Tests of Through-Penetration Firestops"
- C. Underwriters Laboratories (UL) of Northbrook, IL publishes tested systems in their "FIRE RESISTANCE DIRECTORY" that is updated annually.
 1. UL Fire Resistance Directory:
 - a. Firestop Devices (XHJI)
 - b. Fire Resistance Ratings (BXRH)
 - c. Through-Penetration Firestop Systems (XHEZ)
 - d. Fill, Voids, or Cavity Material (XHHW)
 - e. Forming Materials (XHKU)
- D. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments
- E. ASTM E 84, Standard Test Method for Surface Burning Characteristics of Building Materials.
- F. Inspection Requirements: ASTM E 2174, "Standard Practice for On-site Inspection of Installed Fire Stops."
- G. All major building codes: ICBO, SBCCI, BOCA, IBC
- H. NFPA 101 - Life Safety Code
- I. NFPA 70 - National Electric Code

1.6 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Provide through-penetration fire stop systems that comply with specified requirements of tested systems.

- B. Firestop System installation must meet requirements of ASTM E 814, UL 1479 or UL 2079 tested assemblies that provide a fire rating equal to that of construction being penetrated.
- C. Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.
- D. Firestop Systems do not reestablish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.
- E. For those firestop applications that exist for which no qualified tested system is available through a manufacturer, an engineering judgment derived from similar qualified tested system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineering judgment documents must follow requirements set forth by the International Firestop Council.

1.7 SUBMITTALS

- A. Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of qualified firestop systems to be used and manufacturer's installation instructions to comply with Section 01 6000 Submittals.
- B. Manufacturer's engineering judgment identification number and drawing details when no qualified tested system is available for an application. Engineering judgment must include both project name and contractor's name who will install firestop system as described in document.
- C. Submit safety data sheets provided with product delivered to job-site.

1.8 INSTALLER QUALIFICATIONS

- A. Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements. A supplier's willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.
- B. The work is to be installed by a contractor with at least one of the following qualifications:
 - 1. FM 4991 Approved Contractor
 - 2. UL Approved Contractor
 - 3. Hilti Accredited Fire Stop Specialty Contractor
- C. Firm with not less than 3 years experience with fire stop installation.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type and UL label where applicable.
- B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.
- C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.
- D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.
- E. Do not use damaged or expired materials.

1.10 PROJECT CONDITIONS

- A. Do not use materials that contain flammable solvents.
- B. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.
- C. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.
- D. Weather conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.
- E. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

PART- 2 PRODUCTS

2.1 FIRESTOPPING - GENERAL

- A. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.
- B. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.
- C. Penetrations in Fire Resistance Rated Walls: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.
 - 1. F-Rating: Not less than the fire-resistance rating of the wall construction being penetrated.

- D. Penetrations in Horizontal Assemblies: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.
 - 1. F-Rating: Minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.
 - 2. T-Rating: when penetrant is located outside of a wall cavity, minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.
 - 3. W-Rating: Class 1 rating in accordance with water leakage test per UL 1479.
- E. Penetrations in Smoke Barriers: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.
 - 1. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at both ambient and elevated temperatures.
- F. Mold Resistance: Provide penetration firestopping with mold and mildew resistance rating of zero (0) as determined by ASTM G21.
- G. Firestopping Materials are either “cast-in-place” (integral with concrete placement) or “post installed.” Provide cast-in-place firestop devices prior to concrete placement.

2.2 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with through penetration firestop systems (XHEZ) listed in Volume II of the UL Fire Resistance Directory, provide products of the following manufacturer as identified below:
 - 1. Basis of Design:
 - a. Hilti, Inc., Plano, Texas
800-879-8000
www.us.hilti.com
 - 2. Substitution requests shall be considered in accordance with contract provisions and the performance requirements outlined in this document.

2.3 MATERIALS

- A. Use only firestop products that have been UL 1479, ASTM E 814 or UL 2079 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.
- B. Pre-formed firestop devices for use with noncombustible and combustible pipes (closed and open systems), conduit, and/or cable bundles penetrating concrete floors the following products are acceptable:

1. Hilti Cast-In Place Firestop Device (CP 680-P)
 - a. Add Aerator Adaptor when used in conjunction with aerator system.
 2. Hilti Cast-In Place Firestop Device (CP 680-M) for use with noncombustible penetrants.
 3. Hilti Cast-in Place Firestop System for Metal Decks (CFS CID MD P) including all components as described by manufacturer for proper installation.
 4. Hilti Cast-in Place Firestop System for Metal Decks (CFS CID MD M) including all components as described by manufacturer for proper installation, for use with noncombustible penetrants.
 5. Hilti Tub Box Kit (CP 681) for use with tub installations.
 6. Hilti Firestop Speed Sleeve (CP 653) for use with cable penetrations.
 7. Hilti Firestop Drop-In Device (CFS-DID) for use with noncombustible and combustible penetrants.
 8. Hilti Firestop Block (CFS-BL)
 9. Hilti Closet Stub (CFS-CID CS)
- C. Sealants, caulking materials, or foams for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT), the following products are acceptable:
1. Hilti Intumescent Firestop Sealant (FS-ONE MAX)
 2. Hilti Fire Foam (CP 620)
 3. Hilti Flexible Firestop Sealant (CP 606)
 4. Hilti Firestop Silicone Sealant Gun Grade (CFS-S SIL GG)
 5. Hilti Firestop Silicone Sealant Self Leveling (CFS-S SIL SL)
- D. Sealants or caulking materials for use with sheet metal ducts, the following products are acceptable:
1. Hilti Silicone Sealant Gun Grade (CFS-S SIL GG)
 2. Hilti Firestop Silicone Sealant Self Leveling (CFS-S SIL SL)
 3. Hilti Flexible Firestop Sealant (CP 606)
 4. Hilti Intumescent Firestop Sealant (FS-ONE MAX)

- E. Intumescent sealants, caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe, the following products are acceptable:
 - 1. Hilti Intumescent Firestop Sealant (FS-ONE MAX)
- F. Foams, intumescent sealants, or caulking materials for use with flexible cable or cable bundles, the following products are acceptable:
 - 1. Hilti Intumescent Firestop Sealant (FS-ONE MAX)
 - 2. Hilti Fire Foam (CP 620)
 - 3. Hilti Flexible Firestop Sealant (CP 606)
 - 4. Hilti Firestop Silicone Sealant Gun Grade (CFS-S SIL GG)
 - 5. Hilti Firestop Silicone Sealant Self Leveling (CFS-S SIL SL)
- G. Non-curing, re-penetrable intumescent putty or foam materials for use with flexible cable or cable bundles, the following products are acceptable:
 - 1. Hilti Firestop Putty Stick (CP 618)
 - 2. Hilti Firestop Plug (CFS-PL)
- H. Wall opening protective materials for use with U.L. listed metallic and specified nonmetallic outlet boxes, the following products are acceptable:
 - 1. Hilti Firestop Putty Pad (CFS-P PA)
 - 2. Hilti Firestop Putty Pad (CP 617)
 - 3. Hilti Firestop Box Insert
- I. Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems), the following products are acceptable:
 - 1. Hilti Firestop Collar (CP 643N)
 - 2. Hilti Firestop Collar (CP 644)
 - 3. Hilti Wrap Strips (CP 648-E/648-S)
- J. Materials used for large openings and complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:
 - 1. Hilti Firestop Block (CFS-BL)

2. Hilti Composite Sheet (CFS-COS)
 3. Hilti Firestop Mortar (CP 637)
 4. Hilti Fire Foam (CP 620)
 5. Hilti Firestop Board (CP 675T)
- K. Non curing, re-penetrable materials used for large size/complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:
1. Hilti Firestop Block (CFS-BL)
 2. Hilti Firestop Board (CP 675T)
- L. Re-penetrable, round cable management devices for use with new or existing cable bundles penetrating gypsum or masonry walls, the following products are acceptable:
1. Hilti Firestop Speed Sleeve (CP 653) with integrated smoke seal fabric membrane.
 2. Hilti Firestop Cable Collar (CFS-CC)
 3. Hilti Firestop Sleeve (CFS-SL SK)
 4. Hilti Retrofit Sleeve (CFS-SL RK) for use with existing cable bundles.
 5. Hilti Gangplate (CFS-SL GP) for use with multiple cable management devices.
 6. Hilti Gangplate Cap (CFS-SL GP CAP) for use at blank openings in gangplate for future penetrations.
- M. For blank openings made in fire-rated wall or floor assemblies, where future penetration of pipes, conduits or cables is expected, the following products are acceptable:
1. 1. Hilti Firestop Block (CFS-BL)
 2. 2. Hilti Firestop Plug (CFS-PL)
- N. For single or cable bundles up to one inch diameter penetrating gypsum, masonry, concrete walls or wood floor assemblies the following product is acceptable:
1. Hilti Firestop Cable Disc (CFS-D)

PART- 3 EXECUTION

3.1 PREPARATION

- A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
 - 1. Verify penetrations are properly sized and in suitable condition for application of materials.
 - 2. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
 - 3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
 - 4. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
 - 5. Do not proceed until unsatisfactory conditions have been corrected.

3.2 COORDINATION

- A. Coordinate construction of openings, penetrations and construction joints to ensure that the fire stop systems are installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration fire stop systems. Coordinate construction and sizing of joints to ensure that fire-resistive joint systems are installed according to specified requirements.
- C. Coordinate fire stopping with other trades so that obstructions are not placed in the way prior to the installation of the fire stop systems.
- D. Do not cover up through-penetration fire stop and joint system installations that will become concealed behind other construction until each installation has been examined by the building inspector, per requirements of Section 109, International Building Code 2000, ed.

3.3 INSTALLATION

- A. Regulatory Requirements: Install firestop materials in accordance with UL Fire Resistance Directory.
- B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration materials.
 - 1. Seal all holes or voids made by penetrations to ensure an air and water-resistant seal.

2. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of UL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
3. Protect materials from damage on surfaces subjected to traffic.

3.4 FIELD QUALITY CONTROL

- A. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.
- B. Keep areas of work accessible until inspection by applicable code authorities.
- C. Inspection of through-penetration firestopping shall be performed in accordance with ASTM E 2174, "Standard Practice for On-Site Inspection of Installed Fire Stops" or other recognized standard.
- D. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.
- E. Manufacturer's Field Services: Contractor to ensure a manufacturer's direct representative is on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. Training will be done per manufacturer's written recommendations published in their literature and drawing details. During installation, contractor shall have manufacturer's representative provide periodic visual observations and written documentation of the results. Contact Hilti for support at 800.879.8000.

3.5 IDENTIFICATION & DOCUMENTATION

- A. The firestop contractor is to supply documentation for each single application addressed. This documentation is to identify each penetration and joint location on the entire project.
 1. The Documentation Form for through penetrations is to include:
 - a. A Sequential Location Number
 - b. The Project Name
 - c. Date of Installation
 - d. Detailed Description of the Penetration's Location
 - e. Tested System or Engineered Judgment Number
 - f. Type of Assembly Penetrated
 - g. A Detailed Description of the Size and Type of Penetrating Item
 - h. Size of Opening
 - i. Number of Sides of Assemblies Addressed

- j. Hourly Rating to be achieved.
 - k. Installer's Name
- B. Copies of these documents are to be provided to the general contractor at the completion of the project.
- C. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
1. The words: "Warning: Through Penetration Firestop System – Do Not Disturb. Notify Building Management of Any Damage."
 2. Contractor's name, address and phone number.
 3. Through-penetration firestop system designation of applicable testing and inspecting agency.
 4. Date of installation.
 5. Through-penetration firestop system manufacturer's name.
 6. Installer's name.
- D. A firestop documentation manager software shall be used to document, track, and maintain the passive firestop systems throughout the construction and maintenance phase of the facility. The software solution shall be used to track and document every firestop system installed on the project and each subsequent addition, change, or removal of the firestop system. The firestop documentation shall be managed with a cloud-based software which allows the installer to use a standard smartphone or tablet device (either iOS, Android or Windows capable) to capture the relevant information for the installation. The following data shall be tracked for each penetration within the facility: product installed, system installed, date of installation, location of the penetration including a notation on the 2D plan image, F-rating, name of installer, photo (pre-installation and post-installation), and inspection status. The Owner and/ or Construction Manager may designate additional items to be tracked. The firestop documentation manager software must perform the following basic functions:
1. Create multiple projects/ facilities, add/create/ remove users for each project, upload documents including UL systems, 2D floor plans, product data, engineering judgments, etc.
 2. Define data to track using pre-defined input fields or creating custom input fields as desired.
 3. Capture multiple photos for each penetration, including a pre-installation and post-installation photo.
 4. Scan QR Code on Hilti identification label to link the program data to a specific penetration location.
 5. Annotate (mark) location of penetration on 2D floor plan.
 6. Create reports by filtering data and utilizing report templates.

7. Online/ offline (for use in areas where data service is unavailable) synchronization of data between mobile device, online application and cloud-based system.
 8. Ability to transfer ownership of projects from one customer to another from construction phase to facility maintenance.
- E. Permanently attach Hilti identification labels to surfaces adjacent to and within 6 inches (150 mm) of firestopping edge so labels will be visible to anyone seeking to remove or change penetrating items or firestopping. Labels shall have a unique QR code for each penetration which can be scanned by the firestop documentation software to quickly identify the penetration attributes.
- F. Acceptable Software: Hilti CFS-DM, from Hilti Inc., Tulsa, OK. Tel (800) 879-8000 or Hilti (Canada) Corporation, Mississauga, Ontario (800) 363-4458 website: www.us.hilti.com or www.hilti.ca.com
1. Single Source: Obtain firestop documentation manager software and firestop systems for each type of penetration and construction condition indicated only from a single manufacturer.

3.6 ADJUSTING AND CLEANING

- A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.
- B. Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.

3.7 LABOR USE TO INSTALL FIRESTOP SYSTEMS

- A. To ensure complete harmony on the project site, the installation of each scope of work is to be performed jurisdictionally correct per existing trade agreements.

3.8 SCHEDULE OF THROUGH PENETRATION FIRESTOP SYSTEMS

CONCRETE FLOORS			CONCRETE OR BLOCK WALLS		
TYPE OF PENETRANT	F-RATING (HR)	BASIS OF DESIGN UL SYSTEM	TYPE OF PENETRANT	F-RATING (HR)	BASIS OF DESIGN UL SYSTEM
CIRCULAR BLANK OPENINGS	1	F-A-0006, C-AJ-0055, C-AJ-0090	CIRCULAR BLANK OPENINGS	1	C-AJ-0055, C-AJ-0090
	2	F-A-0006, C-AJ-0055, C-AJ-0090		2	C-AJ-0055, C-AJ-0090
	3	F-A-0006, C-AJ-0055, C-AJ-0086,		3	C-AJ-0055, C-AJ-0086
SINGLE METAL PIPES OR CONDUIT	1	C-AJ-1226, F-A-1028, F-A-1017	SINGLE METAL PIPES OR CONDUIT	1	C-AJ-1226, W-J-1067, W-J-1020
	2	C-AJ-1226, F-A-1028, F-A-1017		2	C-AJ-1226, W-J-1067, W-J-1020, W-J-1248
	3	C-AJ-1226, F-A-1017		3	C-AJ-1226, W-J-1041, W-J-1068
	4	C-BJ -1037, C-BJ-1034		4	C-BJ-1034, C-BJ-1037, W-J-1041, W-J-1042, W-J-1068
SINGLE NON-METALLIC PIPE OR CONDUIT (I.E. PVC, CPVC, ABS, FRP, ENT)	1	F-A-2053, F-A-2025, C-AJ-2109, C-AJ-2098, C-AJ-2271, C-AJ-2167,	SINGLE NON-METALLIC PIPE OR CONDUIT (I.E. PVC, CPVC, ABS, FRP, ENT)	1	C-AJ-2109, C-AJ-2098, C-AJ-2167, C-AJ-2371, C-AJ-2342
	2	C-AJ-2098, C-AJ-2271, C-AJ-2167, C-BJ-2021, C-AJ-2371, C-AJ-2342		2	C-AJ-2109, C-AJ-2098, C-AJ-2167, C-AJ-2371, C-AJ-2342
	3	F-A-2054, C-AJ-2109, C-AJ-2098, C-AJ-2371, C-AJ-2342		3	C-AJ-2109, C-AJ-2098, C-AJ-2371, C-AJ-2342
	4	C-BJ 2016, C-AJ-2017		4	W-J-2057, W-J-2091
SINGLE/CABLE BUNDLES	1	F-A-3007,C-AJ-3095,C-AJ-3180, C-AJ-3283	SINGLE/CABLE BUNDLES	1	W-J-3036, C-AJ-3095, C-AJ-3180, W-J-3060, W-J-3167
	2	F-A-3007,C-AJ-3095,C-AJ-3334, F-A-3060		2	W-J-3036, C-AJ-3095, C-AJ-3180, W-J-3060, W-J-3167, W-J-3189
	3	F-A-3007, C-AJ 3095, C-AJ-3285		3	C-AJ-3095, C-AJ-3180, W-J-3167
				4	W-J-3050
CABLE TRAY	1	C-AJ-4034, C-AJ-4035	CABLE TRAY	1	W-J-4027, C-AJ-4034, C-AJ-4035
	2	C-AJ-4034, C-AJ-4035		2	W-J-4027, C-AJ-4034, C-AJ-4035
	3	C-AJ-4034, C-AJ-4035		3	C-AJ-4034, C-AJ-4035
				4	W-J-8007
SINGLE INSULATED PIPES	1	F-A 5015, F-A 5017, C-AJ-5090, C-AJ-5091, C-AJ-5090, C-AJ-5048	SINGLE INSULATED PIPES	1	C-AJ-5090, C-AJ-5091, C-AJ 5061, W-J-5042
	2	F-A 5015, F-A 5017, C-AJ-5090, C-AJ-5091, C-AJ-5090		2	C-AJ-5090, C-AJ-5091, C-AJ-5061, W-J-5042

	3	F-A 5016, C-AJ-5090, F-A-5018		3	C-AJ-5090, C-AJ-5061
	4	C-BJ-5006		4	C-BJ-5006, W-J-5028
ELECTRICAL BUSWAY	1	C-AJ-6006, C-AJ-6017, F-A-6002, C-AJ-6036	ELECTRICAL BUSWAY	1	C-AJ-6006, C-AJ-6017, C-AJ-6036
	2	C-AJ-6006, C-AJ-6017, F-A 6042, C-AJ-6036		2	C-AJ-6006, C-AJ-6017, C-AJ-6036
	3	C-AJ-6006, C-AJ-6017		3	C-AJ-6006, C-AJ-6017
MECHANICAL DUCTWORK WITHOUT DAMPERS NON-INSULATED	1	C-AJ-7046, C-AJ-7051, C-AJ-7084	MECHANICAL DUCTWORK WITHOUT DAMPERS NON-INSULATED	1	C-AJ-7046, C-AJ-7051, W-J-7021, W-J-7022
	2	C-AJ-7046, C-AJ-7051, C-AJ-7085		2	C-AJ-7046, C-AJ-7051, W-J-7021, W-J-7022
	3	C-AJ-7046, C-AJ-7051		3	C-AJ-7046, C-AJ-7051
MECHANICAL DUCTWORK WITHOUT DAMPERS INSULATED	N/A**	N/A**	MECHANICAL DUCTWORK WITHOUT DAMPERS INSULATED	1	W-J-7029, W-J-7124
				2	W-J-7091, W-J-7112, W-J-7124
MIXED PENETRANTS	1	C-AJ 8099, C-AJ-8056, C-AJ-8143	MIXED PENETRANTS	1	C-AJ 8099, C-AJ 8056, W-J 8007, C-AJ 8143
	2	C-AJ-8099, C-AJ-8056, C-AJ-8143		2	C-AJ 8099, C-AJ 8056, W-J 8007, C-AJ 8143
	3	C-AJ-8099, C-AJ-8056		3	C-AJ 8041, C-AJ 8056, W-J 8007, C-AJ 8099
	4	C-AJ-8095		4	C-AJ 8095, W-J 8007
WOOD FLOORS			GYPSUM WALLS		
TYPE OF PENETRANT	F-RATING (HR)	BASIS OF DESIGN UL SYSTEM	TYPE OF PENETRANT	F-RATING (HR)	BASIS OF DESIGN UL SYSTEM
METAL PIPES OR CONDUIT	1	F-C-1009, F-C-1059, F-C-1168	METAL PIPES OR CONDUIT	1	W-L-1054, W-L-1058, W-L-1164, W-L-1506
	2	F-C-1009, F-C-1059, F-C-1168		2	W-L-1054, W-L-1058, W-L-1164, W-L-1506
				4	W-L-1110, W-L-1111, W-L-1165
NON-METALLIC PIPE OR CONDUIT	1	F-C-2232, F-C-2030, F-C-2160, F-C-2389	NON-METALLIC PIPE OR CONDUIT	1	W-L-2078, W-L-2075, W-L-2128
	2	F-C-2029, F-C-2030, F-C-2128, F-C-2160		2	W-L-2078, W-L-2075, W-L-2128
				4	W-L-2184, W-L-2245
SINGLE OR BUNDLED CABLES	1	F-C-3012, F-C-3110, F-C-3044	SINGLE OR BUNDLED CABLES	1	W-L-3065, W-L-3111, W-L-3112, W-L-3334, W-L-3414, W-L-3396
	2	F-C-3012, F-C-3110		2	W-L-3065, W-L-3111, W-L-3112, W-L-3334, W-L-3414, W-L-3396
				3	W-L-3385, W-L-3277
				4	W-L-3139, W-L-3334

INSULATED PIPES	1	F-C-5004, F-C-5037, F-C-5036	CABLE TRAY	1	W-L-4011, W-L-4019, W-L-4081
				2	W-L-4011, W-L-4019, W-L-4081
				4	W-L 8014
	2	F-C-5004, F-C-5037	INSULATED PIPES	1	W-L-5028, W-L-5029, W-L-5047
				2	W-L-5028, W-L-5029, W-L-5047
				4	W-L-5073
NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	F-C-7013	NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	W-L 7017, W-L-7040, W-L-7042, W-L-7155
				2	W-L-7040, W-L-7042, W-L-7155
INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	N/A**	INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	W-L-7059, W-L-7153, W-L-7156, W-L-7151
	2	N/A**		2	W-L-7059, W-L-7153, W-L-7156, W-L-7151
MIXED PENETRANTS	1	F-C-8009, F-C-8014, F-C-8026	MIXED PENETRANTS	1	W-L-1095, W-L-8013
				2	W-L-1095, W-L-8013
				4	W-L-8014

COMPOSITE METALDECK FLOORS

TYPE OF PENETRANT	FLOOR COVERAGE	F-RATING (HR)	BASIS OF DESIGN UL SYSTEM
CIRCULAR BLANK OPENINGS	2-1/2"	2	F-A-0040
	4-1/2"	2	F-A-0040, F-A-0041
SINGLE METALLIC PIPE OR CONDUIT (STEEL, IRON, COPPER)	2-1/2"	2	F-A-1192, F-A-1193
	4-1/2"	3	F-A-1192, F-A-1193
	4-1/2"	2	F-A-1194
SINGLE NON-METALLIC PIPE OR CONDUIT (I.E. PVC, CPVC, ABS, FRP, ENT)	2-1/2"	2	F-A-2310, FA-2311
	4-1/2"	2	F-A-2313, F-A-2314, F-A-2315, F-A-2316
	4-1/2"	3	F-A-2310, FA-2311, F-A-2312
SINGLE/CABLE BUNDLES	2-1/2"	3	F-A-3071, F-A-3072
SINGLE INSULATED PIPES	2-1/2"	2	F-A-5069, F-A-5070, F-A-5071
	4-1/2"	3	F-A-5069, F-A-5070, F-A-5071
MIXED PENETRANTS	4-1/2"	3	F-A-8055

END OF SECTION 07 8413

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Section, apply to work specified in this section.
- B. Refer to other sections of the specification, drawings, and detail to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 DEFINITIONS

- A. Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in fire rated wall and floor assemblies.

1.3 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

- A. Only tested and listed firestop systems shall be used in specific locations as follows:
 - 1. Safing slot gaps between edge of floor slabs and perimeter curtain walls.
 - 2. Openings between structurally separate sections of wall or floors.
 - 3. Gaps between the top of walls and ceilings or roof assemblies.
 - 4. Expansion joints in walls and floors.

1.4 RELATED WORK OF OTHER SECTIONS

- A. Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - 1. Section 03 3000 - Cast-In-Place Concrete
 - 2. Section 07 8413 - Penetration Firestopping
 - 3. Section 07 9000 – Sealants
 - 4. Section 09 2500 - Gypsum Drywall

1.5 REFERENCES

- A. Underwriters Laboratories, Inc. (UL) Fire Resistance Directory, Volume II, updated annually:
 - 1. Joint Systems (XHBN)
 - 2. Perimeter Fire Containment Systems (XHDG)
 - 3. Fire Resistance Ratings (BXRH)
 - 4. Fill, Voids, or Cavity Material (XHHW)
 - 5. Forming Materials (XHKU)
- B. Omega Point Laboratories, Inc. (OPL) Listed Products Directory, Volume II, updated annually:
 - 1. Fire Resistant Joint Systems
- C. ASTM E 1966, "Standard Test Method for Fire-Resistive Joint Systems"
- D. ASTM E 1399, "Test Method for Cyclic Movement and Measuring the Minimum and Maximum Joint Width of Architectural Joint Systems"
- E. ASTM E 84, "Standard Test Method for Surface Burning Characteristics of Building Materials"
- F. ASTM E 2174, "Standard Practice for On-Site Inspection of Installed Fire Stops"
- G. ASTM E 2307, "Standard Test Method for Determining the Fire Endurance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus."
- H. ANSI/UL 2079, "Tests for Fire Resistance of Building Joint Systems"
- I. ASTM D6904, "Standard Practice for Resistance to Wind-Driven Rain"
- J. International Firestop Council Recommended (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments
- K. International Building Code (IBC 2009)
- L. NFPA 101 - Life Safety Code
- M. ASTM C679, "Standard Test Method for Tack-Free Time of Elastomeric Sealants"

1.6 QUALITY ASSURANCE

- A. A manufacturer's direct representative (not distributor or agent) to be on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. This will be done per manufacturer's written recommendations published in their literature and drawing details.

- B. Firestop System installation shall meet requirements of ASTM E 1966 and/or ANSI/UL 2079 tested and listed assemblies that provide fire-resistance ratings not less than that of the construction in which the joint occurs.
- C. Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.
- D. Firestop Systems do not reestablish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.
- E. For those firestop applications that exist for which no tested and listed system is available through a manufacturer, an engineering judgment derived from similar tested system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineering judgment documents shall follow requirements set forth by the International Firestop Council.

1.7 SUBMITTALS

- A. Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of tested firestop systems to be used and manufacturer's installation instructions to comply with Section 01 3000.
- B. Manufacturer's engineering judgment identification number and details when no tested and listed system is available for an application. Engineering judgment shall include both project name and contractor's name who will install firestop system as described in document.
- C. Submit safety data sheets provided with product delivered to job-site.

1.8 INSTALLER QUALIFICATIONS

- A. Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements. A manufacturer's willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.
- B. The work is to be installed by a contractor with at least one of the following qualifications:
 - 1. FM 4991 Approved Contractor
 - 2. UL Approved Contractor
 - 3. Hilti Accredited Fire Stop Specialty Contractor
- C. Installer shall have not less than 3 years' experience with fire stop installation.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL or OPL label, where applicable.
- B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.
- C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.
- D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.
- E. Do not use damaged or expired materials.

1.10 PROJECT CONDITIONS

- A. Do not use materials that contain flammable solvents.
- B. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.
- C. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.
- D. Weather conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.
- E. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.
- F. Comply with ASTM D 6905 (modified) for resistance to wind driven rain and water.

PART- 2 PRODUCTS

2.1 JOINT FIRESTOPPING - GENERAL

- A. Provide firestopping composed of components that are compatible with each other and substrates forming joints under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.
- B. Provide components for each fire-resistive joint system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.
- C. Joints in or between Fire Rated Construction: Provide joint firestopping systems with ratings determined per UL 2079 or ASTM E 1966:

1. F-Rating: not less than the fire resistance rating of the construction they will join.
 2. Firestop Top Track Seal: For metal stud partitions installed on flat concrete slab use one-piece, pre-formed, polyurethane foam based, firestop seal for use with standard head-joint top tracks, and slip-type head joints in fire-rated construction at top of partition to maintain continuity of the fire-resistance-rated assembly indicated. Provide in width and configuration required to accommodate depth and installation of studs and designed to saddle-over the top track.
 3. Firestop Top Track Seal for metal deck: For metal stud partitions installed to underside of metal deck, use one-piece, pre-formed, polyurethane foam based, firestop seal for use with standard head-joint top tracks and slip-type head joints in fire-rated construction at top of partition to maintain continuity of the fire-resistance-rated assembly indicated. Provide in width and configuration required to accommodate depth and installation of studs and designed to saddle-over the top track. Refer to manufacturers installation instructions for plug and cover usage to completely seal off void's formed by metal deck flutes.
- D. Joints at Exterior Curtain Wall / Floor Intersections: Provide joint firestopping systems with ratings determined per ASTM E 2307:
1. F-Rating: not less than the fire resistance rating of the construction they will join.
 2. For the edge of slab conditions use pre-formed polyurethane foam based material for use as part of a perimeter fire barrier between fire resistance rated floors and exterior wall assemblies. Use tested systems HI/BPF 120-18, HI/BPF 120-19 issued by Intertek Laboratories.
 3. For edge of slab conditions with a full height vision glass, or for conditions which do not contain an insulated spandrel at the floor line, only tested system HI/BPF 120-10 issued by Intertek Laboratories shall be used. If the tested system does not meet the project conditions, an engineering judgment derived from HI/BPF 120-10 shall be submitted to local authorities having jurisdiction for their review and approval prior to installation.
 4. Basis of design: Preformed material for use as part of a perimeter fire barrier system between fire resistance rated floors and exterior wall assemblies,
- E. Joints in Smoke Barriers: Provide joint firestopping systems with ratings determined per UL 2079:
1. L-Rating: Not exceeding 5.0 cfm/ft. of joint at both ambient and elevated temperatures.
- F. Joints at Intersection between Rated Wall Assemblies and Nonrated Horizontal Assemblies: Provide joint firestopping systems with ratings determined by ASTM E 2837.
- G. Mold Resistance: Provide joint firestopping system sealant with mold and mildew resistance rating of one (1) or less as determined by ASTM G21.
- H. Rain and water resistance: provide perimeter joint sealant tested in accordance with ASTM D 6904 with less than 1 hour tack free time as tested in accordance with ASTM C 679.

2.2 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with joint systems (XHBN) listed in Volume II of the UL Fire Resistance Directory or OPL Listed Products Directory; provide products of the following manufacturer as identified below:

1. Basis of Design:
 - a. Hilti, Inc., Plano, Texas
 - b. Substitution requests shall be considered in accordance with contract provisions.

2.3 MATERIALS

- A. Use only firestop products that have been tested in accordance with ASTM E 1966 and/or ANSI/UL 2079 for specific rated construction conditions conforming to construction assembly type, movement capability, spacing requirements, and fire-resistance-rating involved for each separate instance.
- B. Sealants, sprays, or pre-formed materials for use with fire-rated construction joints and other gaps, the following products are acceptable:
1. Hilti Firestop Top Track Seal (CFS-TTS)
 2. Hilti Firestop Top Track Seal for Metal deck (CFS-TTS MD)
 3. Hilti Firestop Joint Spray (CFS-SP WB)
 4. Hilti Firestop Silicone Joint Spray (CFS-SP SIL)
 5. Hilti Flexible Firestop Sealant (CP 606)
 6. Hilti Firestop Silicone Sealant Gun Grade (CFS-S SIL GG)
 7. Hilti Firestop Silicone Sealant Self Leveling (CFS-S SIL SL)
 8. Hilti bottom of wall sealant CP 605
- C. Pre-formed materials or sealants for use as part of a Perimeter Fire Barrier System between fire-resistance-rated floors and exterior wall assemblies, the following products are acceptable:
1. Hilti Preformed Firestop System (CFS-EOS QuickSeal)
 2. Hilti Firestop Joint Spray (CFS-SP WB)
 3. Hilti Firestop Silicone Joint Spray (CFS-SP SIL)
 4. Hilti Firestop Silicone Sealant Gun Grade (CFS-S SIL GG)
 5. Hilti Firestop Silicone Sealant Self Leveling (CFS-S SIL SL)

- D. Pre-formed mineral wool designed to fit flutes of metal profile deck and gap between top of wall and metal deck profile; use as a backer for spray material.
 - 1. Hilti Speed Plugs (CP 777)
 - 2. Hilti Speed Strips (CP 767)
- E. Pre-formed mineral wool designed to fit flutes of metal profile deck and gap between top of wall and metal deck profile;
 - 1. Hilti 1.5" Plug (CFS-TTS MD P1.5 - Plug)
 - 2. Hilti 2" Plug (CFS-TTS MD P1.5 - Plug)
 - 3. Hilti 3" Plug (CFS-TTS MD P1.5 - Plug)
 - 4. Hilti 1.5" Cover (CFS-TTS MD C1.5 - Cover)
 - 5. Hilti 2" Cover (CFS-TTS MD C2 - Cover)
 - 6. Hilti 3" Cover (CFS-TTS MD C3 - Cover)
- F. Provide a firestop system with an Assembly Rating as determined by ASTM E 1966 and/or ANSI/UL 2079 which is equal to the fire-resistance ratings of the construction in which the joint occurs.

PART- 3 EXECUTION

3.1 PREPARATION

- A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
 - 1. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
 - 2. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
 - 3. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
 - 4. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Regulatory Requirements: Install firestop materials in accordance with UL Fire Resistance Directory or Omega Point Laboratories Listed Products Directory.

- B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of construction joint materials.

- 1. Protect materials from damage on surfaces subjected to traffic.

3.3 FIELD QUALITY CONTROL

- A. Examine sealed joints to ensure proper installation before concealing or enclosing areas.
- B. Keep areas of work accessible until inspection by applicable code authorities and/or independent inspection agency.
- C. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.
- D. Manufacturer's Field Services: Contractor to ensure a manufacturer's direct representative is on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. Training will be done per manufacturer's written recommendations published in their literature and drawing details. During installation, contractor shall have manufacturer's representative provide periodic visual observations and written documentation of the results. Contact Hilti for support at 800.879.8000.

3.4 IDENTIFICATION & DOCUMENTATION

- A. The firestop contractor is to supply documentation for each single application addressed. This documentation is to identify each penetration and joint location on the entire project.
- B. The Documentation Form for Construction Joints is to include:
 - 1. A Sequential Location Number
 - 2. The Project Name
 - 3. Date of Installation
 - 4. Detailed description of the Construction Joints location
 - 5. Tested System or Engineered Judgment Number
 - 6. Type of Construction Joint
 - 7. The Width of the Joint
 - 8. The Lineal Footage of the Joint
 - 9. Number of sides addressed
 - 10. Hourly rating to be achieved

11. Installers Name

- C. Copies of these documents are to be provided to the general contractor at the completion of the project.
- D. A firestop documentation manager software shall be used to document, track, and maintain the passive firestop systems throughout the construction and maintenance phase of the facility. The software solution shall be used to track and document every firestop system installed on the project and each subsequent addition, change, or removal of the firestop system. The firestop documentation shall be managed with a cloud-based software which allows the installer to use a standard smartphone or tablet device (either iOS, Android or Windows capable) to capture the relevant information for the installation. The following data shall be tracked for each penetration within the facility: product installed, system installed, date of installation, location of the penetration including a notation on the 2D plan image, F-rating, name of installer, photo (pre-installation and post-installation), and inspection status. The Owner and/ or Construction Manager may designate additional items to be tracked. The firestop documentation manager software must perform the following basic functions:
 - 1. Create multiple projects/ facilities, add/create/ remove users for each project, upload documents including UL systems, 2D floor plans, product data, engineering judgments, etc.
 - 2. Define data to track using pre-defined input fields or creating custom input fields as desired.
 - 3. Capture multiple photos for each penetration, including a pre-installation and post-installation photo.
 - 4. Scan QR Code on Hilti identification label to link the program data to a specific penetration location.
 - 5. Annotate (mark) location of penetration on 2D floor plan.
 - 6. Create reports by filtering data and utilizing report templates.
 - 7. Online/ offline (for use in areas where data service is unavailable) synchronization of data between mobile device, online application and cloud-based system.
 - 8. Ability to transfer ownership of projects from one customer to another from construction phase to facility maintenance.
- E. Permanently attach Hilti identification labels to surfaces adjacent to and within 6 inches (150 mm) of firestopping edge so labels will be visible to anyone seeking to remove or change penetrating items or firestopping. Labels shall have a unique QR code for each penetration which can be scanned by the firestop documentation software to quickly identify the penetration attributes. Acceptable Software: Hilti CFS-DM, from Hilti Inc., Plano, TX. Tel (800) 879-8000 or Hilti (Canada) Corporation, Mississauga, Ontario (800) 363-4458 website: www.us.hilti.com or www.hilti.ca.com.
 - 1. Substitutions: Not permitted.
 - 2. Single Source: Obtain firestop documentation manager software and firestop systems for each type of penetration and construction condition indicated only from a single manufacturer.

3.5 ADJUSTING AND CLEANING

- A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.
- B. Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.

3.6 LABOR USE TO INSTALL FIRESTOP SYSTEMS

- A. To ensure complete harmony on the project site, the installation of each scope of work is to be performed jurisdictionally correct per existing trade agreements.

3.7 SCHEDULE OF MOST COMMON JOINT FIRESTOP SYSTEM

- A. Schedule of joint firestop systems. Basis of design: Hilti, Inc.

Joint Type	F-Rating (Hr)	Hilti Basis of Design UL System	
		Joint Width Less than 2"	Joint Width Greater than 2" Less than or Equal to 6" ⁴
Concrete (Floor to Floor)	1	FF-D-1012, FF-D-1013 ¹	FF-D-1012, FF-D-1013
	2	FF-D-1012, FF-D-1013 ¹	FF-D-1012, FF-D-1013
	3	FF-D-1011, FF-D-1026 ¹	FF-D-1011, FF-D-1026
	4	FF-D-1047	FF-D-1125
Concrete (Edge of Floor Slab to Wall)	1	FW-D-1011, FW-D-1012, FW-D-1013	FW-D-1011, FW-D-1012, FW-D-1013, FW-D-1021
	2	FW-D-1011, FW-D-1012, FW-D-1013	FW-D-1011, FW-D-1012, FW-D-1013, FW-D-1021, HI-BPF 120-18, HI-BPF 120-19
	3	FW-D-1011	FW-D-1011, FW-D-1021
	4	FW-D-1047	FW-D-1092
Concrete (Edge of Floor Slab to Curtain wall)	2	HI-BPF 120-18, HI-BPF 120-19	HI-BPF 120-18, HI-BPF 120-19
Concrete or Block Wall to Flat Concrete Floor (Top-of-Wall)	1	N/A**	N/A**
	2	HW-D-0097 ¹	HW-D-1009

	3	HW-D-1008 ¹ , HW-D 0268	HW-D-1008
	4	HW-D-1042	HW-D-1103
Concrete or Block Wall to Concrete Over Fluted Metal Deck (Top-of-Wall)	1	HW-D-0098	N/A**
	2	HW-D-0080, HW-D-0081, HW-D-0098	HW-D-1037
	3	N/A**	N/A**
	4	HW-D-0294	N/A**
Gypsum Wall to Flat Concrete Floor (Top-of-Wall)	1	HW-D-0757, HW-D-0082, HW-D-0083, HW-D-0106, HW-D-0119	HW-D-1011, HW-D-1012, HW-1020
	2	HW-D-0757, HW-D-0082, HW-D-0083, HW-D-0106, HW-D-0119	HW-D-1011, HW-D-1012, HW-1020
	3	HW-D-0119	HW-D-1011, HW-D-1012, HW-1020
Gypsum Shaft Wall to (Top-of-Wall)	2	HW-D-0342 (FLAT CONCRETE) HW-D-0541, HW-D-0542 (CONCRETE OVER METAL DECK)	N/A**
Gypsum Shaft Wall to Concrete Floor (Bottom-of-Wall)	1	BW-S-0023	N/A**
	2	BW-S-0023	N/A**
Gypsum Wall to Concrete Floor (Bottom-of-Wall)	1	BW-S-0001, BW-S-0002, BW-S-0039	N/A**
	2	BW-S-0001, BW-S-0002, BW-S-0039	N/A**
Gypsum Wall to Concrete Over Fluted Metal Deck (Top-of-Wall)	1	HW-D-0042*, HW-D-0049*, HW-D-0087*, HW-D-0089*, HW-D-0045, HW-D-0046*, HW-D-0076*, HW-D-0077*, HW-D-0154, HW-D-0184*, HW-D-0292, HW-D-0295, HW-D-0538*, HW-D-0871, HW-D-0872, HW-D-0873, HW-D-0875, HW-D-0884, HW-D-0876, HW-S-0134, HW-D-0881, HW-D-0881, HW-D-0882, HW-D-0883	HWD-1011, HWD-1012, HW-1020
	2	HW-D-0042*, HW-D-0049*, HW-D-0087*, HW-D-0089*, HW-D-0045, HW-D-0046*, HW-D-0076*, HW-D-0077*, HW-D-0154, HW-D-0184*, HW-D-292, HW-D-0295, HW-D-0538*, HW-D-0871, HW-D-0872, HW-D-0873, HW-D-0874, HW-D-0875, HW-D-0884, HW-D-0876, HW-S-0134, HW-D-0881, HW-D-0881, HW-D-0882, HW-D-0883	HW-D-1011, HW-D-1012, HW-D-1020
	3	HW-D-0292, HW-D-0295	HWD-1011, HWD-1012, HW-1020
	4	HW-D-0292, HW-D-0295	N/A**

Concrete (Wall to Wall)	2	WW-D-0017, WW-D-0082	WW-D-1080, WW-D-1084
	3	WW-D-1011', WW-D-0032	WW-D-1011
	4	WW-D-1047	WW-D-1128
Gypsum to Concrete (Wall to Wall)	1	WW-D-0040	N/A**
	2	WW-D-0040	N/A**

* SEE NOTE 3 ** CONTACT HILTI FOR CURRENT UL-CLASSIFIED SYSTEM OR ENGINEER JUDGMENT
DRAWING: 800-879-8000

NOTES:

1. CLASSIFIED SYSTEMS FOR 2" - 6" WIDE JOINTS MAY BE USED FOR JOINTS 2" WIDE AND LESS.
2. CONFIRM THAT MOVEMENT CAPABILITIES OF THE SELECTED UL SYSTEM MEETS OR EXCEEDS THE SPECIFIED MOVEMENT RANGE OF THE PARTICULAR JOINT.
3. SYSTEMS MARKED WITH ASTERIK (*) ARE SUITABLE FOR TOP-OF-WALL JOINTS WHERE THE FLUTED METAL DECK HAS SPRAY-ON MONOKOTE MK-6/HY FIREPROOFING.
4. VERIFY ALLOWABLE JOINT WIDTH ON SPECIFIC UL SYSTEM DRAWING.

END OF SECTION 07 8443

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specifications, apply to this Section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 DESCRIPTION OF WORK

- A. The required application of sealants include, but are not limited to the following general locations:
 - 1. Expansion joints in exterior and interior concrete slabs and walks.
 - 2. Intersections of concrete walks and slabs with vertical surfaces.
 - 3. Exterior wall joints, and dissimilar materials.
 - 4. Vertical joints on siding material.
 - 5. Metal doorframes, window frames and storefront framing.
 - 6. Joints between items of equipment and other construction.
 - 7. Control joints in interior walls.
 - 8. Joints between dissimilar materials.
 - 9. Locations indicated on drawings.

1.3 QUALITY ASSURANCE

- A. Installer:
 - 1. A firm with a minimum of 5 years' successful experience in the application of the types of materials required, and who agrees to employ only skilled tradesmen for the work.

1.4 SUBMITTALS

- A. Samples:

1. Submit samples of each color required for each type of sealant exposed to view. It shall be the Contractor's responsibility to match color to adjacent wall system or material.
2. Install sample between 2 strips of material similar to or representative of typical surfaces where sealant or compound will be used, held apart to represent typical joint widths. Architect will review samples.
3. Compliance with all other requirements is the exclusive responsibility of the Contractor.

B. Guarantee:

1. Submit written guarantee agreeing to repair or replace sealants which fail to perform as air-tight and water-tight joints; or fail in joint adhesion, cohesion, abrasion resistance, weather resistance, extrusion resistance, migration resistance, stain resistance, or general durability; or appear to deteriorate in any other manner not clearly specified by submitted manufacturer's data, as an inherent quality of the material for the exposure indicated. Provide guarantee signed by the Installer and Contractor.
2. Guarantee period is two (2) years.

1.5 JOB CONDITIONS

A. Condition of Other Work:

1. Examine the joint surfaces, backing, and anchorage of units forming sealant rabbet, and the conditions under which the sealant work is to be performed. Do not proceed with the sealant work until unsatisfactory conditions have been corrected.

B. Weather Conditions:

1. Do not proceed with installation of sealants under adverse weather conditions, or when temperatures are below 40 deg F or above manufacturer's recommended limitations for installation. Proceed with the work only when forecasted weather conditions are favorable for proper cure and variations, install elastomeric sealants only when temperatures are in the lower third of the manufacturer's recommended installation temperature range.

PART- 2 PRODUCTS

2.1 MATERIALS

- A. Sealant: MasterSeal NP 1 by BASF or accepted equal. One component polyurethane sealant complying with ASTM C920; Type S, Grade NS, Class 35 and Use NT.
- B. Silicone Sealant: Silpruf 2000 by General Electric or accepted equal. Single component silicone sealant complying with ASTM C920; type S, Grade NS, Class 25 and Use NT.

- C. Concrete Slab Joint Sealant: MasterSeal SL1 sealant by BASF or accepted equal. One component elastomeric, self-leveling polyurethane sealant complying with ASTM C920; Type S, Grade P, Class 25, and Use T.
- D. Joint Primer/Sealer: As recommended by sealant manufacturer for joint surfaces to be primed or sealed.
- E. Backer Rod: Closed cell polyethylene Sonofoam backer rod joint filler and backing by Sonneborn or accepted equal.
 - 1. Colors:
 - a. Exterior - match exterior surface to adjacent color.
 - b. Windows - match window surface.
 - c. All Other Locations - color as selected by Architect.

PART- 3 EXECUTION

3.1 INSPECTION

- A. The Installer must examine the substrate and the conditions under which caulking work is to be performed, and notify the Contractor in writing of unsatisfactory conditions. Do not proceed with the work until satisfactory conditions have been corrected in a manner acceptable to the Installer.

3.2 JOINT SURFACE PREPARATION

- A. Clean joint surfaces immediately before installation of sealant. Remove dirt, insecure coatings, moisture and other substances, which would interfere with bond of sealant or caulking compound.
- B. Use masking tape where required to prevent contact of sealant with adjoining surfaces which otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION

- A. Comply with sealant manufacturer's printed instructions except where manufacturer's technical representative directs otherwise.
- B. Prime or seal the joint surfaces wherever recommended by the sealant manufacturer. Do not allow primer/sealer to spill or migrate onto adjoining surfaces.
- C. Install sealant backer rod for liquid elastomeric sealants, except where shown to be omitted or recommended to be omitted by sealant manufacturer for the application shown.
- D. Install bond breaker tape wherever shown and wherever required by manufacturer's recommendations to ensure that elastomeric sealants will perform properly.

- E. Employ only proven installation techniques, which will ensure that sealants will be deposited in uniform, continuous ribbons without gaps or air pockets, with complete “wetting” of the joint bond surfaces equally on opposite sides. Fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface and a vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt.
- F. Install sealants to depths as recommended by the sealant manufacturer but within the following general limitations, measured at the center (thin) section of the bead.
- G. For normal moving joints sealed with elastomeric sealants, but not subject to traffic, fill joints to a depth equal to 50% of joint width, but neither more than 1/2” deep nor less than 1/4” deep.
- H. Tool non-sag sealants immediately after sealant application and prior to skinning or curing begin; tool sealants to form smooth, uniform beads of configuration indicated eliminating air pockets and ensuring contact and adhesion of sealant with side of joint. Do not use tooling agents which discolor sealants or adjacent surfaces, or that are not approved by sealant manufacturer.
- I. Provide concave joint configuration per figure 5A, ASTM C 1193, unless noted otherwise.

1. Spillage:

- a. Do not allow sealants or compounds to overflow or spill onto adjoining surfaces, or to migrate into the voids of adjoining surfaces including rough textures such as exposed aggregate panels. Use masking tape or other precautionary devices to prevent staining of adjoining surfaces, by either the primer/sealer to the sealant/caulking compound.
- b. Remove excess and spillage of compounds promptly as the work progresses. Clean the adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage, without damage to the adjoining surfaces or finishes.

2. Polysulfide Sealant Installation:

- a. Comply with standards issued by manufacturer, except where more stringent requirements have been issued by the sealant manufacturer as either requirements or recommendations.

3.4 CURE AND PROTECTION

- A. Cure sealants in compliance with manufacturer’s instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability.
- B. Protect joint sealers from contaminants and damage during and after curing period, so that they are without damage or deterioration at the time of substantial completion. Cutout and remove damaged or deteriorated joint sealers immediately and replace with new materials producing a repair that is indistinguishable from the original work.

END OF SECTION 07 9000

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Section, apply to work specified in this section.
- B. Refer to other sections of the specification, drawings, and detail to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 DEFINITIONS

- A. Acoustic Joint Sealant: "Acoustic Joint Sealant or Spray: Material or combination of materials used to achieve specified acoustical rating of non fire-rated assembly by providing an effective barrier against sound transmission through construction joint and through penetration openings."

1.3 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

- A. Only tested acoustic systems shall be used in specific locations as follows:
- B. Top and bottom of gypsum board partitions.
- C. Top of masonry walls.
- D. Through-penetrations in gypsum and masonry walls.

1.4 RELATED WORK OF OTHER SECTIONS

- A. Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
- B. Section 03 3000 – Concrete
- C. Section 07 8443 - Joint Firestopping
- D. Section 07 9000 - Sealants
- E. Section 09 2500 - Gypsum Drywall
- F. Section 21 0000 – Fire Suppression
- G. Section 22 0000 – Plumbing

- H. Section 23 0000 – Heating, Ventilating, and Air-Conditioning
- I. Section 26 0000 – Electrical
- J. Section 27 0000 – Communications

1.5 REFERENCES

- A. Test Requirements:
- B. ASTM C734, Standard Test Method for Low-Temperature Flexibility of Latex Sealants After Artificial Weathering
- C. ASTM C834, Standard Specification for Latex Sealants
- D. ASTM C919, Standard Practice for Use of Sealants in Acoustical Applications
- E. ASTM D217, Standard Test Methods for Cone Penetration of Lubricating Grease
- F. ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials
- G. ASTM E90, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
- H. ASTM G21, Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi
- I. ISO 11600, Building construction -- Jointing products -- Classification and requirements for sealants
- J. All major building codes: IBC

1.6 QUALITY ASSURANCE

- A. Installing contractor shall arrange for the acoustic joint sealant manufacturer's direct representative (not distributor or agent) to be on-site during initial installation of acoustic sealant and spray systems to train appropriate contractor personnel in proper selection and installation procedures.
- B. Acoustical sealants shall be installed per manufacturer's written recommendations published in their literature and drawing details.

1.7 SUBMITTALS

- A. Submit Product Data: Manufacturer's specifications and technical data for each material including documentation of STC testing and manufacturer's installation instructions in accordance with Section 01 3000.
- B. Submit material safety data sheets provided with product delivered to jobsite.

- C. VOC Content Limitations: Submit documentation of conformance with LEED EQ Credit 4.1 "Low-Emitting Materials, Adhesives, and Sealants."

1.8 INSTALLER QUALIFICATIONS

- A. Engage an experienced Installer who is certified, licensed, or otherwise qualified by the acoustic sealant and acoustic spray manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements. A manufacturer's willingness to sell its acoustical sealant products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers.
- B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at jobsite.
- C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.
- D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.
- E. Do not use damaged or expired materials.

1.10 PROJECT CONDITIONS

- A. Do not use materials that contain flammable solvents.
- B. Schedule installation of acoustical sealants after completion of gypsum wall board but prior to covering or concealing of joints.
- C. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.
- D. Weather conditions: Do not proceed with installation of acoustical sealant materials when temperatures are outside the manufacturers recommended limitations.
- E. During installation, provide masking and drop cloths to prevent acoustical sealant materials from contaminating any adjacent surfaces.

PART- 2 PRODUCTS

2.1 ACOUSTICAL SEALANTS

- A. Acoustic Sealant for Exposed and Concealed Joints and annular spaces around through-penetrations: Provide manufacturer's standard non-sag, paintable, non-staining latex sealant complying with ASTM C834, ASTM C919 and the following:
1. Sealant effectively reduces airborne sound transmission through head-of-wall and bottom-of-wall joints and openings to accommodate through-penetrations in building construction as demonstrated by testing representative assemblies in accordance with ASTM E90.
 2. Acoustical Sealant to maintain STC ratings at sound rated partitions as indicated on the drawings.
 3. Sealant has flame-spread and smoke-developed ratings of less than 25 as tested in accordance with ASTM E84.
 4. Sealant is mold and mildew resistant per ASTM G21 with a rating of zero (0), "no growth".
 5. Sealant has movement capability of minimum 12.5% in accordance with ISO 11600.
 6. Latex sealant according to ASTM C 834 class OP -18°C with shrinkage according to ASTM C 1241 < 25 % C.
 7. Proposed acoustic sealant materials and methods shall conform to applicable governing codes having local jurisdiction.

2.2 ACOUSTICAL SPRAYS

- A. Acoustic Spray for exposed and concealed joints: Provide manufacturer's standard sprayable latex material complying with ASTM C919 and the following:
1. Spray effectively reduces airborne sound transmission through head-of-wall joints in building construction as demonstrated by testing representative assemblies in accordance with ASTM E90.
 2. Acoustical Spray to maintain STC ratings at sound rated partitions as indicated on the drawings.
 3. Spray has flame-spread and smoke-developed ratings of less than 25 as tested in accordance with ASTM E84.
 4. Spray is mold and mildew resistant per ASTM G21 with a rating of zero (0), "no growth".
 5. Spray has movement capability of minimum 12.5%.
 6. Proposed acoustic spray materials and methods shall conform to applicable governing codes having local jurisdiction.

2.3 ACCEPTABLE MANUFACTURERS

- A. Basis of Design:
Hilti, Inc., Plano, Texas
800-879-8000
www.hilti.com
- B. Substitution requests shall be considered in accordance with contract provisions and the performance requirements outlined in this document.

2.4 MATERIALS

- A. Products: Subject to compliance with requirements, provide the following:
 - 1. Hilti CP 506 Smoke and Acoustic Sealant
 - 2. Hilti CP 572 Smoke and Acoustic Spray
 - 3. Hilti CP605 bottom of wall sealant

2.5 ACCESSORIES

- A. Mineral wool

PART- 3 EXECUTION

3.1 PREPARATION

- A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
 - 1. Verify acoustic joints are properly sized and in suitable condition for application of materials.
 - 2. Surfaces to which acoustic sealant and spray materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
 - 3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by acoustic sealant and spray materials.
 - 4. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of acoustic sealant and spray.
 - 5. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with acoustic sealant and spray manufacturer's written installation instructions for products and applications indicated.
- B. Standards: Comply with recommendations of ASTM C919 for use of joint sealants in acoustical applications as applicable to materials, applications and conditions indicated.
- C. Install acoustic sealant backings of type indicated to support sealant and spray during application in accordance with manufacturer's written installation instructions.
- D. Install acoustic sealant and spray free of air pockets, embedded foreign matter, sags and ridges.
- E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess acoustic sealant from surfaces adjacent to joint.
 - 2. Remove excess acoustic spray from surfaces adjacent to joint as indicated on the drawings.
 - 3. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 4. Provide concave joint configuration per Figure 8A in ASTM C1193, unless otherwise indicated.

3.3 FIELD QUALITY CONTROL

- A. Examine acoustic joints and penetrations to ensure proper installation before concealing or enclosing areas.
- B. Keep areas of work accessible until inspection by applicable code authorities.

3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturer of acoustical joint sealants.
- B. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises.

3.5 PROTECTION

- A. Protect acoustic joints during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Contract Completion.

END OF SECTION 07 9219

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings, and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section references specification sections relating to commercial door hardware for the following:
 - 1. Swinging doors.
 - 2. Other doors to the extent indicated.
- B. Commercial door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
 - 2. Electromechanical and access control door hardware.
 - 3. Electromechanical and access control door hardware power supplies, back-ups and surge protection.
 - 4. Automatic operators.
 - 5. Cylinders specified for doors in other sections.
- C. Related Sections:
 - 1. Division 08 Section "Door Hardware".
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 70 - National Electrical Code.
 - 4. NFPA 80 - Fire Doors and Windows.
 - 5. NFPA 101 - Life Safety Code.

6. NFPA 105 - Installation of Smoke Door Assemblies.
 7. State Building Codes, Local Amendments.
- E. Standards: Reference Related Sections for requirements regarding compliance with applicable industry standards.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

- C. Keying Schedule: Prepared under the supervision of the Owner, separate schedule detailing final keying instructions for locksets and cylinders in writing. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner to approve submitted keying schedule prior to the ordering of permanent cylinders.
- D. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals. The manual to include the name, address, and contact information of the manufacturers providing the hardware and their nearest service representatives. The final copies delivered after completion of the installation test to include "as built" modifications made during installation, checkout, and acceptance.
- F. Warranties and Maintenance: Special warranties and maintenance agreements specified in the Related Sections.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.5 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

1.6 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART- 2 PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. Refer to "PART 3 – EXECUTION" for required specification sections.

PART- 3 EXECUTION

3.1 DOOR HARDWARE SETS

- A. The door hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
1. Quantities listed are for each pair of doors, or for each single door.
 2. The supplier is responsible for handing and sizing all products.
 3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
 4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.
- B. Products listed in the hardware sets shall be supplied by and in accordance with the requirements described in the specification section as noted for each item.
1. Section 08 71 00 – Door Hardware.
- C. Manufacturer's Abbreviations:
1. MK - McKinney
 2. PE - Pemko
 3. RO - Rockwood
 4. YA - Arrow, formerly known as Yale
 5. HS - HES
 6. RF - Rixson
 7. OT - Other
 8. SU - Securitron

Hardware Sets

Set: 1.0

Doors: 1-101

1 Continuous Hinge	CFM_HD1-M		PE
1 Storeroom or Closet Lock	MOR3 8805FL Temp Core	626	YA
1 Core	Match existing; field verify	626	YA
3 Silencer	608		RO
1 Wall Stop	RM860/RM861 (As required)	US32D0	RO

Set: 2.0

Doors: 1-103

1 Door Hardware	Hardware by door manufacturer (Cylinder as required)		OT
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END OF SECTION 08 0671

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specifications, apply to this Section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. Section Includes:
 - 1. Standard and custom hollow metal doors and frames.
 - 2. Steel sidelight, borrowed lite and transom frames.
 - 3. Louvers installed in hollow metal doors.
 - 4. Light frames and glazing installed in hollow metal doors.
- B. Related Sections:
 - 1. Division 01 Section "General Conditions".
 - 2. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
 - 3. Division 08 Section "Glazing" for glass view panels in hollow metal doors.
 - 4. Division 08 Section "Door Hardware".
 - 5. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.
- C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
 - 2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.

3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
8. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
9. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
10. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.
11. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
12. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
13. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
14. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
15. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
16. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.
- B. Quality Standard: In addition to requirements specified, furnish SDI-Certified manufacturer products that comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".
- C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL10C (neutral pressure at 40" above sill) or UL 10C.

1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction label certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.
2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
3. Smoke Control Door Assemblies: Comply with NFPA 105.
 - a. Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.
- D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.
- E. Storm Shelter Openings: Provide complete door systems for hurricane or tornado storm shelters, and other areas of refuge, complying and tested according to ICC 500 (2014/2020), ICC/NSSA Standard for the Design and Construction of Storm Shelters.
 1. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.
- F. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.
 1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.6 COORDINATION

- A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Building Information Modeling (BIM) Support: Utilize designated BIM software tools and obtain training needed to successfully participate in the Project BIM processes. All technical disciplines are responsible for the product data integration and data reliability of their Work into the coordinated BIM applications.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
- B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

PART-2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide steel doors and frames from a SDI Certified manufacturer:
 - 1. CECO Door Products (C).
 - 2. Curries Company (CU).
 - 3. Pioneer Industries (PI).

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
- C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

2.3 HOLLOW METAL DOORS

- A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8 and ANSI/NAAMM HMMA 867.

- B. Interior Doors: Face sheets fabricated of commercial quality cold rolled steel that complies with ASTM A 1008/A 1008M. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
1. Design: Flush panel.
 2. Core Construction: Manufacturer's standard kraft-paper honeycomb, or one-piece polystyrene core, securely bonded to both faces.
 - a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
 3. Level/Model: Level 2 and Physical Performance Level B (Heavy Duty), Minimum 18 gauge (0.042-inch - 1.0-mm) thick steel, Model 2.
 4. Vertical Edges: Vertical edges to have the face sheets spot welded and filled full height with an epoxy filler. Welds are to be ground, filled and dressed smooth. Beveled Lock Edge, 1/8 inch in 2 inches (3 mm in 50 mm).
 5. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet.
 6. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
 7. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
- C. Manufacturers Basis of Design:
1. CECO Door Products (C) Polystyrene Core - Legion Series.

2.4 HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- B. Thermal Break Frames: Subject to the same compliance standards and requirements as standard hollow metal frames. Tested for thermal performance in accordance with NFRC 102, and resistance to air infiltration in accordance with NFRC 400. Where indicated provide thermally broken frame profiles available for use in both masonry and drywall construction. Fabricate with 1/16" positive thermal break and integral vinyl weatherstripping.
- C. Exterior Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.
1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
 2. Frames: Minimum 14 gauge (0.067-inch -1.7-mm) thick steel sheet.
 3. Manufacturers Basis of Design:

- a. CECO Door Products (C) – Thermal Break TQB Series.
- D. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.
 - 1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
 - 2. Frames: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.
 - 3. Manufacturers Basis of Design:
 - a. CECO Door Products (C) - DU Series.
 - b. CECO Door Products (C) - SU Series.
- E. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.
- F. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

2.5 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
 - 2. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.
 - 3. Compression Type for Drywall Slip-on (Knock-Down) Frames: Adjustable compression anchors.
- B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.
- C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.6 LOUVERS

- A. Metal Louvers: Unless otherwise indicated provide louvers to meet the following requirements.
 - 1. Blade Type: Vision proof inverted V or inverted Y.
 - 2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.
- B. Louvers for Fire Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire protection rating of 1-1/2 hours and less.
 - 1. Manufacturers: Subject to compliance with requirements, provide louvers to meet rating indicated.

2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

2.7 LIGHT OPENINGS AND GLAZING

- A. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricator's shop. Fixed and removable stops to allow multiple glazed lites each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.
- B. Moldings for Glazed Lites in Doors and Loose Stops for Glazed Lites in Frames: Minimum 20 gauge thick, fabricated from same material as door face sheet in which they are installed.
- C. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames.
- D. Preformed Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated. Match pre-finished door paint color where applicable.

2.8 ACCESSORIES

- A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.9 FABRICATION

- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.
- C. Hollow Metal Doors:
 1. Glazed Lites: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where indicated.
 2. Astragals: Provide overlapping astragals as noted in door hardware sets in Division 08 Section "Door Hardware" on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.
 3. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
- D. Hollow Metal Frames:

1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
 - a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.
3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
7. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
8. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
9. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - i. Two anchors per jamb up to 60 inches high.
 - ii. Three anchors per jamb from 60 to 90 inches high.
 - iii. Four anchors per jamb from 90 to 120 inches high.
 - iv. Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
 - b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - i. Three anchors per jamb up to 60 inches high.
 - ii. Four anchors per jamb from 60 to 90 inches high.

- iii. Five anchors per jamb from 90 to 96 inches high.
 - iv. Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
 - v. Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
10. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".
11. Bituminous Coating: Where frames are fully grouted with an approved Portland Cement based grout or mortar, coat inside of frame throat with a water based bituminous or asphaltic emulsion coating to a minimum thickness of 3 mils DFT, tested in accordance with UL 10C and applied to the frame under a 3rd party independent follow-up service procedure.
- E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
- 1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
 - 2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
 - 3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
 - 4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

2.10 STEEL FINISHES

- A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.
- 1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).

- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.
- C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."
- D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.
- E. Verify tolerances against manufacturers installations instructions for tornado and hurricane storm shelter openings.

3.3 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.
 - 1. Set frames accurately in position, plumbed, leveled, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
 - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
 - 3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
 - 4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.
- C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
 - 1. Non-Fire-Rated Standard Steel Doors:
 - a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
 - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
 - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.

- d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
- 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
- D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow metal work immediately after installation.
- C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

3.5 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
 - 1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

END OF SECTION 08 1113

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required completing this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section includes the following types of access doors: Locations of doors shall be coordinated with all trades and shall be the responsibility of the contractor to furnish and install access doors as may be required. Door shall be located at any concealed mechanical device requiring access. Provide door size as required for proper access.
 - 1. Wall access doors.

1.3 QUALITY ASSURANCE

- A. Single-Source Responsibility: Obtain access doors for entire Project from one source and by a single manufacturer.
- B. Fire-Rated Door Assemblies: Units that comply with NFPA 80, are identical to door and frame assemblies tested for fire-test-response characteristics per test method as indicated below, and are labeled and listed by UL, Warnock Hersey, or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Test Method for Vertical Installations: ASTM E 152.
 - 2. Test Method for Horizontal Installations: ASTM E 119.
- C. Size Variations: Obtain Architect's acceptance of manufacturer's standard size units, which may vary slightly from sizes indicated.

PART- 2 PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products by one of the following:

1. Karp Associates, Inc.
2. J.L. Industries.
3. Larson's Manufacturing Co.

2.2 MATERIALS

- A. Steel Sheet: ASTM A 366/A 3366M commercial-quality, cold-rolled steel sheet with baked-on, rust-inhibitive primer.

2.3 ACCESS DOORS - EXPOSED AREAS

- A. Fire-Rated Access Doors – KRP – 450 FR, as manufactured by Karp Associates Inc. or equal.
 1. Self-latching units consisting of frame, door, and hardware, including automatic-closer, interior latch release, and complying with the following requirements:
 - a. Trimless Frame.
- B. Non-insulated Doors for Walls: KDW as manufactured by Karp Associates, or equal.
 1. Self-latching units consisting of frame, door, and hardware, and complying with the following requirements:
 - a. Trimless Frame.

2.4 PARTS

- A. Access Doors: WB EXT 1350 Ultra Exterior Access Door
 1. Door: 16-gauge steel, trim 1-1/2" wide.
 2. Frame: 16-gauge steel, 2-3/8" depth.
 3. Insulation: Double layer of 1" GreenGuard Extruded Polystyrene insulation board, with R-Value @ 75 degrees F. Mean 5.0 x 2, FM approved.
 4. Gaskets: Open celled microcellular polyurethane on inside of door. Closed cell neoprene sponge SC42 W/PSA stripping gasketing on the back of the door.
 5. Hinge: Continuous piano hinge allows opening to 180 degrees; located at the top of the door.
 6. Latches: Chrome plated "T" type handle with pivot rod 3-point catch. WB 151 keycode cylinder lock.

7. Finish: Zinc dipped baked grey enamel; prepared for final paint.
8. Application: For exterior purposes.
 - a. Size: 24" x 24".

2.5 FABRICATION

- A. General: Manufacture each access door assembly as an integral unit, ready for installation.
- B. Steel Access Doors and Frames: Continuous welded construction. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required securing access panels to types of supports indicated.
 1. For gypsum board assemblies, furnish frames with edge trim for gypsum board.

PART- 3 EXECUTION

3.1 PREPARATION

- A. Advise Installer of other work about specific requirements relating to access door installation, including sizes of openings to receive access door and frame, as well as locations of supports, inserts, and anchoring devices.
- B. Furnish inserts and anchoring devices for access doors that must be built into other construction. Coordinate delivery with other work to avoid delay.

3.2 INSTALLATION

- A. Comply with manufacturer's instructions for installing access doors. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finished surfaces.
- B. Install concealed-frame access doors flush with adjacent finish surfaces.
- C. Locate access doors above ceilings wherever possible.

END OF SELECTION 08 3050

PART- 1 GENERAL

1.1 GENERAL REQUIREMENTS

- A. Provide all materials, labor, equipment and services necessary to furnish, deliver and install all work under this section as shown on the contract documents, specified herein, and as specified by the job conditions.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required completing this section whether or not it is clearly or explicitly shown.

1.3 DESCRIPTION

- A. Related work specified elsewhere:
 - 1. Metal Fabrication. Section 05 5000
 - 2. Rough Carpentry. Section 06 1000
 - 3. Access Panels & Doors: Section 08 3050
 - 4. Painting: Section 09 9000
 - 5. Electrical: Division 26

1.4 SUBMITTALS

- A. Procedures: Furnish submittals in accordance with the general requirements specified.
- B. Shop Drawing: Furnish shop drawings for architect's approval. Include elevations, sections, and details indicating dimensions, materials, finishes, conditions for anchorage and support of each coiling security grille.
- C. Product Literature: Submit manufacturer's technical literature describing the product to be used under this section.
- D. Maintenance and Operating Manuals: Furnish complete manuals describing the materials, devices and procedures to be followed in operating and maintaining all coiling security grilles under this section. Include manufacturer's brochures and parts lists describing the actual materials used in the product.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with applicable requirements of the laws, codes, ordinances and regulations of federal, state and municipal authorities having jurisdiction.
- B. Manufacturer Requirements: Coiling security grille manufacturer shall have been in the business of and have experience in manufacturing the type of product covered under this specification section as well as giving credible service for a minimum of five (5) years. Provide list of at least ten (10) completed projects which include the products covered under this section.

1.6 DELIVERY, STORAGE AND HANDLING

- A. General: Deliver and store materials in manufacturer's original packaging, labeled to show name, brand and type. Store materials in a protected dry location off the ground in accordance with manufacturer's instructions.

1.7 WARRANTY

- A. Coiling Security Grille Warranty: Provide Two (2) Year Warranty signed by the manufacturer and installer agreeing to repair or replace work which has failed as a result of defects in materials or workmanship. Upon notification within the warranty period, such defects shall be repaired at no cost to the owner.

PART- 2 PRODUCTS

2.1 COILING SECURITY GRILLES

- A. Manufacturer: Side coiling security grilles shall be the model SC3000G-SL9-A as manufactured by McKEON or equal.

2.2 MATERIALS

- A. General: Each unit shall consist of an open type grille curtain designed to travel in a horizontal plane, smoothly and without binding. Curtain shall be driven to the open and close position by a positive action sprocket drive, without the use of cables or counterbalance weights.
 - 1. Grille Curtain: Shall be the SL9 pattern consisting of 5/16" diameter solid galvanized steel rods, encased by 3/8" aluminum tubular spacers 9" long. The horizontal links shall be fabricated of 1/8" x 5/8" aluminum strips and shall be set in a straight lattice pattern. The vertical spacing shall be 1½" while the horizontal spacing shall be 9".
- B. Leading Edge: Curtain shall be furnished with an aluminum member of tubular design to provide stiffness, limit deflection and provide for a tight fitting closure.
- C. Receiving Edge: Shall be fabricated of an extruded aluminum member with sufficient depth, designed to accept the leading edge and form a tight fitting closure when the grille is the fully closed position.

- D. Head Track: Shall be of not less than 1/8" thick steel and shall be provided with integral locking bars. The faying surface shall not be less than 38% of the flat plate area when the side coiling grille is in the closed position. Locking bars shall lock and retain the coiling curtain in place. Unit shall not require or utilize any type of floor track system.
- E. Counterbalance Assemblies: The side coiling grille shall be counterbalanced by means of adjustable steel helical torsion springs attached to shaft enclosed in pipe with required mounting blocks for attachment of curtain. Torsion springs shall be anchored to the same shaft and held in position by the same adjusting wheel accessible from outside the barrel assemblies.
- F. Coil Box: Shall be provided to entirely enclose coiled curtain and counterbalance assemblies. Coil box cover shall be of a rectangular design fabricated of 22 gauge G90 galvanized sheet steel.
- G. Electric Motor Operator: Side coiling grille shall be provided with a compact power unit designed and built by the side coiling grille manufacturer. Operator shall be equipped with an adjustable screw-type limit switch to break the circuit at termination of travel. High efficiency gearing running in an oil bath, shall be furnished together with a magnetic operated brake, completely housed to protect against damage, dust and moisture. An efficient overload protection device, which will break the power circuit and protect against damage to the motor windings shall be integral with the unit. Operator is to be housed in a NEMA type 1 enclosure.
 - 1. Motor: Shall be intermediate duty, thermally protected, ball bearing type with a class A or better insulation. Horsepower of motor is to be 1/3hp minimum or of manufacturer's recommended size, which ever is greater.
 - 2. Starter: Shall be size "0" magnetic reversing starter, across the line type with mechanical and electrical interlocks, with 10 amp continuous rating and 24 volt control circuit.
 - 3. Reducer: Spiral gear type, 70% efficiency minimum.
 - 4. Brake: Magnetically activated, integral within the operator's housing.
 - 5. Control Station: Provide surface mount push button control station marked open, close and stop.
- H. Obstruction Sensing Device: The side coiling grille shall be designed with a radio activated obstruction sensing safety edge. In the event that the safety edge meets an obstruction during the normal closing operation, the grille shall stop, reverse and return to the open position.
- I. Finish After completion of fabrication, clean all metal surfaces to remove dirt and chemically treat to provide for paint adhesion. All steel components shall receive a coat of prime paint finish, all exposed aluminum shall be of a clear anodized.

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Examine surfaces and field conditions to which this work is to be performed and notify architect if conditions of surfaces exist which are detrimental to proper installation and timely completion of work.

- B. Verify all dimensions taken at job site affecting the work. Notify the architect in any instance where dimensions vary.
- C. Coordinate and schedule work under this section with work of other sections so as not to delay job progress.

3.2 INSTALLATION

- A. Perform installation using only factory approved and certified representatives of the coiling security grille manufacturer.
- B. Install coiling security grille assemblies at locations shown in perfect alignment and elevation, plumb, level, straight and true.
- C. Adjust coiling security grille installation to provide uniform clearances and smooth non-binding operation.
- D. Install wiring in accordance with applicable local codes and the National Electrical Code Standard. Materials shall be UL listed.

3.3 PROTECTION AND CLEANING

- A. Protect installed work using adequate and suitable means during and after installation until accepted by owner.
- B. Remove, repair or replace materials which have been damaged in any way.
- C. Clean surfaces of grime and dirt using acceptable and recommended means and methods.

END OF SELECTION 08 3300

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specifications, apply to this Section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section includes commercial door hardware for the following:
 - 1. Swinging doors.
- B. Door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
 - 2. Cylinders specified for doors in other sections.
- C. Related Sections:
 - 1. Division 08 Section "Hollow Metal Doors and Frames".
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 70 - National Electrical Code.
 - 4. NFPA 80 - Fire Doors and Windows.
 - 5. NFPA 101 - Life Safety Code.
 - 6. NFPA 105 - Installation of Smoke Door Assemblies.
 - 7. State Building Codes, Local Amendments.
- E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:

1. ANSI/BHMA Certified Product Standards - A156 Series.
2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
3. ANSI/UL 294 - Access Control System Units.
4. UL 305 - Panic Hardware.
5. ANSI/UL 437- Key Locks.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing, fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- D. Informational Submittals:
 1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

1.4 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).
- C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
 1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.

- F. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.
- G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
 - 1. Function of building, purpose of each area and degree of security required.
 - 2. Plans for existing and future key system expansion.
 - 3. Requirements for key control storage and software.
 - 4. Installation of permanent keys, cylinder cores and software.
 - 5. Address and requirements for delivery of keys.
- H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
 - 1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 - 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 - 3. Review sequence of operation narratives for each unique access controlled opening.
 - 4. Review and finalize construction schedule and verify availability of materials.
 - 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- I. At completion of installation, provide written documentation that components were applied according to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.
- C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.
- C. Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

PART-2 PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- C. Please note that ASSA ABLOY is transitioning the Yale Commercial brand to Arrow. This affects only the brand name; the products and product numbers will remain unchanged. The brand transition is expected to be complete in or about May of 2024, and products shipping after that time will be branded Arrow.
- D. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
1. Quantity: Provide the following hinge quantity:
 - a. Two Hinges: For doors with heights up to 60 inches.
 - b. Three Hinges: For doors with heights 61 to 90 inches.
 - c. Four Hinges: For doors with heights 91 to 120 inches.
 - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
 2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
 3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
 - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
 - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

4. Hinge Options: Comply with the following:

- a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

5. Manufacturers:

- a. McKinney (MK) - TA/T4A Series, 5 knuckle.

B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 continuous geared hinge. with minimum 0.120-inch thick extruded 6063-T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:

- a. Pemko (PE).

2.3 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: Provide products conforming to ANSI/BHMA A156.3 and A156.16, Grade 1.

- 1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
- 2. Furnish dust proof strikes for bottom bolts.
- 3. Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
- 4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.

5. Manufacturers:

- a. Ives (IV).
- b. Rockwood (RO).

B. Door Push Plates and Pulls: ANSI/BHMA A156.6 door pushes and pull units of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

- 1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.

2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
4. Pulls, where applicable, shall be provided with a 10" clearance from the finished floor on the push side to accommodate wheelchair accessibility.
5. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
6. Manufacturers:
 - a. Hiawatha, Inc. (HI).
 - b. Rockwood (RO).
 - c. Trimco (TC).

2.4 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
 1. Manufacturers:
 - a. Schlage (SC).
 - b. Match Existing, Field Verify.
- B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:
 1. Threaded mortise cylinders with rings and cams to suit hardware application.
 2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
 4. Tubular deadlocks and other auxiliary locks.
 5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
 6. Keyway: Match Facility Standard.
- C. Small Format Interchangeable Cores: Provide small format interchangeable cores (SFIC) as specified, core insert, removable by use of a special key; usable with other manufacturers' cylinders.

- D. Keying System: Each type of lock and cylinders to be factory keyed.
 - 1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
 - 2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
 - 3. Existing System: Field verify and key cylinders to match Owner's existing system.
- E. Key Quantity: Provide the following minimum number of keys:
 - 1. Change Keys per Cylinder: Two (2)
 - 2. Master Keys (per Master Key Level/Group): Five (5).
 - 3. Construction Control Keys (where required): Two (2).
 - 4. Permanent Control Keys (where required): Two (2).
- F. Construction Keying: Provide temporary keyed construction cores.
- G. Key Registration List (Bitting List):
 - 1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
 - 2. Provide transcript list in writing or electronic file as directed by the Owner.

2.5 MECHANICAL LOCKS AND LATCHING DEVICES

- A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.
 - 1. Manufacturers:
 - a. Arrow, formerly known as Yale (YA) - 8800FL Series.
 - b. Corbin Russwin Hardware (RU) - ML2000 Series.
 - c. dormakaba Best (BE) - 45H Series.
- B. Cylindrical Locksets, Grade 1 (Commercial Duty): ANSI/BHMA A156.2, Series 4000, Operational Grade 1 Certified Products Directory (CPD) listed.
 - 1. Locks are to be non-handed and fully field reversible.

2. Manufacturers:

- a. Arrow, formerly known as Yale (YA) 4700LN Series.
- b. Corbin Russwin Hardware (RU) - CL3500 Series.
- c. dormakaba (DO) - CL800 Series.

2.6 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
 - 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 - 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 - 3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
 - 4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
- B. Standards: Comply with the following:
 - 1. Strikes for Mortise Locks and Latches: BHMA A156.13.
 - 2. Strikes for Bored Locks and Latches: BHMA A156.2.
 - 3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
 - 4. Dustproof Strikes: BHMA A156.16.

2.7 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
- B. Exit devices shall have a five-year warranty.
- C. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
- D. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
- E. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.

- F. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
- G. Flush End Caps: Provide flush end caps made of architectural metal in the same finish as the devices as in the Hardware Sets. Plastic end caps will not be acceptable.
- H. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
 - 1. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
 - 2. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
- I. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
- J. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
- K. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
- L. Rail Sizing: Provide exit device rails factory sized for proper door width application.
- M. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
- N. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.
 - 1. Manufacturers:
 - a. Arrow, formerly known as Yale (YA) - 7000 Series.
 - b. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
 - c. Von Duprin (VD) - 35A/98 XP Series.

2.8 DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:
 - 1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.

2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
 3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
 4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
 5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
 6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.
- B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.
1. Heavy duty surface mounted door closers shall have a 30-year warranty.
 2. Manufacturers:
 - a. Arrow, formerly known as Yale (YA) - 4400 Series.
 - b. Corbin Russwin Hardware (RU) - DC6000 Series.
 - c. Norton Rixson (NO) - 7500 Series.
- C. Door Closers, Surface Mounted (Unitrol): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted closers with door stop mechanism to absorb dead stop shock on arm and top hinge. Hold-open arms to have a spring loaded mechanism in addition to shock absorber assembly. Arms to be provided with rigid steel main arm and secondary arm lengths proportional to the door width.
1. Manufacturers:
 - a. Arrow, formerly known as Yale (YA) - Unitrol Series.
 - b. Corbin Russwin Hardware (RU) - Unitrol Series.
 - c. Norton Rixson (NO) - Unitrol Series.

2.9 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
4. Protection Plates: ANSI/BHMA A156.6 protection plates (kick, armor, or mop), fabricated from the following:
 - a. Stainless Steel: 300 grade, .050-inch thick.
5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Manufacturers:
 - a. Hiawatha, Inc. (HI).
 - b. Ives (IV).
 - c. Rockwood (RO).

2.10 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
 1. Manufacturers:
 - a. Hiawatha, Inc. (HI).
 - b. Ives (IV).
 - c. Rockwood (RO).

- C. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

- 1. Manufacturers:

- a. dormakaba (DO).
- b. Norton Rixson (RF).
- c. Rockwood (RO).

2.11 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

- 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

- 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.

- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

- F. Manufacturers:

- 1. Pemko (PE).

2.12 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.13 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. DHI TDH-007-20: Installation Guide for Doors and Hardware.

3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
 - E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
 1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
 - 1. Quantities listed are for each pair of doors, or for each single door.
 - 2. The supplier is responsible for handing and sizing all products.
 - 3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
 - 4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.
- B. Refer to Section 08 0671, Door Hardware Sets, for hardware sets.

END OF SECTION 08 7100

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown

1.2 DESCRIPTION OF WORK

- A. Gypsum drywall work is hereby defined to include all gypsum board work and a tape-and compound joint treatment system known as “drywall finishing” work.
- B. The types of work required includes but is not limited to the following:
 - 1. Gypsum drywall including metal support system.
 - 2. Gypsum shaft wall construction.
 - 3. Gypsum backing boards for application of other finishes.
 - 4. Cementitious backer units.
 - 5. Gypsum drywall ceilings.
 - 6. Sound dampening gypsum drywall.
 - 7. Drywall finishing (joint tape-and-compound treatment).
 - 8. Metal support systems for cementitious backer panels.
 - 9. Installing access doors.
 - 10. Acoustical Sealants.

1.3 QUALITY ASSURANCE

- A. Fire-Resistance Rating: Where work is indicated for fire-resistance ratings, including those required to comply with governing regulations, provide materials and installations identical with applicable assemblies

which have been tested and listed by recognized authorities and acceptable to authorities having jurisdiction, including UL, WH and the Gypsum Association.

- B. Fire Resistance Ratings: Refer to Drawings.
- C. Industry Standard: Comply with applicable requirements of GA-216 "Application and Finishing of Gypsum Board" by the Gypsum Association, except where more detailed or more stringent requirements are indicated, including the recommendations of the manufacturer.
- D. Allowable Tolerance:
 - 1. 1/16" offsets between planes of board faces, and 1/8" in 10'-0" for plumb, level, warp and bow.

1.4 PRODUCT HANDLING

- A. Deliver gypsum drywall materials in sealed containers and bundles, fully identified with manufacturer's name, brand, type and grade; store in a dry, well-ventilated space, protected from the weather, under cover and off the ground.

1.5 JOB CONDITIONS

- 1. Temperature and Humidity Conditions: Do not install joint treatment compounds unless installation areas comply with the minimum temperatures and ventilation requirements recommended by the manufacturer and conditions are acceptable to the installer.
- 2. During the period of laminating and of finishing wallboard joints, maintain a temperature within the building uniformly between 55 deg and 70 deg F. Provide adequate ventilation to eliminate excessive moisture. Avoid drafts during hot, dry weather to prevent finishing materials from drying to rapidly.
- 3. Coordinate with installation of metal stud wall systems and insulation.

PART- 2 PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products by one of the following:
 - 1. Steel Framing and Furring:
 - a. United States Gypsum.
 - b. National Gypsum Co. - Gold Bond Building Products Div.
 - c. Dietrich Industries, Inc.
 - 2. Grid Suspension Assemblies:

- a. Chicago Metallic Corp.
 - b. Armstrong World Industries, Inc.
 - c. United States Gypsum.
- 3. Interior and Exterior Gypsum Board and Related Products:
 - a. United States Gypsum.
 - b. Georgia-Pacific Corp.
 - c. National Gypsum Co., Gold Bond Building Products Div.
- 4. Gypsum Shaftwall Studs and Liner Panel:
 - a. United States Gypsum.
 - b. Domtar Gypsum.
 - c. Georgia-Pacific Corp.

2.2 METAL SUPPORT MATERIALS

- A. Wire for Hangers and Ties:
 - 1. ASTM A 641, soft temper, #8 gauge galvanized annealed steel wire for hangers, 16- gauge minimum annealed steel wire for ties.
- B. Hanger Rods: Mild steel and zinc-coated or protected with rust-inhibitive paint.
- C. Flat Hangers: Mild steel and zinc-coated or protected with rust-inhibitive paint.
- D. Studs: (non-load bearing) ASTM C 645; 20 gauge by 3-5/8", or as required for interior partitions and column enclosures; ASTM A 570, 33 KSI steel, G60 hot-dip galvanized coating per ASTM A 525. Note: Use heavy gauge structural studs as noted on the drawings. At door jambs use double 16-gauge studs strapped together.
- E. Steel Studs for Furring Walls: Provide same material as specified for studs, 3-5/8" depth or as indicated.
- F. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes due to deflection of structure above.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Blazeframe Industries.
 - b. Fire Trak Corp.

- c. MBA Building Supplies.
 - d. Metal-Lite.
- G. Firestop Tracks: Manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness, not less than indicated for studs and in width to accommodate depth of studs.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. BlazeFrame Industries.
 - b. CEMCO; California Expanded Metal Products Co.
 - c. Fire Trak Corp.
- H. Steel Rigid Furring Channels: ASTM C 645, hat-shaped, depth of 7/8", and minimum 25 gauge, G 60 hot-dip galvanized coating per ASTM A 525.
- I. Steel Resilient Furring Channels: Manufacturer's standard product designed to reduce sound transmission, fabricated from steel sheet complying with ASTM A 525 or ASTM A 568 to form 1/2" deep channel with single-Leg Configuration, asymmetric-shaped channel with face connected to a single flange by a single slotted leg [web].
- J. Runners: Match studs, type recommended by stud manufacturer for floor and ceiling support of studs, and for vertical abutment of drywall work at other work.
- K. Stud System Accessories: Provide stud manufacturer's standard clips, shoes, ties, reinforcements, fasteners, and other accessories as needed for a complete stud system.
- L. Runner: J-Type for floor ceiling support of studs.

2.3 ACCESSORY MATERIALS

- A. Metal Backer Plates: Provide 20-gauge metal plate, 6" wide or as indicated on drawings, in lengths required.
- B. Drywall Sealant: At sound partitions and rated walls required to meet the ratings shown, provide non-drying, non-shrinking, non-migrating sealant recommended by the drywall manufacturer.
- C. Trim Accessories: Provide trim accessories of the sizes required for the drywall applications shown and specified, fabricated from galvanized steel, rolled Zinc or plastic and other following types.
- D. At external corners, provide metal/plastic corner bead with smooth rigid nose and perforated and knurled metal flanges.
- E. Control Joint: Formed with vee-shaped slot per Fig. 1 in ASTM C 1047, with slot opening covered with removable strip maximum 30' o.c. VSG control joint No. 93 or equivalent.

- F. Cold-Rolled Channels: #16-gauge steel, galvanized for 3/4" sizes and black asphalt painted for all other sizes.
- G. Fasteners: Provide fasteners of type, material, size, corrosion resistance, holding power and other properties required to fasten steel framing and furring members securely to substrates involved; complying with the recommendations of gypsum drywall manufacturers for application indicated.
 - 1. Type S –12, fluted tip, aluminum of 1-1/4" long, with organic-polymer coating or other corrosion-protective coating.
 - 2. Where drywall abuts, or intersects dissimilar construction, and for protection of exposed wallboard edges around openings, provide metal casing bead trim of the following design:
 - 3. Beaded nose with exposed flange knurled for joint treatment: USG No. 200-A or equivalent.
- H. Cold-Rolled Channel Bridging: Steel, 0.053-inch minimum base-metal thickness, with minimum 1/2-inch-wide flanges.
 - 1. Depth: 1-1/2 inches.
 - 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch- thick, galvanized steel.
- I. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1 1/2" inch, wall attachment flange of 7/8 inch, minimum uncoated-metal thickness of 0.018 inch, and depth required to fit insulation thickness indicated.

2.4 STEEL FRAMING COMPONENTS FOR SUSPENDED AND FURRED CEILINGS AND SOFFITS SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- diameter wire, or double strand of 0.048-inch- diameter wire.
- B. Hanger Attachments to Concrete:
 - 1. Anchors: Capable of sustaining a load equal to 5 times that imposed as determined by ASTM E 488.
 - a. Type: Cast-in-place anchor, designed for attachment to concrete forms
 - 2. Powder-Actuated Fasteners: Capable of sustaining, a load equal to 10 times that imposed as determined by ASTM E 1190.
- C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.
- D. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.053 inch and minimum 1/2-inch- wide flanges.
 - 1. Depth: As indicated on Drawings.

2.5 AUXILIARY MATERIALS

- A. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

2.6 GYPSUM BOARD PRODUCTS

- A. Exposed Interior Gypsum Board:

1. ASTM C 36, regular type with tapered long edges for walls and ceilings.
 - a. Sheet Size: Maximum length available which will minimize end joints.
 - b. Thickness: As noted.
 - c. Type: Type X.

- B. Moisture Resistant Gypsum Board:

1. ASTM C 630, regular type with long edges for walls, not permitted at ceilings.
 - a. Sheet Size: Maximum length available which will minimize end joints.
 - b. Thickness: As noted.
 - c. Type: Type X.
 - i. Provide at all areas to receive tile and at all sink areas. (Not resident bathrooms, spa and shower rooms)

- C. Cementitious Backer Board: Durock by United States Gypsum or accepted equal – (bathrooms and shower rooms).

- D. Exterior Gypsum Ceiling Board: ASTM C 931, 5/8" thick, Type "X", fire resistant, treated gypsum core with chemically treated fiber paper. Material shall be made specifically for exterior use on ceilings and provide extra resistance to moisture and sagging required for outdoor conditions.

2.7 JOINT TREATMENT MATERIALS

- A. Interior Gypsum Board:

1. Joint Tape: Plain or perforated complying with ASTM C 475.
2. Joint Compound: Ready-mixed vinyl tape for interior use.
3. Grade: Two separate grades: one specifically for bedding tapes and filling depressions, and one for topping and sanding.

- B. Exterior Joint Compound: Special moisture-resistant, chemical-hardening type.
- C. High Impact Compound: As recommend by manufacturer.

2.8 ACOUSTICAL SEALANT

- A. Acoustical Sealant: Paintable, non-staining, latex sealant complying with ASTM C834.
- B. Manufacturer: Hilti CP506 Smoke and Acoustical Sealant or equal.

PART- 3 EXECUTION

3.1 PREPARATION AND COORDINATION

- A. Install supplementary stripping, backing, blocking, and bracing, at locations required to support fixtures, equipment, services, heavy trim, furnishings and similar work which cannot be adequately supported directly on gypsum board and applied finishes as indicated.
 - 1. Provide framed openings as required for Ductwork penetrations thru walls as required.

3.2 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.
- E. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
- F. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 - 1. Install two studs at each jamb strapped together. Stud shall be full height to deck above.

2. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
- G. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
- H. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
1. Firestop Track: Where indicated, install to maintain continuity of fire-resistance rated assembly indicated.
- I. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
- J. Curved Partitions:
1. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
 2. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches o.c.
- K. Direct Furring:
1. Screw to wood framing.
 2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
- L. Z-Furring Members:
1. Erect insulation vertically and hold in place with Z-furring members spaced 24 inches o.c.
 2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
 3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.
- M. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.3 INSTALLING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
- D. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
- E. Do not attach hangers to steel roof deck.
- F. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
- G. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
- H. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- I. Fire-Resistance-Rated Assemblies:
 - 1. Wire tie-furring channels to supports.
- J. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

3.4 INSTALLATION OF GYPSUM BOARD

- A. General Standards: In addition to compliance with GA-216, comply with manufacturer's instructions and requirements for fire-resistance ratings, whichever is most stringent.
- B. Provide moisture resistant gypsum board at wall of all bathrooms, and toilet rooms, do not use on ceilings.

3.5 SINGLE LAYER APPLICATIONS

A. Ceilings:

1. Apply gypsum board with long dimension at right angles to supports with end joints located over supports. Use maximum practical length boards to minimize end joints. Stagger end joints in alternate courses of boards and locate as far away from center of ceiling as possible. Fasteners shall be spaced not more than 8" o.c. Fasten with zinc-screws.
2. Gypsum board shall be attached to steel studs in accordance with ASTM Specification C 840, except that the steel drill screws (Specification ASTM C 954) shall be spaced not more than 8" o.c. at the edges and ends, and not more than 12" o.c., in the field on the board. On exterior walls, field screwing shall be at 8" o.c. Fasten with zinc-coated screws.

3.6 SOUND RATED APPLICATIONS

A. For sound-rated construction, comply with the following:

1. Partitions: Provide continuous beads of sealant at juncture of both faces of runner with floor construction, and wherever drywall abuts dissimilar materials. Install sealant prior to installation of gypsum boards.

3.7 GYPSUM SHAFTWALL CONSTRUCTION

- A. Install gypsum board shaft wall systems to comply with performance and other requirements indicated as well as with manufacturer's installation instructions and the following:
- B. ASTM C 754 for installation of steel framing. Fasten face layer of shaft wall system with screws through base layer and into supports. Do not bridge building expansion joints with shaft wall system, frame both sides of joints with furring and other support as indicated.
- C. Install supplementary framing, blocking, and bracing to support gravity and pullout loads of fixtures, equipment, services, heavy trim, furnishings and similar work which cannot be adequately supported directly by regular framing of gypsum board shaft wall system.
- D. Where handrails are indicated for direct attachment to gypsum board shaft wall system, provide not less than 0.0341" thick by 4" wide galvanized steel reinforcement strip, accurately positioned and secured behind not less than one gypsum board face layer of 5/8" thickness.
- E. At penetration in shaft wall, maintain fire resistance rating of entire shaft wall assembly by installing supplementary fire protection behind boxes containing wiring devices, elevator call buttons, elevator floor indicators, and similar items.
- F. Isolate shaft wall system from transfer of structural loading to system, both horizontally and vertically. Provide slip or cushioned type joints to attain lateral support and avoid axial loading. Comply with details shown and with manufacturer's instructions.

- G. Seal gypsum board shaft walls at perimeter of each section, which abuts work, and at joints and penetration within each section. Install acoustical sealant to withstand discoloration by air pressure differential between shaft and external spaces; comply with manufacturer's instructions and ASTM C 919.

3.8 DRYWALL ACCESS DOORS

- A. Install in an opening cut between two adjacent studs. The frame shall be positioned in the opening and screw attached to the studs.

3.9 DRYWALL FINISHING

- A. Finish exposed drywall surfaces with joints, corners and exposed edges reinforced or trimmed as specified, and with all joints, fasteners heads, trim accessory flanges and surface defects filled with joint compound in accordance with manufacturer's recommendations for a smooth, flush surface.
- B. Form true, level or plumb lines, without joints, fastener heads, flanges of trim accessories or defects visible after application of field-applied decoration.
- C. Use joint tape to reinforce joints formed by tapered edges or butt ends of drywall units and at interior corners and angles. Set tape in joint compound then apply skin coat over tape in one application.
- D. Where open spaces of more than 1/16" width occur between abutting drywall units, (except at control joints), prefill joints with joint compound and allow prefill to dry before application of joint tape.
- E. Reinforce external corners of drywall work with corner beads.
- F. Securely fasten metal corner beads as recommended by the manufacturer. Use fasteners which will be fully concealed by joint compound fill applied over flanges.
- G. Edge Trim:
 - 1. Provide specified type of metal casing bead trim. Install in single unjointed lengths wherever possible.
- H. Application of Joint Compounds:
 - 1. Allow drying time between applications of joint compound in accordance with manufacturer's recommendations for the relative humidity and temperature levels at the time of application. In no case, allow less than 24 hours drying time between applications of joint compound. Apply not less than 3 separate coats of joint compound over joints, fastener heads and metal flanges.
 - 2. Topping coat and sanding is not required above suspended ceilings where partition/walls are shown to extend to structural deck.
 - 3. Seal airtight all locations where pipes, ducts, conduits and other devices penetrate partitions above suspended ceiling. Seal both sides of partitions using joint treatment compounds and plastic tape as required.

4. Sealing of joints between tops of partitions that extend to metal roof deck and corrugations of metal roof deck is specified in Section 078413 "Penetration Fire Stopping".
- I. Protect gypsum sheathing that will be exposed to weather for more than one month as follows:
 1. Protect cutouts, corners, and joints in the sheathing by filling with a flexible sealant or by applying tape recommended by sheathing manufacturer at the time sheathing is applied.

3.10 CLEAN-UP

- A. At completion of each stage of the work, all excess materials, cuttings, scrap, etc. shall be removed from the site, and all spatters, droppings, etc., shall be cleaned up.

END OF SECTION 09 2500

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 DESCRIPTION OF WORK

- A. The extent of each type of tile work is shown on the drawings or herein specified including, but not necessarily limited to the following:
 - 1. Porcelain Wall Tile.
 - 2. Glass Tile.
 - 3. Waterproof Membrane (Walls).

1.3 REFERENCES

- A. Tile Council of America - Installation Handbook.
- B. American National Standards Institute (ANSI):
 - 1. ANSI A108 Series/A118 Series – American National Standard Specifications for Installation of Ceramic Tile.
 - 2. ANSI A108.19 – American National Standard Specifications for Gauged Porcelain Tiles and Gauged Porcelain
 - 3. Tile Panels/Slabs.
 - a. ANSI A108.20 – American National Standard Specifications for Exterior Installation of Vertical and Overhead Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method Bonded with Improved Modified Dry-Set Cement Mortar.
 - b. ANSI A137.1 – American National Standard Specifications for Ceramic Tile.
 - c. ANSI A137.3 – American National Standard Specifications for Gauged Porcelain Tile and Gauged Porcelain Tile
- C. Panels/Slab

1. ANSI A138.1 – American National Standard Specifications for Green Squared Certification for Tiles and
- D. Installation Materials.
1. ASTM International (ASTM):
 - a. ASTM A1064 – Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
 - b. ASTM C144 – Standard Specification for Aggregate for Masonry Mortar. Jobsite mix.
 - c. ASTM C150 – Standard Specification for Portland Cement. Jobsite mix.
 - d. ASTM C645 – Standard Specification for Nonstructural Steel Framing Members.
 2. NSI (DSDM) – Dimension Stone Design Manual; Natural Stone Institute.
 3. TCNA (HB) – Handbook for Ceramic Tile, Glass, and Stone Installation; Tile Council of North America.
 4. TTMAC – Specifications Guide 09 30 00 Tile Installation Manual.
 5. International Organization for Standardization (ISO):
 - a. ISO 13007 – Ceramic tiles – Grout and adhesives.
 6. Leadership in Energy and Environmental Design (LEED®) – U.S. Green Building Council.

1.4 SUBMITTALS

- A. Prior to starting work, provide Architect with a "Master Grade Certificate" stating grade, type and quantity of material and bearing signature of tile manufacturer and Contractor. Covering order shall show name of Owner, Architect, the Project and project location.
- B. Installation Instructions: Manufacturer's printed instructions for each product
- C. Submit 2 samples of each type, class, and color of tile required. Architect's review will be for colors, pattern, and texture only. Compliance with all other requirements is the exclusive responsibility of the Contractor.
- D. Obtain approval of job sample submittals before delivering any products to job site.
- E. Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.
- F. Maintenance Data: Include recommended cleaning methods, cleaning materials, and maintenance coatings.

- G. Manufacturer's Certificates: Certify products meet or exceed specified requirements. When applicable, submit a Master Grade Certificate signed by the manufacturer and the installer certifying that products meet or exceed the specified requirements of ANSI A137.1 and/or ANSI A137.3.

1.5 QUALITY ASSURANCE

- A. To ensure single-source warranty requirements and compatibility of products: Please provide cleaners, sealing and maintenance products as well as tile grout, setting materials, underlayments, additives, accessories and factory- prepared dry-set mortars from the same manufacturer.
- B. Installer Qualifications:
 - 1. Engage an experienced installer who has completed tile installations similar in material, design, and extent to that indicated for this project and with a record of successful in-service performance. Installer to have a minimum of five years' experience.
 - 2. Five-Star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.
 - 3. Contractors' Association of America.
 - a. Installer's supervisor for the project must hold the International Masonry Institute's Foreman Certification.
 - b. Installer employs Ceramic Tile Education Foundation Certified Installers or installers recognized by the U.S.
- C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution

1.6 PRODUCT DELIVERY, STORAGE HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels legible and intact until time of use identifying brand name and contents. Prevent damage or contamination to materials by water, freezing, foreign matter and other causes.
- B. Store tile and setting materials on elevated platforms, under cover and in a dry location and protect from contamination, dampness, freezing and overheating in accordance with manufacturer's instructions.
- C. Do not use frozen materials unless specifically allowed by manufacturer.
- D. Deliver and store materials on site at least 24 hours before work begins.
- E. Provide heated and dry storage facilities on site
- F. Tile cartons grade-sealed by manufacturer in accordance with TCA 137.1. Grade-seals unbroken.

- G. Manufactured mortars and grouts to contain hallmarks certifying compliance with reference standards and be types recommended by tile manufacturer for application.
- H. Deliver mastic grout ready for use.
- I. Deliver dry-set mortar in sealed, moisture-proof containers.

1.7 ENVIRONMENTAL CONDITIONS

- A. Comply with requirements of referenced standards and recommendations of material manufacturers for environmental conditions before, during, and after installation.
- B. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.
- C. Maintain substrate and ambient temperatures in tiled areas between 50°F and 95°F during installation and for at least 7 days after completion, unless otherwise indicated in the product instructions and/or ANSI A108 installation standards.
- D. Provide adequate lighting for good grouting and clean-up.
- E. Setting products must be kept in a dry area prior to use.

PART- 2 PRODUCTS

2.1 PORCELAIN

- A. CT-1 Bespoke Collection, Stacked Celestine, Silver Polished Glass Mosaic.
 - 1. Size: 2" x 6" (12" x 12" sheet)
 - 2. Grout Joint: 1/16"

2.2 ADHESIVE

- A. Walls: Laticrete or equal, Glass Tile Adhesive Lite.

2.3 SEALANT

- A. Walls: Sanitary 1700 Sealant by General Electric or accepted equal. One part mildew resistant silicone sealant. Color as selected by Architect.

2.4 COLORED GROUT

- A. Colored grout shall be as manufactured by Laticrete International, Inc., or approved equivalent. Color selected by Architect.
- B. "SpectraLoc" Pro Premium or "SpectraLoc" Pro Premium Translucent Grout as chosen by Architect.

2.5 EDGE BAND

- A. As manufactured by Schluter Systems, Interior Finish Schedule.
 - 1. Outside Corner: RONDEC
 - 2. Cap: RONDEC

2.6 ACCESSORIES

- A. Temporary Setting Shims: Ridged plastic shims, size to suit joint thickness.
- B. Setting Shims: Strips of resilient plastic or neoprene, of thickness to prevent point loading of stone on anchors and of depths to suit anchors without intruding into required depths of pointing materials.
- C. Cleaner: Cleaner specifically formulated for tile types, finishes, and applications indicated, as recommended by tile producer. Do not use cleaning compounds containing acids, caustics, harsh fillers, or abrasives.

PART- 3 EXECUTION

3.1 PREPARATION

- A. Beginning work on any surface constitutes acceptance of the surface as suitable to receive work of this section and acceptance of full responsibility for the quality and appearance of finished work.
- B. Do not start until work of other trades, which goes through or in the space behind tile, has been completed.
- C. Examine substrates for compliance with requirements for conditions affecting performance of the work. Refer to ANSI A108.01, ANSI A108.02 and if applicable ANSI A108.19 and/or ANSI A108.20. This includes, but is not limited to squareness and plumbness of walls and variations in floor.
- D. Do not proceed with tilework until surfaces and conditions comply with requirements indicated in reference tile installation standard and manufacturer's printed instructions
- E. Work shall not be started on concrete surfaces until surfaces are thoroughly cured and dry.

- F. Surfaces to receive thin-bed mortar shall not vary more than 1/8" above and 1/8" below required plane in any undivided space; nor shall there be more than 1/16" variation within any single running foot.
1. Cementitious Backer Board Substrate:
 - a. Verify board fastening at 8 inches on center with screws firmly anchored into stud backing.
 - b. All horizontal and vertical joints and corners are to have 1/8 inch spacing to be filled solid with mortar. Apply 2-inch glass fiber mesh tape embedded in a skim coat of the mortar at all joints and corners.
 2. Expansion Joints:
 - a. Notify Architect if concrete slab expansion joints are located within work areas. Install tile at expansion joints in conformance with TCA EJ171.
- G. Close off spaces in which tile is being set to traffic and other work during installation and for at least 72 hours after completion of tile work.
- H. Floor tile operations in spaces receiving wall tile shall not be started until after wall tile installation has been completed.
- I. Before installing base tile, seal areas around pipes penetrating the backing material. Sealer used shall be compatible with material which will be used to install the tile.

3.2 WORKMANSHIP

- A. All tile shall be installed by skilled mechanics thoroughly competent to execute the work in accordance with best practices and methods common to the trade and in accordance with Tile Council of America "Handbook for Ceramic Tile Installation", latest edition.
- B. Accurate pitch of setting bed to floor drains to be maintained.
- C. Porcelain tile shall be set with constant 1/8" joints. Marble shall be set at 1/16" joints. Adjust factory mounted tile as required to align joints squarely. Tile shall be firmly secured in place in straight lines and level plans. The finished work shall be free from scratched, broken, inverted, cracked, or misplaced tiles.
- D. Grind and fit tile carefully at intersections, against trim finish, and at built-in fixtures and accessories. Fit tile closely around outlets, pipes, fixtures, and fittings so that plates, escutcheons and collars will overlap cuts. Cut and drill tile and trim shapes accurately without damage. Rub all exposed cut edges smooth with abrasive stone.
- E. Layout shall be symmetrical at all spaces and preclude the use of less than half tile sizes. Tile shall accurately align in all directions, vertically and horizontally, and shall be flush throughout the field.
- F. Except where otherwise shown or specified, make joints in floor tile perpendicular and parallel to walls.
- G. Prevent rapid evaporation of moisture from the mortar bed. Do not set tile on dry bed.

3.3 APPLICATION

- A. Install tile in accordance with manufacturer's printed instructions and the applicable requirements of ANSI A108 Series for the materials being used.
- B. Protect surrounding finish materials during application of waterproofing. Clean spillage's immediately with solvent recommended by manufacturer and flush with clear water.
- C. For installation on existing wall tile, verify existing tile is soundly secured to wall. If needed removed loose tile and fill with mortar filler. Degrease existing tile before installing new tile.
- D. Install all floor, wall and base tile in strict accordance with ANSI specifications for the particular applications scheduled on the drawings. Comply with manufacturer instructions.
- E. Extend tile work into recesses and under or behind equipment and fixtures, to form a complete covering without interruptions, except as otherwise shown. Terminate work neatly at obstructions, edges and corners without disrupting pattern or joint alignments.
- F. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures and other penetrations so that plates, collards or covers overlap tiles,
 - 1. Jointing pattern:
 - a. Unless otherwise shown, lay tile in grid pattern. Align joints when adjoining tiles on the floor, base, walls, and trim are same size. Layout tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting.
 - 2. Sealant:
 - a. Seal junction of plumbing fixtures, exposed pipe penetrations, fitting and expansion joints with sealant after grouting.
 - 3. Trim:
 - a. Install metal cap trim on wainscot tile wall as recommended by manufacturer. All corners shall be mitered.

3.4 GROUTING

- A. Grout joints in accordance with manufacturer's instructions and ANSI A108.6 and/or ANSI A108.10.
- B. Remove standing water, dust, and foreign substances from joints to be grouted
- C. Clean and dry tile surfaces.
- D. After grouting, remove all grout residue promptly.

- E. Dry-set grout may be applied over dry tile without wetting of tile. Grout for floors shall be, color to be selected by Owner. Factory premixed colored grouts may be used. Colored grout for walls shall be as selected by Architect.

1. Allow mortar to attain initial set before placing joint grout.
2. Before grout is set, strike or tool joints to depth of cushion.
3. Fill all gaps and skips.
4. Clean excess grout from all surfaces before grout sets.

3.5 CURING AND CLEANING

- A. Floors shall be covered with waterproof paper with all joints lapped at least 4" and the laps tape-sealed or held down with planks or weights and allowed to damp cure for at least 72 hours before foot traffic is permitted thereon.
- B. Sponge and wash all tile thoroughly. Acid or acid type cleaners not permitted.
- C. Tile which is stained, broken or damaged in any way is not acceptable and must be replaced.
- D. Upon completion of all work, tile contractor shall remove all unused material and rubbish from the site.

3.6 PROTECTION

- A. Floors: Protect from all traffic for at least 72 hours after installation.
 1. Do not step on floor for at least 24 hours; if traffic is unavoidable after that, use plywood stepping boards.
 2. Protect from heavy traffic for at least 7 days after installation.
 3. When fast-setting materials are used to allow faster occupancy, comply with the manufacturer's recommendations.
- B. Protect from impact, vibration and heavy hammering on adjacent and opposite walls for at least 14 days after installation, unless manufacturer's instructions allow a shorter period.
- C. Protect from stain-causing food products and chemicals for at least 14 days.
- D. Tiled vertical outside corners (external angles) shall be protected with board corner strips in areas used as passageways by workmen.
- E. Protect tile work from damage until project completion or acceptance.

END OF SECTION 09 3000

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 DESCRIPTION OF WORK

- A. The types of acoustical panel ceilings specified in this section includes, but is not limited to, the following:
 - 1. Suspended mineral fiber panel systems.
 - 2. Exposed grid suspension system for acoustical ceilings
 - 3. Grid suspension systems for gypsum board ceilings and soffits
 - 4. Wire hangers, fasteners, main runners, cross tees and wall angle moldings
 - 5. Perimeter trim

1.3 QUALITY ASSURANCE

- A. Fire Resistance Ratings: As indicated by reference to design designation in UL "Fire Resistance Directory" for floor, roof or beam assemblies in which acoustical ceilings function as a fire protective membrane; tested per ASTM E 119. Provide protection materials for lighting fixtures and air ducts to comply with requirements indicated UL design assemblies as shown on drawings.
- B. Surface Burning Characteristics: As follows, tested per ASTM E 84.
 - 1. Flame Spread: 25 or less.
 - 2. Smoke Developed: 50 or less.
- C. Coordination of Work: Coordinate layout and installation of acoustical ceiling units and suspension system components with other work supported by, or penetrating through, ceilings, including light fixtures, HVAC equipment, fire-suppression system components (if any), and partition system (if any). Reflected ceiling plans may vary due to variations in room size. Contractor's bid shall include all such variations.

- D. Single source responsibility: Provide acoustical panel units, grid components, and trim by a single manufacturer.

1.4 SUBMITTALS

- A. For information only, submit 2 copies of manufacturer's product specifications and installation instructions for each acoustical ceiling material required, and for each suspension system, including certified laboratory test reports and other data as required to show compliance with these specifications. Distribute one additional copy of each installation instruction to the Installer.
- B. Include manufacturer's recommendations for cleaning and refinishing acoustical units, including precautions against materials and methods, which may be detrimental to finishes and acoustical performances.
- C. Submit 2 sets of 6" square samples for each acoustical unit required. In each set of samples, show the full range of exposed color and texture to be expected in the completed work. Sample submittal and Architect's review will be for color and texture only. Compliance with other requirements is the exclusive responsibility of the Contractor.
- D. When work is completed, deliver stock of replacement material to Owner for each type of acoustical unit used in the work. Furnish full size units, matching installed materials, packaged and marked for identification. Furnish not less than two cases of each type of acoustical unit installed.

1.5 WARRANTY

- A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace acoustical panels that fail within the warranty period. Failures include but are not limited to:
 - 1. Acoustical Panels: Sagging and warping as a result of defects in materials or factor workmanship.
 - 2. Grid System: Rusting and manufacturer's defects.
 - 3. Acoustical Panels with BioBlock Plus or designated as inherently resistive to the growth of micro-organisms installed with Armstrong suspension systems: Visible sag and will resist the growth of mold/mildew and gram positive and gram negative odor and stain causing bacteria.
- B. Warranty Period Humiguard:
 - 1. Acoustical panels: Ten (10) years from date of substantial completion.
 - 2. Grid: Ten (10) years from date of substantial completion.
 - 3. Acoustical panels and grid systems with HumiGuard Plus or HumiGuard Max performance supplied by one source manufacturer is thirty (30) years from date of substantial completion.

- C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.6 PRODUCT HANDLING

- A. Deliver acoustical panels in manufacturer's original unopened packages, fully identified with type, finish, performance data and compliance labels. Handle and store in accordance with manufacturer's instructions and recommendations.

1.7 JOB CONDITIONS

- A. Do not install acoustical units until installation areas meet the following requirements: exterior openings have been closed and roofs are weathertight; mechanical, electrical, and other work above ceilings have been completed; wet work has been installed; temperature and relative humidity have reached levels which comply with acoustic materials manufacturer's recommendations for the units to be used and are acceptable to the Installer.
- B. Coordinate all work with Mechanical and Electrical trades. Prior to layout work, it shall be the responsibility of the Contractor to meet with the General Contractor and Electrical Contractor to properly coordinate the installation of the ceiling and electrical fixtures.
- C. Examine related sections of these specifications for hangers, inserts, etc. provided under those sections.
- D. Suspension system shall be coordinated with metal stud and/or demountable partitions. Bracing, etc., required for stiffening of partition system shall be provided by this Contractor.

1.8 EXTRA MATERIALS

- A. Deliver extra materials to Owner. Furnish new extra materials described below that match products installed. Package with protective covering for storage and identified with appropriate labels.
 - 1. Acoustical Ceiling Units: Furnish quantity of full-size units equal to 1 percent of the amount installed.
 - 2. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed.

1.9 ALTERNATE CONSTRUCTION WASTE DISPOSAL

- A. Ceiling material being reclaimed must be kept dry and free from debris.
- B. Contact the Armstrong Recycle Center a consultant will verify the condition of the material and that it meets the Armstrong requirements for recycling. The Armstrong consultant will provide assistance to facilitate the recycling of the ceiling.

PART-2 PRODUCTS

2.1 MATERIALS – GENERAL

- A. The following specified acoustical materials shall have the minimum requirements listed below, in addition to the requirements of the "Quality Assurance" Section.
- B. Examine related sections of these specifications for hangers, inserts, etc. provided under those sections.
- C. Suspension system shall be coordinated with metal stud and/or demountable partitions. Bracing, etc., required for stiffening of partition system shall be provided by this Contractor.

2.2 EXTRA MATERIALS

- A. Deliver extra materials to Owner. Furnish extra materials (1% of amount installed), packaged with protective covering for storage and identified with appropriate labels.

2.3 ACOUSTICAL

- A. The following specified acoustical materials shall have the minimum requirements listed below, in addition to the requirements of Quality Assurance Section.
 - 1. NRC: .55
 - 2. CAC 40
 - 3. CSTC: 35
 - 4. L.R.: 75%
 - 5. Flame Spread - 0 -25, Class A per ASTM E 1264.

2.4 CEILING MATERIALS

- A. Basis of Design Product: Subject to compliance with requirements, provide products as indicated by Armstrong World Industries, Inc. or an equal product by one of the following:
 - 1. Armstrong World Industries
 - 2. Celotex Corporation
 - 3. USG Corporation
- B. Except as noted, the materials as manufactured by Armstrong World Industries are specified. Equal patterns and textures furnished by one of the above companies will be considered.

2.5 CEILING TYPES

- A. Provide units of the composition, patterns, finishes, sizes, thickness, edge profiles and other characteristics as indicated and recommended by the manufacturer for the indicated application. Tile must comply with UL design systems as previously noted. The manufacturer based Armstrong ceiling solutions or equal.
 - 1. A.C.T. 1
 - a. Tile: Tectum DesignArt - Lines, 24" X 24" X 1".
 - b. Suspension System: 15/16" – Square Tegular #7301 with Angle molding #7800 to match.
 - c. Color as chosen by Architect from manufacturer's full range of colors.
 - d. Grid to be color matched.
- B. Armstrong Contact: Lynda Caccamo (315) 399-8257 - lmccamo@armstrongceilings.com

2.6 SUSPENSION SYSTEM MATERIALS – GENERAL

- A. Acceptable Manufacturers: Materials of the following manufacturers are acceptable where applicable:
 - 1. Armstrong World Industries or Equal.
- B. Except as noted, the materials as manufactured by Armstrong World Industries are specified. Equal grid system furnished by one of the above companies will be acceptable, provide it is a component complying with the UL design system previously noted.
- C. Standard: Comply with the requirements of ASTM C 635, as applicable to the suspended acoustical ceilings system materials indicated. Provide fire-rated system throughout.
- D. Structural Classification: Intermediate-duty system.
- E. Coordination of Components
 - 1. Provide suspension system which is coordinated with partitions, and which is coordinated with the indicated limitations and requirements for hanging from structure and supporting light fixtures,
 - 2. HVAC components and similar work indicated to be supported by or located in suspended acoustical panel ceilings. Include the necessary components for a complete suspension system including (as applicable) inserts, anchors, hangers, carrying channels, main runners, cross runners, splines, edge moldings, splices, clips, fasteners, springs, tie wires, hold-down devices, and similar members, devices and accessories.
- F. Corrosion Protection: Electro galvanized steel meeting requirements of ASTM C 635 for normal use environments.
- G. Attachment Devices: Type recommended by suspension system manufacturer for attachment or anchorage of ceiling hangers to structure above ceiling, sized for not less than 5-times the hanger design load for the structural classification indicated; ASTM C 635, Table 1, Direct Hung.

- H. Hanger Wire: Galvanized carbon steel wire, ASTM A 641, soft temper, prestretched, Class 1 coating.
- I. Gauge: Provide wire sized so that stress at 5-times hanger design load (ASTM C 635, Table 1, Direct Hung) will be less than yield stress of wire, but provide not less than 12 gauge (0.106") wire.

2.7 RUNNERS, CROSS RUNNERS EDGE MOLDINGS AND TRIM

- A. General: Except as otherwise indicated, provide manufacturer's standard units of the metal, finish and shapes recommended for the applications indicated.
- B. Type of System: Either direct-hung or indirect-hung suspension system, at Contractor's option.
- C. Exposure of System: Provide fully exposed suspension system (for lay-in panels), with lower flanges of both main runners and cross runners exposed.
- D. Finish of Exposed Members: Provide uniform white matte baked enamel factory-applied finish on exposed surfaces of ceiling suspension system including moldings, trim and accessories.
- E. Edge Molding: Square Edge or shadow as noted in ceiling types.
- F. Trim: Armstrong Ceiling Systems, Axiom trim profiles or equal. Provide Axiom Classic and Vector trim rails with all required accessories.

2.8 TECTUM PANELS

- A. Panels mechanically attached to steel framing shall be installed per manufactures installation instructions.
- B. Panels shall be installed in an ashlar pattern. Whenever panel a butts another panel, edge shall be beveled.
- C. Screens shall be as defined in manufactures installation instructions. Screw head should be flush with surface.
- D. Paint screw head prior to installation to match natural finish.

2.9 MISCELLANEOUS MATERIALS

- A. Trapeze: Cold rolled steel channels, 16 MSG, 1-1/2".

PART- 3 EXECUTION

3.1 INSPECTION AND PREPARATION WORK

- A. Examine the conditions under which the acoustical panel ceiling work is to be performed. Do not proceed with the work until satisfactory conditions have been corrected.

- B. Plan each layout to balance border widths at opposite edges of each ceiling area. Avoid use of less-than-half width units wherever possible. Comply with Architect's reflected ceiling plans to the greatest extent possible.

3.2 INSTALLATION

- A. Install acoustical tile ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- B. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders and comply with layout shown on reflected ceiling plans.
- C. Suspend ceiling hangers from building's structural members, plumb and free from contact with insulation or other objects within ceiling plenum. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, counterplaying, or equally effective means. Where widths of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers, use trapezes or equivalent devices.
 - 1. Do not support ceilings directly from permanent metal forms or floor deck; anchor into concrete slabs.
 - 2. Do not attach hangers to steel deck tabs or steel roof deck.
- D. Install edge moldings and trim at perimeter of acoustical tile ceiling area and where necessary to conceal edges of acoustical units. Screw attached moldings to substrate with concealed fasteners at intervals not more than 16 inches o.c. and not more than three inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
- E. Lighting fixtures shall be installed according to reflected ceiling plans. All lighting fixtures shall have hanger wires at each corner. Provide rated enclosure for fixtures.
- F. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- G. Install acoustical tiles in coordination with suspension system and exposed moldings and trim. Place splines or suspension system flanges into kerfed edges so tile-to-tile joints are closed by double lap of material. Fit adjoining tile to form flush, tight joints. Scribe and cut tile for accurate fit at borders and around penetrations through tile. Where reveal edge tile meets border, kerf tile to provide recess. Where cut edge is exposed, paint to match tile. Hold tile field in compression by inserting leaf-type, spring-steel spacers between tile and moldings, spaced 12 inches o.c.

3.3 CLEANING AND PROTECTION

- A. Clean exposed surfaces of acoustical panels, trim, edge moldings, and suspension members; comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work, which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 5100

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. Section Includes:
 - 1. Resilient Wall Base.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. LEED Submittals:
 - 1. Product Data for Credit EQ 4.1: For adhesives, include printed statement of VOC content and chemical components.
- C. Samples for Initial Selection: For each type of product indicated.
- D. Samples for Verification: For each type of product indicated, in manufacturer's standard-size samples of each resilient product color, texture, and pattern required.
- E. Product Schedule: For resilient products. Use same designations indicated on Drawings.

1.4 QUALITY ASSURANCE

- A. Installation Qualification: Contractors for floor covering installation should be experienced in managing commercial flooring projects and provide professional installers, qualified to install the various flooring materials specified. An installer is "qualified" if trained, or a certified by Tarkett or a certified INSTALL (International Standards & Training Alliance) resilient floor covering installer.
- B. Mockups: Provide resilient products with mockups specified in other Sections.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by Tarkett, but not less than 55 deg F or more than 85 deg F.

1.6 PROJECT CONDITIONS

- A. Install resilient products after other finishing operations, including painting, have been completed.
- B. Maintain ambient temperatures within range recommended by Tarkett, but not less than 65 deg F or more than 85 deg F in spaces to receive resilient products during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- C. Maintain the ambient relative humidity between 40% and 60% during installation.
- D. Until Substantial Completion, maintain ambient temperatures within range recommended by Tarkett, but not less than 55 deg F or more than 85 deg F.

PART- 2 PRODUCTS

2.1 RESILIENT WALL BASE

- A. Provide vinyl base complying with FS SS-W-40, Type II, as follows:
 - 1. Manufacturers:
 - a. Johnsonite
 - b. Burke Flooring

2.2 RESILIENT TRADITIONAL VINYL WALL BASE (VB-1)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Johnsonite – Millwork plastic Vinyl Wall Base.
- B. Performance requirements meets ASTM F1861 Standard Specification for Resilient Vinyl Wall Base, Type TV, Group 1.
- C. Height: 4 1/4"
- D. Thickness: .25"

- E. Style: Reveal MW-XX-F
- F. Colors and Patterns: As selected by Architect from full range of industry colors.
- G. Test Data:
 - 1. Flexibility, ASTM F137: Passes 1/4 inch mandrel
 - 2. Resistance to light, ASTM F1515: Passes
 - 3. Resistance to chemicals, ASTM F925: Passes
 - 4. ASTM E 648, Standard Test Method for Critical Radiant Flux of 0.45 watts/cm² or greater, Class 1.

2.3 RESILIENT TRADITIONAL VINYL WALL BASE (VB-1)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Johnsonite plastic Vinyl Wall Base.
- B. Performance requirements meets ASTM F1861 Standard Specification for Resilient Vinyl Wall Base, Type TV, Group 1.
- C. Height: 4".
- D. Length: Roll - 120' long.
- E. Thickness: 1/8" gauge.
- F. Style: Standard top-set cove
- G. Colors and Patterns: As selected by Architect from full range of industry colors.
- H. Test Data:
 - 1. Flexibility, ASTM F137: Passes 1/4 inch mandrel
 - 2. Resistance to light, ASTM F1515: Passes
 - 3. Resistance to chemicals, ASTM F925: Passes
 - 4. ASTM E 648, Standard Test Method for Critical Radiant Flux of 0.45 watts/cm² or greater, Class 1.

2.4 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

- B. Flooring products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.5 INSTALLATION MATERIALS

- A. Adhesives: as recommended by Tarkett to meet site conditions
 - 1. Tarkett 960 Cove Base Adhesive (Porous applications)
 - 2. Tarkett 946 Premium Contact Bond Adhesive (Non-porous applications)

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the work.
- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to Tarkett's written instructions to ensure adhesion of resilient wall base.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- C. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- D. Vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 RESILIENT BASE INSTALLATION

- A. Comply with Tarkett's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

- D. Tightly adhere resilient wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.

3.4 CLEANING AND PROTECTION

- A. Comply with Tarkett's written instructions for cleaning and protection of resilient products.
- B. Perform the following operations immediately after completing resilient product installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

END OF SECTION 09 6513

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings, and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. This section includes the following Linoleum Modular Flooring:
 - 1. Marmoleum® Modular Striato
- B. Sections related to this section include:
 - 1. Concrete: Refer to Division 3 Concrete Sections for cast-in-place concrete, concrete toppings, and cementitious underlayments.
 - 2. Resilient Flooring Accessories: Refer to Division 9 Finishes Sections for resilient wall bases, reducer strips, metal edge strips and other resilient flooring accessories.

1.3 REFERENCES

- A. Forbo Technical Data Sheets
- B. Forbo Installation Guide
- C. Forbo Floor Care Guide
- D. Safety Data Sheets (MSDS or SDS)
- E. American Society for Testing and Materials (ASTM):
 - 1. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials
 - 2. ASTM E 492 – Standard Test Method for Laboratory Measurement of Impact Sound Transmission through Floor-Ceiling Assemblies Using the Tapping Machine
 - 3. ASTM E 648 – Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
 - 4. ASTM E 662 – Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
 - 5. ASTM E 989 – Standard Classification for Determination of Impact Insulation Class (IIC)

6. ASTM E 1745 – Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs
 7. ASTM F 141 – Standard Terminology Relating to Resilient Floor Coverings
 8. ASTM F 710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
 9. ASTM F 1482 – Standard Practice for Installation and Preparation of Panel Type Underlayments to Receive Resilient Flooring
 10. ASTM F 1861 – Standard Specification for Resilient Wall Base
 11. ASTM F 1869 – Standard Test Method for Measuring Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
 12. ASTM F 2195 – Standard Specification for Linoleum Tile Floor Covering
 13. ASTM F 2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
 14. ASTM F 2419 – Standard Practice for Installation of Thick Poured Gypsum Concrete Underlayments and Preparation of the Surface to Receive Resilient Flooring
 15. ASTM F 2471 – Standard Practice for Installation of Thick Poured Lightweight Cellular Concrete Underlayments and Preparation of the Surface to Receive Resilient Flooring
 16. ASTM F 2659 – Standard Guide for Preliminary Evaluation of Comparative Moisture Condition of Concrete, Gypsum Cement and other Floor Slabs and Screeds Using a Non- Destructive Electronic Moisture Meter
 17. ASTM F 2678 – Standard Practice for Preparing Panel Underlayments, Thick Poured Gypsum Concrete Underlayments, Thick Poured Lightweight Cellular Concrete Underlayments, and Concrete Subfloors with Underlayment Patching Compounds to Receive Resilient Flooring
 18. ASTM F 3191 – Standard Practice for Field Determination of Substrate Water Absorption (Porosity) for Substrates to Receive Resilient Flooring
- F. National Fire Protection Association (NFPA):
1. NFPA 253 – Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
 2. NFPA 258 – Test Method for Specific Optical Density of Smoke Generated by Solid Materials

1.4 SUBMITTALS

- A. Submit the following in accordance with conditions of contract and Division 1 specification section 01 3300 "Submittal Procedures".
- B. Product Data: Submit three (3) copies of the manufacturer's technical data and installation recommendations for each type of flooring and accessory products specified.
- C. Shop Drawings:

1. Submit shop drawings showing layout, locations of seams, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
 2. Show details of profiles and product components, including anchorage, accessories, finish colors, patterns and textures.
- D. Samples: Submit three (3) sets of samples of each type, color and finish of flooring and accessory products specified, with an indication of full range of color, pattern and texture variation. Provide samples with a minimum size of 6" x 9" for flooring products and 6" in length for accessories.
- E. Quality Assurance Submittals:
1. Submit three (3) copies of the manufacturer's Product Technical Data Sheet, specifying performance characteristics, criteria and physical requirements.
 2. Submit three (3) copies of the manufacturer's written installation recommendations.
- F. Closeout Submittals:
1. Submit three (3) copies of the maintenance and operations data. This should include methods for maintaining the installed products and any precautions against cleaning materials or methods that are detrimental to the product and their performance.
 2. Submit three (3) copies of the warranty as specified herein.
 3. Installer Certification: Submit proof of certification from the manufacturer certifying that the installers comply with the specified requirements.
- G. Replacement Material: After completion of work, deliver to project site replacement materials from the same manufactured lot as materials installed. Package materials with protective covering and identify each with descriptive labels.
1. Flooring Materials: No less than 50 square feet of each type, pattern and color installed.
 2. Accessories: No less than 10 linear feet for each 500 linear feet or fraction thereof each different type and color installed.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Whenever possible, provide each type of flooring as provided by a single manufacturer, including recommended primers, adhesives, sealants, patching and leveling compounds.
- B. Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation and floor care recommendations and manufacturer's warranty requirements. Comply with requirements according to the "Project Management and Coordination" in Division 1 Project Meetings Section.
- C. Pre-Installation Testing: Conduct and document pre-installation testing as specified by manufacturer in accordance with the latest version of the specified test methods.
1. Substrate Porosity Testing: ASTM F 3131 – Standard Practice for Field Determination of Substrate Water Absorption (Porosity) for Substrates to Receive Resilient Flooring.

2. pH testing: ASTM F 710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
 3. In-situ Relative Humidity Testing: ASTM F 2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
 4. Calcium Chloride Testing: ASTM F 1869 – Standard Test Method for Measuring Moisture Vapor Emissions Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
 5. Surface Moisture Testing: ASTM F 2659 – Standard Guide for Preliminary Evaluation of Comparative Moisture Condition of Concrete, Gypsum Cement and other Floor Slabs and Screeds Using a Non-Destructive Electronic Moisture Meter.
 6. Bond Testing: Conduct testing and document results in accordance with the manufacturer's recommendations.
- D. Flooring Contractor Qualifications:
1. The awarded flooring contractor shall be an established firm, experienced in the installation of the specified product and shall have access to all manufacturer's required specifications, technical, installation and maintenance related documents.
- E. Installer Qualifications: Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
1. Engage installers certified by Forbo as a "Forbo Certified Modular Technician."
 2. Proof of valid certification must be submitted to the General Contractor and verified by Forbo prior to the start of the project.
 3. Forbo Certified Modular Technicians must be present on the jobsite daily.
- F. Regulatory Requirements: Provide flooring products with the following fire performance characteristics as determined by testing identical products in accordance with the latest version of ASTM method indicated below by a certified testing laboratory or another testing and inspecting agency acceptable to authorities having jurisdiction.
1. ASTM E 648 – Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source or NFPA 253 – Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
 2. ASTM E 662 – Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials or NFPA 258 – Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
- G. Standard of Quality Mock-Up: For the purpose of evaluating the quality of workmanship, install a mock-up of the specified flooring completed by the pre-qualified installers following the manufacturer's installation recommendations. Obtain Owner's and Architect's acceptance of finish color, texture and pattern, and workmanship standard. Comply with requirements according to the "Quality Control" in Division 1 Mock-Up Requirements Section.
1. Size and Location of Mock-Up: As directed in field by Owner and Architect.
 2. Maintenance of Mock-Up: Maintain mock-up during construction for workmanship comparison; remove and legally dispose of mock-up when no longer required.

3. Approval of Mock-Up: Upon approval of the mock-up, this installation shall be considered the standard of quality and basis of comparison for the balance of the project. Areas to be found deficient by specification standards or application procedures shall be repaired or replaced at the contractor's expense.
 4. Incorporation of Mock-Up: The mock-up may be incorporated into final construction upon Owner's approval.
- H. Post-Installation Meetings: Conduct post-installation meetings to review methods and procedures related to floor care and warranty requirement.

1.6 WARRANTY

- A. Project Warranty: Comply with requirements according to the "Conditions of the Contract" in Division 1 Closeout Submittals Warranty Section for project warranty provisions.
- B. Manufacturer's Warranty: Submit the manufacturer's standard warranty document executed by authorized company official for Owner's acceptance. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.
 1. Warranty Period: Thirty (30) year limited warranty commencing on Date of Original Purchase from manufacturer.
- C. Installation Warranty: Submit the flooring contractor's installation warranty signed by the General Contractor and Installer for Owner's Acceptance, agreeing to repair or replace work which has failed as a result of defects in workmanship. Failure shall include, but not limited to, tearing, cracking, separation, deterioration or loosening from substrate, seam failure, ripples, bubbling or puckering. Upon notification of such installation deficiencies, within the warranty period, make necessary repairs or replacement at the convenience of the Owner. Other guaranties or warranties may not be substituted by the Contractor for the terms of this warranty. Installation warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents
 1. Warranty Period: Two (2) year limited warranty commencing on Date of Substantial Completion from flooring contractor.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with the Division 1 Product Requirements Sections.
- B. Ordering: Comply with the manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- C. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- D. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.
 1. All materials (flooring, adhesives, weld rod and accessories) should be stored in areas that are fully enclosed and weathertight. The permanent HVAC should be fully operational and controlled and set at a minimum temperature 65° F. If this is not possible, the areas should be acclimated and controlled by means of temporary HVAC to the service level conditions expected during occupancy. The temperature and humidity should range from 75° F $\pm$ 10°F with a 50% $\pm$ 10% ambient relative humidity.
 2. Store modular cartons stacked per the manufacturer's recommendations.

3. Comply with the manufacturer's recommendation for the acclimation of all materials in the space where they will be installed for at least 48 hours prior to the installation unless longer conditioning periods are required by the manufacturer.

1.8 PROJECT CONDITIONS

A. Environmental Requirements/Conditions:

1. Areas to receive material should be clean, fully enclosed and weather tight. The permanent HVAC should be fully operational and controlled and set at a minimum temperature 65° F. If this is not possible, the areas should be acclimated and controlled by means of temporary HVAC to the service level conditions expected during occupancy. The temperature and humidity should range from 75° F $\pm$ 10°F with a 50% $\pm$ 10% ambient relative humidity. These conditions **MUST** be established at least seven days prior to beginning the installation, maintained during the installation, and continued for at least seven days following the installation.
2. The flooring material should be conditioned in the same manner for at least 48 hours prior to the installation.
3. Substrate evaluation and preparation should not begin until a stable, conditioned environment has been established as described in this section.
4. Areas to receive flooring must have adequate lighting to allow for proper inspection and preparation of the substrate, installation of the flooring and final inspection.

B. Temperature Requirements: Maintain air temperature in spaces where products will be installed for time period before, during, and after installation as recommended by manufacturer.

1. Temperature Conditions: 65° F for at least seven days prior to beginning the installation, maintained during the installation, and continued for at least seven days following the installation.

C. Substrate Conditions:

1. Existing Conditions.
2. Concrete Curing: Do not install flooring over concrete substrates until substrates have cured and are dry to bond with adhesive as determined by the concrete and flooring manufacturer's recommendations.
3. Testing Results: Conduct and document pre-installation testing as specified by manufacturer in accordance with the latest version of the specified test methods.
 - a. Substrate Porosity Testing: ASTM F 3131 – Standard Practice for Field Determination of Substrate Water Absorption (Porosity) for Substrates to Receive Resilient Flooring.
 - b. pH testing: ASTM F 710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
 - c. In-situ Relative Humidity Testing: ASTM F 2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
 - d. Calcium Chloride Testing: ASTM F 1869 – Standard Test Method for Measuring Moisture Vapor Emissions Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

- e. Surface Moisture Testing: ASTM F 2659 – Standard Guide for Preliminary Evaluation of Comparative Moisture Condition of Concrete, Gypsum Cement and other Floor Slabs and Screeds Using a Non- Destructive Electronic Moisture Meter.
 - f. Bond Testing: Conduct testing and document results in accordance with the manufacturer's recommendations.
- 4. Close spaces to traffic during flooring installation and for time period after installation recommended in writing by the manufacturer.
 - 5. Installation should not begin until the work of all other trades has been completed, especially overhead trades.
 - 6. Where demountable partitions and other items are indicated for installation on top of flooring material, install flooring material before these items are installed.
- D. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

PART- 2 PRODUCTS

2.1 LINOLEUM MODULAR FLOORING

- A. Basis of Design:
- 1. FORBO - Marmoleum® Modular Striato
US Headquarters
8 Maplewood Dr.
Hazleton, PA 18202
Phone: 1-800-842-7839
www.forboflooringNA.com
 - 2. Substitution requests shall be considered in accordance with contract provisions.

2.2 MATERIALS

- A. Material Name: Marmoleum® Modular Striato
- 1. Description: Homogeneous linoleum tile made primarily of natural materials consisting of linseed oil, wood flour, and rosin binders, mixed and calendared onto a polyester backing. Pattern and color shall extend throughout total thickness of material.
 - 2. Finish: Topshield2™ applied during the manufacturing process
 - 3. Size: Match Existing
 - 4. Gauge: 2.5mm (1/10")
 - 5. Backing: Polyester
 - 6. Color and Pattern: Colors and patterns shall be selected by Architect. Patterns shall be defined in any given area, applied in stripes, diagonals, checkerboard pattern and other designs as determined by the

Architect. All selections shall be made from the manufacturer's full product lines (including premium colors).

a. Existing: Marmoleum Striato, Rocky Ice #T5232.

B. Adhesive: Forbo T 940 Adhesive or as recommended by manufacturer.

2.3 ACCESSORIES

A. Resilient Edge Strips: Strips shall be homogeneous vinyl or rubber composition with a tapered or bull nose edge no less than 1" wide, colored to match flooring or as selected by Architect from standard colors available.

B. Metal Edge Strips: Strips shall be of width shown and of required thickness to protect the exposed edge of the flooring with units in maximum length available to minimize the number of joints.

C. Floor Care Products: Provide products as required in Section 3.7 Cleaning.

2.4 SOURCE QUALITY

A. Source Quality: Obtain flooring product materials from a single manufacturer.

PART- 3 EXECUTION

3.1 MANUFACTURER'S RECOMMENDATIONS

A. Compliance: Comply with manufacturer's product technical data, including product technical bulletins, installation recommendations and floor care recommendations.

3.2 INSPECTION

A. Site Verification of Conditions: The Flooring Contractor and Installer shall examine and verify conditions previously described in other sections under which flooring and accessories are to be installed to be in accordance with the manufacturer's installation recommendations and must notify the General Contractor in writing of conditions detrimental to proper and timely completion of work. Work shall not proceed until all unsatisfactory conditions are corrected to acceptable conditions to the Owner and Architect.

B. Material Inspection: Visually inspect all materials prior to installation in accordance with the manufacturer's installation recommendations. Material with visual defects shall not be installed and shall not be considered as a legitimate claim if they are installed.

3.3 PREPARATION

A. General: Comply with manufacturer's written installation recommendations for preparing substrates indicated to receive flooring products and accessories.

B. Adjacent Surfaces Protection: Protect adjacent work areas and finish surfaces from damage during product installation.

C. Surface Preparation:

1. General: Prepare substrate in accordance with manufacturer's recommendations and ASTM industry standards. Work shall not proceed until all unsatisfactory conditions are corrected to acceptable conditions to the Owner and Architect.
 2. Substrate: Substrates to receive flooring must be structurally sound, rigid, smooth, flat, clean, and permanently dry. The substrates must be free of all foreign materials including, but not limited to, dust, solvent, paint, wax, oils, grease, residual adhesive, adhesive removers, film-forming curing compounds, silicate penetrating curing compounds, sealing, hardening or parting compounds, alkaline salts, excessive carbonation or laitance, mold, mildew, and other foreign materials that might affect the rate of moisture dissipation from the concrete, the adhesion of flooring to the concrete or cause a discoloration of the flooring from below.
 3. Concrete Substrates: Concrete substrates shall be cured per the concrete manufacturer's recommendations. They must have a minimum compressive strength of 3,000 psi and a minimum dry density of 150 pounds per cubic foot. Refer to Division 3 Concrete Sections for patching, repairing crack materials and leveling compounds with Portland cement-based compounds.
 - a. Refer to Division 3 Concrete Sections for cast-in-place concrete, concrete toppings, and cementitious underlayments.
 - b. Reference Standard: Comply with the latest version of ASTM F 710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
- D. Wood Substrates: Wood substrates must be double construction with a minimum total thickness of 1 inch. Wood substrates must be rigid, free from movement and have at least 18" of well-ventilated air space below. Forbo products should not be installed over wooden subfloors built on sleepers over on or below grade concrete floors without first making sure that adequate precautions have been taken to ensure the structural integrity of the system, and to prevent moisture migration from the concrete slab.
1. Refer to Division 6 Carpentry Section for wood substrates and wood underlayment.
 2. Reference Standard: Comply with the latest version of ASTM F 1482 – Standard Practice for Installation and Preparation of Panel Type Underlayments to Receive Resilient Flooring.
- E. Substrate Testing: In order to ensure that the moisture condition of concrete substrates is within acceptable limits, it is essential that moisture testing be conducted and documented on ALL concrete substrates regardless of age or grade level, including those where resilient flooring has already been installed. Moisture testing should only be conducted once a stable, conditioned environment has been established in accordance with the latest version of the specified test methods. All other testing types shall be conducted on all substrate types. A diagram of the area showing the location and results of each test should be submitted to the Architect, General Contractor or End User. If at the time of testing the test results exceed the limitations set forth by the flooring manufacturer, the installation must not proceed until the problem has been corrected. The Contractor responsible for the substrate shall be responsible for the costs associated with analysis of the substrate and subsequent remediation requirements.
1. Surface Moisture Testing: ASTM F 2659 – Standard Guide for Preliminary Evaluation of Comparative Moisture Condition of Concrete, Gypsum Cement and other Floor Slabs and Screeds Using a Non-Destructive Electronic Moisture Meter.
 - a. Conduct testing at each calcium chloride test location as the calcium chloride test is being placed.

- b. The concrete surface must be dry and have a value of 5 or less when using Forbo Sustain 1299 adhesive.
- 2. In-situ Relative Humidity Testing: ASTM F 2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
 - a. Conduct three (3) tests for the first 1,000 square feet (100 square meters) and at least one additional test for each additional 1,000 square feet (100 square meters).
 - b. The concrete internal relative humidity must not exceed 75% when using Forbo T 940 adhesive.
 - c. The concrete internal relative humidity must not exceed 85% when using Forbo Sustain 885m adhesive.
 - d. The concrete internal relative humidity must not exceed 95% when using Forbo Sustain 1195 adhesive.
 - e. The concrete internal relative humidity must not exceed 95% when using Forbo Sustain 1299 adhesive.
 - f. The concrete internal relative humidity must not exceed 80% when using Forbo 660 adhesive.
- 3. Calcium Chloride Testing: ASTM F 1869 – Standard Test Method for Measuring Moisture Vapor Emissions Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
 - a. Conduct three (3) tests for the first 1,000 square feet (100 square meters) and at least one additional test for each additional 1,000 square feet (100 square meters).
 - b. The concrete moisture vapor emissions must not exceed 5.0 lbs. per 1,000 square feet in 24 hours when using Forbo T 940 adhesive.
 - c. The concrete moisture vapor emissions must not exceed 8.0 lbs. per 1,000 square feet in 24 hours when using Forbo Sustain 885m adhesive.
 - d. The concrete moisture vapor emissions must not exceed 10.0 lbs. per 1,000 square feet in 24 hours when using Forbo Sustain 1195 adhesive.
 - e. The concrete moisture vapor emissions must not exceed 6.0 lbs. per 1,000 square feet in 24 hours when using Forbo 660 adhesive.
- 4. Substrate Porosity Testing: ASTM F 3131 – Standard Practice for Field Determination of Substrate Water Absorption (Porosity) for Substrates to Receive Resilient Flooring.
 - a. Conduct testing in accordance with the manufacturer's recommendations in various locations throughout the area where flooring is to be installed. Although the number of tests required may vary, enough tests should be performed to allow an evaluation of the entire area where material will be installed.
 - b. Water should penetrate into the substrate within 5 – 20 minutes to be considered acceptable. If water penetrates too rapidly or too slowly, adjustments to the substrate must be made to provide the proper surface profile. Substrates determined to be overly porous, dusty or generally insufficient may need to be primed using a primer according to the manufacturer's recommendations to regulate the porosity level of the substrate.

5. pH testing: ASTM F 710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
 - a. Conduct testing at each calcium chloride test location as the calcium chloride tests are removed.
 - b. The surface pH of the concrete must not exceed a pH of 10.0 when using Forbo [T 940] [Sustain 885m] adhesive. Concrete surfaces with pH readings less than 7.0 or above 10.0 will require remediation prior to installation.
 - c. The surface pH of the concrete must not exceed a pH of 11.0 when using Forbo Sustain 1195 adhesive. Concrete surfaces with pH readings less than 7.0 or above 11.0 will require remediation prior to installation.
 - d. The surface pH of the concrete must not exceed a pH of 12.0 when using Forbo Sustain 1299 adhesive. Concrete surfaces with pH readings less than 8.0 or above 12.0 will require remediation prior to installation.
 - e. The surface pH of the concrete must not exceed a pH of 9.0 when using Forbo 660 adhesive. Concrete surfaces with pH readings less than 7.0 or above 9.0 will require remediation prior to installation.

F. Bond Testing

1. Conduct testing in accordance with the manufacturer's recommendations in various locations throughout the area where flooring is to be installed. Although the number of tests required may vary, enough tests should be performed to allow an evaluation of the entire area where material will be installed.

3.4 INSTALLATION

- A. Material Installation: Measure the area to be installed and determine the direction in which the material will be installed. Marmoleum® Modular and MCT flooring products are fit using conventional tile fitting techniques. It is customary to start from the center of the room. In corridors and small spaces, it may be simpler to work lengthwise from one end, using the center line as a guide. After establishing the starting lines, spread the adhesive using a 1/16" x 1/16" x 1/16" square notch trowel. Be sure to spread adhesive all the way to the starting line without leaving any voids. Begin laying tiles at the starting point, ensuring that the tile is placed exactly along the layout lines. If the first few tiles are not installed accurately, the entire installation will be affected. The tiles must be installed into wet adhesive. Do not spread adhesive in an area larger than can be installed while ensuring 100% wet transfer to the backing of the material. Immediately roll the flooring in all directions using a 100 lb. roller to ensure proper adhesive transfer. Additional rolling is required during adhesive setup to ensure that the material is flat and fully adhered. The use of a three-section wall roller or steel seam roller is required at walls, under toe kicks or anywhere the full weight of a 100 lb. roller cannot access or be applied.
- B. Adhesive Application: Use trowel recommended by flooring manufacturer for adhesive.
 1. Square notch trowel as recommended by flooring manufacturer.
 2. Spread rate as recommended by flooring manufacturer.
- C. Flash Cove Installation: Extend the flooring up the wall in a flash-coved method to a height of 4 inches, as indicated.
- D. Installation Techniques:

1. Where demountable partitions and other items are indicated for installation on top of finished flooring, install flooring before these items are installed.
 2. Scribe, cut, fit flooring to butt tightly to vertical surfaces, permanent fixtures and built-in furniture, including pipes, outlets, edgings, thresholds, nosings, and cabinets.
 3. Extend flooring into toe spaces, door reveals, closets, and similar openings.
 4. Install flooring on covers for telephone and electrical ducts, and similar items occurring within finish floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed on these covers.
 5. Do not install resilient flooring over expansion joints. Use expansion joint covers manufactured for use with resilient flooring. Refer to other specification sections for expansion joint covers.
 6. Adhere resilient flooring to substrate without producing open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections in completed installation.
 7. Use adhesive applied to the substrate in compliance with the flooring manufacturer's recommendations, including those for proper spreading of the adhesive, adhesive missing and adhesive open and working times.
 8. Immediately roll the flooring in all directions using a 100 lb. roller to ensure proper adhesive transfer. Additional rolling is required during adhesive setup to ensure that the material is flat and fully adhered. The use of a three-section wall roller or steel seam roller is required at walls, under toe kicks or anywhere the full weight of a 100 lb. roller cannot access or be applied.
- E. Finish Flooring Patterns: As detailed on drawings and/or directed by Architect.

3.5 FIELD QUALITY REQUIREMENTS

- A. Manufacturer's Field Services: Upon request of the Owner, General Contractor or Architect, and with at least 72 hours' notice, provide manufacturer's field service consisting of product use recommendations and periodic site visit for inspection of product installation in accordance with manufacturer's recommendations.
1. Site Visits: 2

3.6 PROTECTION

- A. Protection: Do not allow heavy traffic or rolling loads for at least 72 hours following the installation. Additional time may be necessary if the installation is over a non-porous substrate. Protect installed product and finish surfaces from damage during construction. Remove and legally dispose of protective covering at time of Substantial Completion.

3.7 CLEANING

- A. Initial Maintenance: In order to allow the adhesive to dry and cure properly, wait a minimum of five days following the installation before conducting wet cleaning procedures or initial maintenance. Additional time may be necessary if the installation is over a non-porous substrate.
- B. Procedure:

1. Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's recommendations prior to Owner's acceptance. Remove construction debris from project site and legally dispose of debris.
2. Remove visible adhesive and other surface blemishes using cleaning methods recommended by floor manufacturer.
3. Marmoleum® with Topshield 2™ is pre-sealed and pre-finished. It is occupancy ready and no additional finish is required at the time of installation. See manufacturers' recommendations for further information.
4. Remove all surface soil, debris, sand and grit by dust mopping, sweeping or vacuuming the floor.
5. Mix a neutral pH cleaning solution according to the label directions and apply the solution to the floor. Do NOT flood the floor. Allow the solution to dwell on the floor for 5 – 10 minutes.
6. Scrub the floor using a 3M™ Red Buffer Pad #5100 or equivalent.
7. Pick up the scrubbing solution with a wet vacuum or an automatic scrubber.
8. Rinse the entire floor surface with a clean mop using clean, cool water.
9. Allow the floor to dry thoroughly before allowing traffic.

3.8 INITIAL MAINTENANCE PROCEDURES

- A. General: Include in Contract Sum Amount cost for initial maintenance procedures, and execute procedures after flooring installation as recommended by flooring manufacturer.
- B. Initial maintenance to be conducted by awarded Flooring Contractor.

END OF SECTION 09 6516

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. This section includes the following:
 - 1. Resinous flooring system as shown on the drawings and in schedules.
- B. Related sections include the following:
 - 1. Cast-in-Place Concrete, section 03 30 00

1.3 SYSTEM DESCRIPTION

- A. The work shall consist of preparation of the substrate, the furnishing and application of a cementitious urethane and a squeegee-applied resinous flooring system with decorative chip broadcasts and topcoat. The system shall have the color and texture as specified by the Owner with a nominal thickness of 3/16 inch. It shall be applied to the prepared area(s) as defined in the plans strictly in accordance with the Manufacturer's recommendations.
- B. Cove base to be applied where noted on plans and per manufacturers standard details unless otherwise noted.

1.4 SUBMITTALS

- A. Product Data: Latest edition of Manufacturer's literature including performance data and installation procedures.
- B. Manufacturer's Safety Data Sheet (SDS) for each product being used.
- C. Samples: A 3 x 3 inch square sample of the proposed system. Color, texture, and thickness shall be representative of overall appearance of finished system subject to normal tolerances.

1.5 QUALITY ASSURANCE

- A. The Manufacturer shall have a minimum of 10 years experience in the production, sales, and technical support of epoxy and urethane industrial flooring and related materials.

- B. The Applicator shall have experience in installation of the flooring system as confirmed by the manufacturer in all phases of surface preparation and application of the product specified.
- C. No requests for substitutions shall be considered that would change the generic type of the specified System.
- D. System shall be in compliance with requirements of United States Department of Agriculture (USDA), Food, Drug Administration (FDA), and local Health Department.
- E. A pre-installation conference shall be held between Applicator, General Contractor and the Owner to review and clarification of this specification, application procedure, quality control, inspection and acceptance criteria and production schedule.
- F. System shall be in compliance with the Indoor Air Quality requirements of California section 01350 as verified by a qualified independent testing laboratory.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Packing and Shipping
 - 1. All components of the system shall be delivered to the site in the Manufacturer's packaging, clearly identified with the product type and batch number.
- B. Storage and Protection
 - 1. The Applicator shall be provided with a storage area for all components. The area shall be between 60 F and 90 F, dry, out of direct sunlight and in accordance with the Manufacturer's recommendations and relevant health and safety regulations.
 - 2. Copies of Safety Data Sheets (SDS) for all components shall be kept on site for review by the Engineer or other personnel.
- C. Waste Disposal
 - 1. The Applicator shall be provided with adequate disposal facilities for non-hazardous waste generated during installation of the system.

1.7 PROJECT CONDITIONS

- A. Site Requirements
 - 1. Application may proceed while air, material and substrate temperatures are between 60 F and 85 F providing the substrate temperature is above the dew point. Outside of this range, the Manufacturer shall be consulted.
 - 2. The relative humidity in the specific location of the application shall be less than 85 % and the surface temperature shall be at least 5 F above the dew point.
 - 3. The application of Accelera where jobsite relative humidity is less than 30% is not recommended.
 - 4. Use Accelera LH resin where jobsite relative humidity is between 10% and 30%.
 - 5. The Applicator shall ensure that adequate ventilation is available for the work area.

6. The Applicator shall be supplied with adequate lighting equal to the final lighting level during the preparation and installation of the system.
- B. Conditions of new concrete to be coated with cementitious urethane material.
1. Concrete shall be moisture cured for a minimum of 3 days and have fully cured a minimum of 5 days in accordance with ACI-308 prior to the application of the coating system pending moisture tests.
 2. Concrete shall have a flat rubbed finish, float or light steel trowel finish (a hard steel trowel finish is neither necessary nor desirable).
 3. Sealers and curing agents should not to be used.
 4. Concrete shall have a minimum design strength of 3,500 psi. and a maximum water/cement ratio of 0.45
 5. Concrete surfaces on grade shall have been constructed with a vapor barrier to protect against the effects of vapor transmission and possible delamination of the system.
- C. Safety Requirements
1. All open flames and spark-producing equipment shall be removed from the work area prior to commencement of application.
 2. "No Smoking" signs shall be posted at the entrances to the work area.
 3. The Owner shall be responsible for the removal of foodstuffs from the work area.
 4. Non-related personnel in the work area shall be kept to a minimum.

1.8 WARRANTY

- A. Dur-A-Flex, Inc. warrants that material shipped to buyers at the time of shipment substantially free from material defects and will perform substantially to Dur-A-Flex, Inc. published literature if used in accordance with the latest prescribed procedures and prior to the expiration date.
- B. Dur-A-Flex, Inc. liability with respect to this warranty is strictly limited to the value of the material purchase.

PART- 2 PRODUCTS

2.1 FLOORING

- A. Dur-A-Flex, Inc. ACCELERA HC self-leveling, decorative chip broadcast, cementitious urethane/blended polymer seamless flooring system
1. System Materials:
 - a. Topping: Dur-A-Flex, Inc, Poly-Crete SL resin, hardener and SL aggregate.
 - b. The broadcast aggregate shall be Dur-A-Flex, Inc. Micro or Macro chips.

- c. 2nd Broadcast Coat: Dur-A-Flex, Inc, ACCELERA resin and hardener.
- d. Topcoat: Dur-A-Flex, Inc. ACCELERA resin and hardener.
- e. Integral Cove Base: Dur-A-Flex, Inc. Dur-A-Glaze #4 Cove Rez resin and Dur-A-Glaze #4 hardener.

2. Patch Materials

- a. Shallow Fill and Patching: Use Dur-A-Flex, Inc. Poly-Crete SL (up to 1/2 inch).
- b. Deep Fill and Sloping Material (over 1/4 inch): Use Dur-A-Flex, Inc. Poly-Crete WR.

- B. Substitution requests shall be considered in accordance with contract provisions and the performance requirements outlined in this document.

2.2 MANUFACTURER

- A. Dur-A-Flex, Inc., 95 Goodwin Street, East Hartford, CT 06108, Phone: (860) 528-9838, Fax: (860) 528-2802
- B. Manufacturer of Approved System shall be single source.

2.3 PRODUCT REQUIREMENTS

A. Topping

1. Membrane

- a. ELAST-O-COAT Waterproofing Membrane
- b. Film Thickness: 30 mils
- c. VOC: 4.34 g/L
- d. Tensile Strength, ASTM D-412: 2,400 psi
- e. Hardness, Shore A ASTM D2240: 90
- f. Tensile Strength: ASTM D-412

2. Cove Base

- a. DUR-A-GLAZE #4 COVE-REZ
- b. VOC: 3.83 g/L
- c. Bond Strength to Concrete ACI-403: Concrete fails before loss of bond
- d. Compressive Strength, ASTM D-695: 17.5-19,000 psi
- e. Tensile Strength, ASTM D 638: 12-13,000 psi
- f. Flexural Strength, ASTM D 790: 18-19,000 psi

- g. Hardness, Shore D ASTM D2240: 75-80
- h. Flame Spread / NFPA-101, ASTM E-84: Class A

3. Poly-Crete SL

- a. Percent Reactive: 100 %
- b. VOC: 0 g/L
- c. Bond Strength to Concrete ASTM D 4541: 400 psi, substrates fails
- d. Compressive Strength, ASTM C579: 9,000 psi
- e. Tensile Strength, ASTM D 638: 2,175 psi
- f. Flexural Strength, ASTM D 790: 5,076 psi
- g. Impact Resistance @ 125 mils, MIL D-3134: 160 inch lbs

B. Broadcast and Topcoat

1. ACCELERA

- a. Percent Solids: 100 %
- b. VOC: 0 g/L
- c. Bond Strength to Concrete ASTM D 4541: 400 psi, substrates fails
- d. Hardness, Shore D ASTM D2240: 70
- e. Compressive Strength, ASTM C579: 18,000 psi
- f. Tensile Strength, ASTM D638: 2,600 psi
- g. Abrasion Resistance, ASTM D4060: 27 mg loss, C-17 Wheel, 1,000 gm load, 1,000 cycles
- h. Pot life @ 70 F: 7 – 10 minutes
- i. Gloss (ASTM D523) 60°: 90
- j. Coefficient of Friction (ASTM D2047): 0.6

C. Primer and Topcoat

1. ACCELERA EXT

- a. Percent Solids: 96 %
- b. VOC: 33 g/L
- c. Bond Strength to Concrete ASTM D 4541: 400 psi, substrates fails

- d. Hardness, Shore D ASTM D2240: 70
- e. Compressive Strength, ASTM C579: 18,000 psi
- f. Tensile Strength, ASTM D638: 2,600 psi
- g. Abrasion Resistance, ASTM D4060: 27 mg loss, C-17 Wheel, 1,000 gm load, 1,000 cycles
- h. Potlife @ 70 F: 10 – 15 minutes
- i. Gloss (ASTM D523) 60: 90
- j. Coefficient of Friction (ASTM D2047) : >0.6

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas and conditions, with Applicator present, for compliance with requirements for maximum moisture content, installation tolerances and other conditions affecting flooring performance.
 - 1. Verify that substrates and conditions are satisfactory for flooring installation and comply with requirements specified.

3.2 PREPARATION

- A. General
 - 1. New and existing concrete surfaces shall be free of oil, grease, curing compounds, loose particles, moss, algae growth, laitance, friable matter, dirt, and bituminous products.
 - 2. Moisture Testing: Perform tests recommended by manufacturer and as follows.
 - a. Perform anhydrous calcium chloride test ASTM F 1869-98. Application will proceed only when the vapor/moisture emission rates from the slab is less than and not higher than 20 lbs/1,000 sf/24 hrs.
 - b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 99% relative humidity level measurement.
 - c. If the vapor drive exceeds 99% relative humidity or 20 lbs/1,000 sf/24 hrs then the Owner and/or Engineer shall be notified and advised of additional cost for the possible installation of a vapor mitigation system that has been approved by the manufacturer or other means to lower the value to the acceptable limit.
 - 3. There shall be no visible moisture present on the surface at the time of application of the system. Compressed oil-free air and/or a light passing of a propane torch may be used to dry the substrate.
 - 4. Mechanical surface preparation

- a. Shot blast all surfaces to receive flooring system with a mobile steel shot, dust recycling machine (Blastrac or equal). All surface and embedded accumulations of paint, toppings hardened concrete layers, laitance, power trowel finishes and other similar surface characteristics shall be completely removed leaving a bare concrete surface having a minimum CSP of 3 as described by the International Concrete Repair Institute.
- b. Floor areas inaccessible to the mobile blast machines shall be mechanically abraded to the same degree of cleanliness, soundness and profile using diamond grinders, needle guns, bush hammers, or other suitable equipment.
- c. Where the perimeter of the substrate to be coated is not adjacent to a wall or curb, a minimum 1/4 inch
- d. key cut shall be made to properly seat the system, providing a smooth transition between areas. The detail cut shall also apply to drain perimeters and expansion joint edges.
- e. Cracks and joints (non-moving) greater than 1/8 inch wide are to be chiseled or chipped-out and repaired per manufacturer's recommendations. Refer to Dur-A-Flex joint guidelines.
- f. At spalled or worn areas, mechanically remove loose or delaminated concrete to a sound concrete and patch per manufactures recommendations.

3.3 APPLICATION

A. General

1. The system shall be applied in four distinct steps as listed below:
 - a. Substrate preparation
 - b. Topping/overlay application with decorative chip broadcast.
 - c. Resin application with decorative chip broadcast
 - d. Topcoat application
2. Immediately prior to the application of any component of the system, the surface shall be dry and any remaining dust or loose particles shall be removed using a vacuum or clean, dry, oil-free compressed air.
3. The handling, mixing and addition of components shall be performed in a safe manner to achieve the desired results in accordance with the Manufacturer's recommendations.
4. The system shall follow the contour of the substrate unless pitching or other leveling work has been specified by the Architect.
5. A neat finish with well-defined boundaries and straight edges shall be provided by the Applicator.

B. Membrane

1. The membrane shall be applied on suitable substrates and molded up onto vertical areas, over curbs, etc. as a seamless elastomeric membrane.

2. For use underneath epoxy flooring systems to provide a vibration resilient cushion and to deaden sound and as a crack & joint filler.
3. Fiberglass mat to be embedded into ELAST-O-COAT over control joints or where the floor meets the wall.
4. DUR-A-GLAZE #4 COVE-REZ
 - a. Prime the wall with a light coat of the mixed resin and hardener.
 - b. Trowel up a mixture of 1 qt. DUR-A-GLAZE COVE RESIN to 1 pt. DUR-A-GLAZE #4 Hardener to 25lbs FLINTSHOT, DUR-A-QUARTZ Q-11 or Q-28.
 - c. After curing, use a brush to topcoat.
 - d. Remove any excess material with a squeegee. This should be done by pulling the material down to the bottom of the cove radius, then back up to the top edge of the cove.

C. Topping

1. The topping shall be applied as a self-leveling system as specified by the Architect. The topping shall be applied in one lift with a nominal thickness of 1/8 inch.
2. The topping shall be comprised of three components, a resin, hardener and aggregate as supplied by the Manufacturer at a rate of 55 sq ft per kit
3. The hardener shall be added to the resin and thoroughly dispersed by suitably approved mechanical means. SL Aggregate shall then be added to the catalyzed mixture and mixed in a manner to achieve a homogenous blend.
4. The topping shall be applied over horizontal surfaces using a 1/2" V-notched squeegee, trowels or other systems approved by the Manufacturer.
5. Immediately upon placing, the topping shall be degassed with a loop roller.
6. Chip aggregate shall be broadcast to excess into the wet resin, Macro chip at the rate of 0.1 lbs/sf and Micro chip at the rate of 0.15 lbs/sf.
7. Allow material to fully cure. Vacuum, sweep and/or blow to remove all loose aggregate.

D. Second Broadcast Coat

1. The second broadcast coat shall be comprised of two components: a resin and a hardener as supplied by the Manufacturer and mixed per manufacturer instructions.
2. The hardener shall be added to the resin and thoroughly mixed by suitably approved mechanical means.
3. The second broadcast coat shall be applied over horizontal surfaces using a flat squeegee and cross rolled with a 3/8 inch nap roller at the rate of 65 SF/kit.
4. Chip aggregate shall be broadcast to excess into the wet resin, Macro chip at the rate of 0.1 lbs/sf and Micro chip at the rate of 0.15 lbs/sf.

5. Allow material to fully cure. Vacuum, sweep and/or blow to remove all loose aggregate.

E. Topcoat

1. The topcoat shall be comprised of ACCELERA resin and hardener mixed per the manufacturer's instructions.
2. The topcoat shall be applied using a flat squeegee and cross rolled with a 3/8 inch nap roller at the rate of 65 SF/kit.
3. The finished floor will have a nominal thickness of 3/16 inch.

3.4 FIELD QUALITY CONTROL

A. Tests, Inspection

1. The following tests shall be conducted by the Applicator:
 - a. Temperature
 - i. Air, substrate temperatures and, if applicable, dew point.
 - b. Coverage Rates
 - i. Rates for all layers shall be monitored by checking quantity of material used against the area covered.

3.5 CLEANING AND PROTECTION

- A. Cure flooring material in compliance with manufacturer's directions, taking care to prevent their contamination during stages of application and prior to completion of the curing process.
- B. Remove masking. Perform detail cleaning at floor termination, to leave cleanable surface for subsequent work of other sections.

END OF SECTION 09 6723

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings, and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. Section Includes: Stainless Steel Wall Panels.

1.3 REFERENCES

- A. National codes (IBC, UBC, SBCCI, BOCA and Life Safety)
- B. American Society for Testing and Materials (ASTM)

1.4 SUBMITTALS

- A. Submit the following in accordance with conditions of contract and Division 1 specification Section 01 3300 "Submittal Procedures".
- B. Product Data: Manufacturer's printed product data and detailed specifications for each system component and installation accessory required, including installation methods for each type of substrate.
- C. Shop drawings showing locations, extent, installation and mounting details with the appropriate adhesives for specific project substrates.
- D. Manufacturer's Installation Instruction: Printed installation instructions for stainless steel wall panels.
- E. Maintenance data for wall protection system components for inclusion in the operating and maintenance manuals specified in Division 1.

1.5 QUALITY ASSURANCE

- A. Installer qualifications: Engage an installer who has no less than 3 years' experience in installation of systems similar in complexity to those required for this project.
- B. Manufacturer's qualifications: Not less than 5 years' experience in the production of specified products and a record of successful in-service performance.
- C. Code compliance: Assemblies should conform to all applicable codes including IBC, UBC, SBCCI, BOCA and Life Safety.

- D. Fire performance characteristics: Provide stainless steel components tested in accordance with ASTM E84 for Class A/1 fire characteristics.
- E. Single source responsibility: Provide all components of the wall protection system manufactured by the same company to ensure compatibility of color, texture and physical properties.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in unopened factory packaging clearly labeled to show manufacturer to the jobsite.
- B. Inspect materials at delivery to assure that specified products have been received.
- C. Store in original packaging in a climate-controlled location away from direct sunlight.
- D. Materials must be stored flat.

1.7 PROJECT CONDITIONS

- A. Environmental Requirements: Products must be installed in an interior climate-controlled environment.

1.8 WARRANTY

- A. Standard Limited Lifetime Warranty against material and manufacturing defects.

PART-2 PRODUCTS

2.1 MANUFACTURER

- A. Acceptable Manufacturer: CS Acrovyn Stainless Steel Sheet.
- B. Substitution requests shall be considered in accordance with contract provisions
- C. Provide all stainless-steel wall panels and wall protection from a single source.

2.2 MANUFACTURED UNITS

- A. Wall Panels
- B. Stainless Steel Wall Panels
- C. Provide stainless steel wall panel systems furnished as a complete packaged system that include panels, outside corners and inside corners. Panel system shall include stainless steel panels that have recessed overlap joints that maintain panel flatness and minimizes panel protrusion.
- D. Panel Size – Custom, Maximum 4' x 10'
- E. Panel Thickness - 16 gauge with standard Smooth texture.
- F. Stainless Steel - Type 304 (type 304 conforms to NSF Standard 51)

- G. Stainless Steel Outside Corners
- H. 1. 2" x 2", 16 gauge. Maximum Height 96", edges shall have an 11° taper
- I. Stainless Steel - Type 430 or type 304 (type 304 conforms to NSF Standard 51)
- J. Attachment: Adhesive mount or screw mount
- K. Stainless Steel Inside Corners
- L. 1. 2" x 2" 16 gauge. Maximum Height 96", edges shall have an 11° taper
- M. Stainless Steel - Type 430 or type 304 (type 304 conforms to NSF Standard 51)
- N. Attachment: Adhesive mount or screw mount

2.3 MATERIALS

- A. Stainless Steel
- B. Wall panels shall be manufactured from Type 304, 16 gauge. Stainless Steel.
- C. Outside and Inside Corners
- D. Thickness - 16 gauge
- E. Type 4304 (conforms to NSF Standard 51)

2.4 COMPONENTS

- A. Attachment
- B. Panels
- C. Panels shall be adhered with field applied heavy duty adhesive.
- D. Corner Guards
- E. Adhesive mount - Corner guards shall be adhered with field applied heavy duty adhesive and foam tape.
- F. Screw mount – Corner guards shall be attached with stainless steel Phillips head screws into counter sunk beveled mounting holes.
- G. Edge finish – Edges shall be finished with color-matched caulk.

2.5 FINISH

- A. Stainless Steel: Panels and corner guards shall have a No. 4 satin finish.

- B. Comply with NAAMM "Metal Finishes Manual" for recommendations relative to applications and designations of finishes.

2.6 FABRICATION

- A. Fabricate wall protection products to comply with requirements indicated for design, dimensions, detail, finish and sizes.

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions in which the wall panel systems will be installed.
- B. Complete all finishing operations, including painting, before beginning installation of wall panel system materials.
- C. Identify conditions detrimental to proper or timely completion. Do not proceed until unsatisfactory conditions have been corrected.
- D. Wall surface shall be dry and free from dirt, grease and loose paint.

3.2 PREPARATION

- A. General: Prior to installation, clean substrate to remove dust, debris and loose particles.
- B. Perform additional preparation procedures as required by manufacturer's instructions.
- C. Take all necessary steps to prevent damage to material during installation as required in manufacturer's installation instructions.

3.3 INSTALLATION

- A. Install the work of this section in strict accordance with the manufacturer's recommendations using only approved hardware and locating all components firmly into position, level and plumb.

3.4 CLEANING

- A. Immediately upon completion of installation, clean wall protection products and accessories in accordance with manufacturer's recommended cleaning method.
- B. Remove surplus materials, rubbish and debris resulting from installation as work progresses and upon completion of work.

3.5 PROTECTION

- A. Protect installed materials to prevent damage by other trades. Use materials that may be easily removed without leaving residue or permanent stains

END OF SECTION 09 7813

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 DESCRIPTION OF WORK

- A. The work includes the painting of all interior exposed items and surfaces throughout the project, except as herein specified. Surface preparation, priming and coats of paint specified are in addition to shop priming and surface treatment specified under other sections, except as otherwise specified.
- B. The work includes the field painting or finishing of all miscellaneous exposed surfaces, and primed metal surfaces of equipment in the following locations.
 - 1. Interior Painting: Panel board covers, etc. mounted in exposed areas.
 - 2. Gypsum board walls & ceilings, Woodwork, Metal Doors & Metal Frames.
 - 3. All other items in finished areas that previously have been painted.
 - 4. Plastic trim and paneling.
 - 5. Interior painting of exposed steel
 - 6. Exterior painting of exposed steel.
 - 7. Painting exterior face of overhead door.
 - 8. Painting exterior metal doors and frames, steel handrails, all exterior lintels and other miscellaneous ferrous metals.
 - 9. Painting of all new work.
- C. The term "paint" as used herein means all coating systems materials, which includes primers, emulsions, enamels, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.

- D. Paint all exposed surfaces except where the natural finish of the material is obviously intended. Where items or surfaces are not specifically mentioned, paint these the same as adjacent similar materials or areas.
- E. Operating Parts and Labels:
 - 1. Do not paint any moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sensing devices, motor and fan shafts, unless otherwise indicated.
 - 2. Do not paint over any code-required labels, such as Underwriters Laboratories and Factory Mutual, or any equipment identification performance rating, name, or nomenclature plates.

1.3 QUALITY ASSURANCE

- A. Provide the best quality grade of the various types of coatings as regularly manufactured by approved paint materials manufacturers listed below. Materials not displaying the manufacturer's identification as a standard, best-grade product will not be acceptable.
- B. Submit manufacturer's specifications, including paint label analysis and application instructions for each material specified.
- C. List each material and cross-reference to the specific paint and finish system and application. Identify by manufacturer's catalog number and general classification.
- D. Submit samples for Architect's review of color and texture only. Compliance with all other requirements is the exclusive responsibility of the Contractor.
- E. Provide finish coats, which are compatible with the prime paints used. Review other sections of these specifications in which paints are to be provided to ensure compatibility of the total coatings system for the various substrates. Upon requests from other subcontractors, furnish information on the characteristics of the specified finish materials to ensure that compatible prime coats are used.
- F. Provide barrier coats over incompatible primers or remove and re-prime as required. Notify the Architect in writing of any anticipated problems using the coating systems as specified with substrates primed by others.
- G. Fire Hazard Classification:
 - 1. Provide coatings which have been tested in accordance with ASTM E 84, maximum of 25 all surfaces, and are listed in Underwriters Laboratories "Building Materials Directory".

1.4 DELIVERY AND STORAGE

- A. Deliver all materials to the job site in original, new and unopened packages and containers bearing manufacturer's name and label, and application instructions thereon.

- B. Provide labels on each container with the following information:
1. Name or title of material.
 2. Fed. Spec. Number, if applicable.
 3. Manufacturer's stock number.
 4. Manufacturer's name.
 5. Contents by volume, for major pigment and vehicle constituents.
 6. Thinning instructions.
 7. Application instructions.
- C. Coating Maintenance Manual: Upon conclusion of the project, the contractor or manufacturer/supplier shall furnish a coating maintenance manual, such as Sherwin Williams "Custodian Project Color and Product Information" or equal. Manual shall include an Area Summary with finish schedule. Area Detail designating where each product/color/finish was use product data pages, Material Safety Data Sheets, care and cleaning instructions, touch up procedures and color samples of each color and finished used.

1.5 JOB CONDITIONS

- A. Work under this Section shall be scheduled and coordinated with other trades and shall not proceed until other work and/or job conditions are as required to achieve satisfactory results.
- B. Do not apply paints when the temperature of surfaces to be painted and the surrounding air temperatures are below 55° F unless otherwise permitted by the paint manufacturer's printed instructions.
- C. Do not apply paint when the relative humidity exceeds 85% or to damp or wet surfaces; unless permitted by the manufacturer's printed instructions. Painting may be continued during inclement weather only if the areas and surfaces to be painted are enclosed and heated within the temperature limits specified by the paint manufacturer during application and drying periods.
- D. Environmental conditions shall be maintained in compliance with the recommendation of the manufacturers for respective finishes required and the following criteria:
1. Before painting is started in any area, it shall be broom cleaned and excessive dust shall be removed.
 2. After painting operations begin in a given area, broom cleaning will not be allowed; cleaning shall then be done only with commercial vacuum cleaning equipment.
 3. Adequate illumination shall be provided in all areas where painting operations are in progress.

- E. All materials shall be stored in a single place, as directed. Such storage place shall be kept neat and clean, and all damage thereto or its surroundings shall be made good. Any soiled or used rags; waste and trash must be removed from the building every night. Every precaution must be taken to avoid the danger of fire.

PART- 2 PRODUCTS

2.1 MATERIALS

A. General:

1. Paint products, shall be of type specified under Finish Schedule. Basic painting materials such as linseed oil shellac, turpentine, thinners, driers, etc., shall be of highest quality and have identifying labels on containers.
2. Approved manufacturers of painting and textured finish products materials are listed in following paragraph. Match the colors as required and submit samples for approval before proceeding with the work.

2.2 MANUFACTURERS

A. Paint:

1. Sherwin Williams
2. Benjamin Moore Paint Co.
3. ICI

B. Structural steel exposed (exterior & interior).

2.3 INTERIOR PAINT AND COATING COMMERCIAL SYSTEMS

A. (PT-1) Metal doors and frames and miscellaneous metal surfaces:

1. 1 coat Industrial Metal Primer (unprimed surfaces) Dining Room – Sherwin Williams Pro-Cryl Primer B66W01310.
2. 2 coats (pre-primed surfaces) - Pro Industrial DTM Acrylic.
3. Finish- Eggshell
4. Patch all surfaces as required to achieve smooth finish and sand smooth. Hand sand all surfaces to be painted with extra fine sandpaper on painted or sealed surfaces.

B. (PT-2) Gypsum board ceilings and soffits:

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1. 1 coat - Pro Mar 200 Primer Zero VOC B28W02600.
 2. 2 coats - Pro Mar 200 Zero VOC B30W12651
 3. Finish: Flat
- C. **(PT-3)** Gypsum wallboard wall surfaces:
1. 1 coat - Pro Mar 200 Zero VOC B28W02600
 2. 2 coats - Pro Mar 200 Zero VOC B20W01951
 3. Finish: Low gloss Egg-Shel
- D. **(PT-4)** Interior Metal: (Piping, hangers, and other miscellaneous metals)
1. 1st coat- Polyamidoamine Epoxy, Tnemec Series N69. Sherwin Williams Duraplate 235 B67W00235.
 2. 2nd and 3rd coat- Aliphatic Polyurethane, Tnemec Series 1075V Endurashield II. Sherwin Williams Hi Solids Polyurethane 100 B65-630.

PART- 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions under which painting work is to be performed. Do not proceed with the work until unsatisfactory conditions have been corrected.
- B. Starting of painting work will be construed as the applicator's acceptance of the surfaces within any particular area.
- C. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, runs in shop prime coats, or conditions otherwise detrimental to the formation of a durable paint film.

3.2 SURFACE PREPARATION

- A. General: Perform all preparation and cleaning procedures in strict accordance with the paint manufacturer's instructions and as herein specified, for each particular substrate condition.
- B. Patch all surfaces as required to achieve smooth finish and sand smooth.
- C. Hand sand all surfaces to be painted with extra fine sandpaper on painted or sealed surfaces.
- D. Remove all hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish painted, or provide surface applied protection prior to surface preparation and painting operations. Remove, if necessary, for the complete painting of the items and

adjacent surfaces. Following completion of painting of each space or area, reinstall the removed items by workmen skilled in the trades involved.

- E. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease with clean cloths and cleaning solvents prior to mechanical cleaning. Program the cleaning and painting so that dust and other contaminants from the cleaning process will not fall in wet, newly painted surfaces.

F. Wood, Composite Panels and Mineral Profile Panels:

- 1. Hand sand wood surfaces to be painted of all existing finishes, as required. Clean surface prior to painting.
- 2. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sandpaper smooth when dried.
- 3. Spray coating to a smooth and uniform finish, with no orange peel effect.

G. Gypsum Drywall:

- 1. Repair all holes exposed tape joints or other irregularity in surface.
- 2. Touch sand all joint compound to remove surface irregularities and "tooth" wipe free of dust. Do not permit sanding to raise paper surface of gypsum board. Wipe surface clean.

H. Ferrous Metals:

- 1. Surface preparation of Steel.
 - a. Prepare steel surfaces in accordance with manufacturer's instructions.
 - b. Fabrication Defects:
 - i. Correct steel and fabrication defects revealed by surface preparation.
 - ii. Remove weld spatter and slag.
 - iii. Round sharp edges and corners of welds to a smooth contour.
 - iv. Smooth weld undercuts and recesses.
 - v. Grind down porous welds to pinhole-free metal.
 - vi. Remove weld flux from surface.
 - c. Ensure surfaces are dry.
 - d. Removed visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter in accordance with SSPC-SP 6/NACE 3, unless otherwise specified.
 - e. Abrasive Blast-Cleaned Surfaces: Coat abrasive blast-cleaned surfaces with primes before visible rust forms on surface. Do not leave blast-cleaned surfaces uncoated for more than 8 hours.

- f. Shop Primer: Prepare shop primer to receive filed coat in accordance with manufacturer's instructions.

I. Plastic Surfaces:

1. Hand sand surface with fine sandpaper. Wipe surface clean.

3.3 MATERIALS PREPARATION

- A. General: Mix and prepare painting materials in strict accordance with the manufacturer's directions.
- B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing, and application of paint in a clean condition, free of foreign materials and residue.
- C. Stir all materials before application to produce a mixture of uniform density, and as required during the application of the materials. Do not stir any film, which may form on the surface into the material. Remove the film and, if necessary, strain the material before using.
- D. Tinting:
 1. Tint each undercoat a lighter shade to facilitate identification of each coat where multiple coats of the same material are to be applied. Tint undercoats to match the color of the finish coat but provide sufficient difference in shade of undercoats to distinguish each separate coat. Provide a code number to identify material tinted by the manufacturer.

3.4 APPLICATION

- A. General:
 1. Apply paint to brush, roller or spray in accordance with the manufacturer's directions. Use brushes best suited for the type of material being applied. Use rollers of carpet, velvet back, or high pile lamb's wool as recommended by the paint manufacturer for material and texture required. Spray paint uniformly with suitable equipment.
 2. On gypsum board surfaces, primer may be sprayed, but remaining coats are to be rolled. Metal doors, frames, HVAC wall diffusers and radiator covers shall be sprayed all coats.
 3. The number of coats and paint film thickness required is the same regardless of the application method. Do not apply succeeding coats until the previous coat has completely dried.
 4. Sand between coat applications with fine sandpaper or rub surfaces with pumice stone where required to produce an even, smooth surface in accordance with the coating manufacturer's directions.
 5. Apply additional coats when undercoats, or other conditions show through the final coat of paint, until the paint film is of uniform finish, color and appearance.

B. Minimum Coating Thickness:

1. Apply each material at not less than the manufacturer's recommended spreading rate, to provide a total dry film thickness of not less than 5.0 mils for the entire coating system of prime and finish coats for 3-coat work.

C. Prime Coats:

1. Before application of finish coats, apply a prime coat to material which is required to be painted or finished, and which has not been prime coated by others.

D. Re-coat primed and sealed walls and ceilings where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.

E. Pigmented (Opaque) Finishes:

1. Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance, and coverage.
2. Provide semi-gloss finish for final coats, unless otherwise indicated.

F. Brush Application:

1. Brush-out and work all brush coats onto the surfaces in an even film. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable. Neatly draw all glass lines.

G. Completed Work:

1. Match approved samples for color, texture and coverage. Remove, refinish, or repaint work not in compliance with specified requirements.

3.5 PROTECTION

- A. Protect work of other trades, whether to be painted or not, against damage by the painting and finishing work. Leave all such work undamaged. Correct any damages by cleaning, repairing or replacing, and repainting, as directed by the Architect.
- B. Provide "Wet Paint" signs as required to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.

3.6 CLEAN-UP

- A. During the progress of the work, remove from the project all discarded paint materials, rubbish, cans and rags.

- B. Upon completion of painting work, clean all window glass and other paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

3.7 ACCEPTANCE

- A. It shall be distinctly understood that by using materials specified and going over surface number of times specified, acceptance will not be assured.
- B. Acceptance at final inspection will be governed by body finish and effect produced. Additional coats shall be applied as required to produce proper finish and coverage, if required, at no additional cost to Owner.
- C. Any wall, which is touched up, and the area remains noticeable, the entire wall shall be repainted, at no additional cost to the Owner.

END OF SECTION 09 9000

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provision of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings, and details to determine type and extent of work there if affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SECTION INCLUDES

- A. Exterior high-performance paint and coatings systems including surface preparation.

1.3 RELATED SECTIONS

- A. Section 05 5000 - Metal Fabrications.
- B. Section 05 1200 Structural Steel
- C. Section 05 3100 Steel Decking

1.4 REFERENCES

- A. Steel Structures Painting Council (SSPC):
 - 1. SSPC-SP 1 - Solvent Cleaning.
 - 2. SSPC-SP 2 - Hand Tool Cleaning.
 - 3. SSPC-SP 3 - Power Tool Cleaning.
 - 4. SSPC-SP5/NACE No. 1, White Metal Blast Cleaning.
 - 5. SSPC-SP6/NACE No. 3, Commercial Blast Cleaning.
 - 6. SSPC-SP7/NACE No. 4, Brush-Off Blast Cleaning.
 - 7. SSPC-SP10/NACE No. 2, Near-White Blast Cleaning.
 - 8. SSPC-SP11, Power Tool Cleaning to Bare Metal.
 - 9. SSPC-SP12/NACE No. 5, Surface Preparation and Cleaning of Metals by Waterjetting Prior to Recoating.
 - 10. SSPC-SP 13 / NACE No. 6 Surface Preparation for Concrete.

- B. Material Safety Data Sheets / Environmental Data Sheets: Per manufacturer's MSDS/EDS for specific VOCs (calculated per 40 CFR 59.406). VOCs may vary by base and sheen.
- C. California Department of Public Health (CDPH):
 - 1. CDPH v1.1-2010 and V1.2-2017

1.5 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data: For each paint system indicated, including.
 - 1. Product characteristics.
 - 2. Surface preparation instructions and recommendations.
 - 3. Primer requirements and finish specification.
 - 4. Storage and handling requirements and recommendations.
 - 5. Application methods.
 - 6. Cautions for storage, handling and installation.
- C. Selection Samples: Submit a complete set of color chips that represent the full range of manufacturer's products, colors and sheens available.
- D. Verification Samples: For each finish product specified, submit samples that represent actual product, color, and sheen.
- E. Coating Maintenance Manual: Upon conclusion of project, the Contractor or paint manufacturer/supplier shall furnish a coating maintenance manual, such as Sherwin-Williams, "Custodian Project Color and Product Information" report or equal. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product/color/finish was used, product data pages, Material Safety Data Sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used. "
- F. Only submit complying products based on project requirements (i.e. LEED). One must also comply with the regulations regarding VOCs (CARB, OTC, SCAQMD, LADCO). To ensure compliance with district regulations and other rules, businesses that perform coating activities should contact the local district in each area where the coating will be used.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

- B. Paint exposed surfaces. If a color of finish, or a surface is not specifically mentioned, Architect will select from standard products, colors and sheens available.
- C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels unless indicated.
- D. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Finish surfaces for verification of products, colors and sheens.
 - 2. Finish area designated by Architect.
 - 3. Provide samples that designate primer and finish coats.
 - 4. Compatibility and Adhesion: Check after one week of drying and curing by testing in accordance with ASTM D3359; Adhesion by tape test. If coating system is incompatible, additional surface preparation up to and including complete removal may be required.
 - 5. Do not proceed with remaining work until the Architect approves the mock-up.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver manufacturer's unopened containers to the work site. Packaging shall bear the manufacturer's name, label, and the following list of information.
 - 1. Product name, and type (description).
 - 2. Application and use instructions.
 - 3. Surface preparation.
 - 4. VOC content.
 - 5. Environmental handling.
 - 6. Batch date.
 - 7. Color number.
- B. Storage: Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.
- C. Store materials in an area that is within the acceptable temperature range, per manufacturer's instructions. Protect from freezing.
- D. Handling: Maintain a clean, dry storage area, to prevent contamination or damage to the coatings.

1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.9 EXTRA MATERIALS

- A. Furnish extra paint materials from the same production run as the materials applied and in the quantities described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to Owner.
- B. Furnish Owner with an additional one percent of each material and color, but not less than 1 gal (3.8 l) or 1 case, as appropriate.

PART-2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Sherwin-Williams, which is located at: 101 Prospect Ave.; Cleveland, OH 44115; ASD Toll Free Tel: 800-524-5979; Tel: 216-566-2000; Fax: 440-826-1989; Email: request infospecifications@sherwin.com; Web: www.swspecs.com.
- B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 APPLICATIONS/SCOPE

- A. High Performance Exterior Paint and Coating Systems:
 - 1. Metal: Miscellaneous iron, ornamental iron, ferrous metal.
 - 2. Formed, Poured in Place Concrete.

2.3 PAINT MATERIALS - GENERAL

- A. Paints and Coatings:
 - 1. Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
 - 2. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color. Or follow manufactures product instructions for optimal color conformance.
- B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

- C. Coating Application Accessories: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required, per manufacturer's specifications.
- D. Color: Refer to Finish Schedule for paint colors, and as selected by Owner.

2.4 HIGH PERFORMANCE EXTERIOR PAINT AND COATING SYSTEMS

- A. **(PT-5) Metal** - (Structural Steel Columns, Joists, Trusses, Beams, Miscellaneous and Ornamental Iron, Structural Iron, Ferrous Metal).
 - 1. Urethane System; Solvent Base:
 - a. Gloss Finish:
 - i. 1st Coat: S-W Macropoxy 646-100 Fast Cure Epoxy, B58 Series (7.0-13.5 mils wet, 5.0-10.0 mils dry per coat).
 - ii. 2nd Coat: S-W Hi-Solids Polyurethane 250 Gloss or Semi-Gloss, B65-Series.
 - iii. 3rd Coat: S-W Hi-Solids Polyurethane 250 Gloss or Semi-Gloss, B65-Series. (4.5-8.0 mils wet, 3.0-5.0 mils dry per coat).

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared; notify Architect of unsatisfactory conditions before proceeding. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- B. Proceed with work only after conditions have been corrected and approved by all parties, otherwise application of coatings will be considered as an acceptance of surface conditions.
- C. Previously Painted Surfaces: Verify that existing painted surfaces do not contain lead based paints, notify Architect immediately if lead based paints are encountered.

3.2 SURFACE PREPARATION

- A. General: Surfaces shall be dry and in sound condition. Remove oil, dust, dirt, loose rust, peeling paint or other contamination to ensure good adhesion.
 - 1. Prior to attempting to remove mildew, it is recommended to test any cleaner on a small, inconspicuous area prior to use. Bleach and bleaching type cleaners may damage or discolor existing paint films. Bleach alternative cleaning solutions are advised.
 - 2. Remove mildew before painting by washing with a solution of 1 part liquid household bleach and 3 parts of warm water. Apply solution and scrub the mildewed area. Allow solution to remain on the surface for 10 minutes. Rinse thoroughly with clean water and allow surface to dry before painting. Wear protective

glasses or goggles, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

3. Remove items including but not limited to thermostats, electrical outlets, switch covers and similar items prior to painting. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
 4. No exterior painting should be done immediately after a rain, during foggy weather, when rain is predicted, or when the temperature is below 50 degrees F (10 degrees C), unless products are designed specifically for these conditions. On large expanses of metal siding, the air, surface and material temperatures must be 50 degrees F (10 degrees F) or higher to use low temperature products.
- B. Aluminum: Remove all oil, grease, dirt, oxide and other foreign material by cleaning per SSPC-SP1, Solvent Cleaning.
- C. Block (Cinder and Concrete): Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement, and hardeners. Concrete and mortar must be cured at least 30 days at 75 degrees F (24 degrees C). The pH of the surface should be between 6 and 9 unless the products are designed to be used in high pH environments. On tilt-up and poured-in-place concrete, commercial detergents and abrasive blasting may be necessary to prepare the surface. Fill bug holes, air pockets, and other voids with a cement patching compound.
- D. Concrete, SSPC-SP13 or NACE 6: This standard gives requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems. The requirements of this standard are applicable to all types of cementitious surfaces including cast-in-place concrete floors and walls, precast slabs, masonry walls, and shotcrete surfaces. An acceptable prepared concrete surface should be free of contaminants, laitance, loosely adhering concrete, and dust, and should provide a sound, uniform substrate suitable for the application of protective coating or lining systems.
- E. Copper and Stainless Steel: Remove all oil, grease, dirt, oxide and other foreign material by cleaning per SSPC-SP 2, Hand Tool Cleaning.
- F. Galvanized Metal: Clean per SSPC-SP1 using detergent and water or a degreasing cleaner to remove greases and oils. Apply a test area, priming as required. Allow the coating to dry at least one week before testing. If adhesion is poor, Brush Blast per SSPC-SP16 is necessary to remove these treatments.
- G. Steel: Structural, Plate, And Similar Items: Should be cleaned by one or more of the surface preparations described below. These methods are used throughout the world for describing methods for cleaning structural steel. Visual standards are available through the Society of Protective Coatings. A brief description of these standards together with numbers by which they can be specified follow.
1. Solvent Cleaning, SSPC-SP1: Solvent cleaning is a method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants. Solvent cleaning does not remove rust or mill scale. Change rags and cleaning solution frequently so that deposits of oil and grease are not spread over additional areas in the cleaning process. Be sure to allow adequate ventilation.
 2. Hand Tool Cleaning, SSPC-SP2: Hand Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this

process. Before hand tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.

3. Power Tool Cleaning, SSPC-SP3: Power Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before power tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.
4. White Metal Blast Cleaning, SSPC-SP5 or NACE 1: A White Metal Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
5. Commercial Blast Cleaning, SSPC-SP6 or NACE 3: A Commercial Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 33 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
6. Brush-Off Blast Cleaning, SSPC-SP7 or NACE 4: A Brush-Off Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, loose mill scale, loose rust, and loose paint. Tightly adherent mill scale, rust, and paint may remain on the surface. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP 1 or other agreed upon methods.
7. Power Tool Cleaning to Bare Metal, SSPC-SP11: Metallic surfaces that are prepared according to this specification, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxide corrosion products, and other foreign matter. Slight residues of rust and paint may be left in the lower portions of pits if the original surface is pitted. Prior to power tool surface preparation, remove visible deposits of oil or grease by any of the methods specified in SSPC-SP1, Solvent Cleaning, or other agreed upon methods.
8. Near-White Blast Cleaning, SSPC-SP10 or NACE 2: A Near White Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 5 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
9. High- and Ultra-High Pressure Water Jetting for Steel and Other Hard Materials: SSPC-SP12 or NACE 5: This standard provides requirements for the use of high- and ultra-high pressure water jetting to achieve various degrees of surface cleanliness. This standard is limited in scope to the use of water only without the addition of solid particles in the stream.

10. Water Blasting, SSPC-SP12/NACE No. 5: Removal of oil grease dirt, loose rust, loose mill scale, and loose paint by water at pressures of 2,000 to 2,500 psi at a flow of 4 to 14 gallons per minute.

3.3 INSTALLATION

- A. Apply all coatings and materials with the manufacturer's specifications in mind. Mix and thin coatings according to manufacturer's recommendations.
- B. Do not apply to wet or damp surfaces. Wait at least 30 days before applying to new concrete or masonry. Or follow manufacturer's procedures to apply appropriate coatings prior to 30 days. Test new concrete for moisture content. Wait until wood is fully dry after rain or morning fog or dew.
- C. Apply coatings using methods recommended by manufacturer.
- D. Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen.
- E. Apply coatings at spreading rate required to achieve the manufacturers recommended dry film thickness.
- F. Regardless of number of coats specified, apply as many coats as necessary for complete hide, and uniform appearance.
- G. Inspection: The coated surface must be inspected and approved by the Architect just prior to the application of each coat.

3.4 PROTECTION

- A. Protect finished coatings from damage until completion of project.
- B. Touch-up damaged coatings after substantial completion, following manufacturer's recommendation for touch up or repair of damaged coatings. Repair any defects that will hinder the performance of the coatings.

END OF SECTION 09 9100

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. Work Included;
 - 1. Stencil Warning Sign.
 - 2. Fire Extinguisher Cabinet Signs

1.3 QUALITY ASSURANCE

- A. Uniformity: For each sign form and graphic image process indicated, furnish products of a single manufacturer.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions for each type of sign required.
- B. Samples: Submit samples of each sign form and material showing finishes, colors, surface textures and qualities of manufacturer and design of each sign component including graphics.
- C. Shop Drawings: Provide drawings indicating layout and construction with full size selections of typical members.

PART- 2 PRODUCTS

2.1 MATERIALS

- 1. Stencil Warning Sign:

- a. Provide custom cut out stencil on walls above ceiling of all one hour rated walls, font to be 2" high, sign to read:

"ONE HOUR FIRE RATED SMOKE BARRIER – SEAL ALL OPENINGS".

2. Fire Extinguisher Cabinet Sign

- a. 9"x7" 2D projection panel, 2 viewable sides; reflective.
- b. As manufactured by Compliance signs, model # NHE-27897PROJ (or equal.)

PART- 3 EXECUTION

3.1 INSTALLATION

- A. Securely install plumb and level in conformance with approved submittals and manufacturer's recommendations.
- B. Interior Panel Signs: Wall mount adjacent to door at 5'-0" above finished floor to centerline of sign.
- C. Provide custom cut out stencil on walls above ceiling of all smoke walls, sign to read:
 1. **"ONE HOUR FIRE RATED SMOKE BARRIER – SEAL ALL OPENINGS".**
 2. Use red spray paint to create sign.
 3. Space Stencil Waring Sign at 10' – 0" o.c. visible above ceiling.

3.2 CLEANING AND PROTECTION

- A. After installation, clean soiled sign surfaces in according to manufacturer's instructions. Protect from damage until acceptance.

END OF SECTION 10 1400

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to, complete this section whether or not it is clearly or explicitly shown.

1.2 DESCRIPTION OF WORK

- A. The extent of miscellaneous specialties work is as shown on the drawings and specified herein, including:
 - 1. Fire Extinguishers & Cabinets.

1.3 SUBMITTALS

- A. Submit manufacturer's cuts, installation details and/or shop drawings of all items specified in accordance with the Supplementary Conditions.

PART- 2 PRODUCTS

2.1 FIRE EXTINGUISHER AND CABINETS

- A. Manufacturer: Subject to compliance with requirements, provide Fire Extinguisher and Cabinets from one of the following:
 - 1. Potter-Roemer
 - 2. Lausen Manufacturing Co.
 - 3. J.L. Industries
- B. Fire Extinguisher Cabinets: Potter-Roemer, or equal, 7025 - DV-6-SS -VB, recessed, Stainless Steel 304 #6 dull satin finish. Cartridge operated by wet chemical
- C. Fire extinguishers for cabinets shall be Model 3202 Class K extinguisher as manufactured by Potter Roemer or approved equivalent, red enamel.
- D. All fire extinguishers shall be fully loaded just prior to acceptance of building.

PART- 3 EXECUTION

3.1 INSTALLATION

- A. Install specialty items as recommended by the manufacturer. Provide all required accessories, sealant, hardware, fasteners, etc. for complete installation.
- B. Assemble items and associated fittings and trim in accordance with manufacturer's instructions.
- C. Install supports attached to building structure for equipment requiring supports.
- D. Install equipment level, plumb, and firmly in place in accordance with manufacturer's rough-in drawings.

3.2 CLEANING AND PROTECTION

- A. Repair or replace defective work, including damaged equipment and components.
- B. Clean unit surfaces, and leave in ready-to-use condition.

3.3 TESTING AND ADJUSTING

- A. Test each piece of equipment provided with moving parts to assure proper operation, freedom of movement, and alignment.
- B. Repair or replace malfunctioning equipment, or equipment with parts that bind or are misaligned.

END OF SECTION 10 1800

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. This section includes the following types of wall protection systems:
 - 1. Corner Guards.
 - 2. End Mount Wall Protectors.
 - 3. Crash Rails.
 - 4. High Impact Wall Panels.
 - 5. Door Frame Guards.

1.3 SUBMITTALS

- A. General:
 - 1. Submit the following in accordance with conditions of contract and Division1 specification section 01 3300 "Submittal Procedures".
 - 2. Product data and detailed specifications for each system component and installation accessory required, including installation methods for each type of substrate.
 - 3. Shop drawings showing locations, extent and installation details of corner guards. Show methods of attachment to adjoining construction.
 - 4. Samples for verification purposes: Submit the following samples, as proposed for this work, for verification of color, texture, pattern, finish and end cap attachment and alignment.
 - a. 12" long sample of each model specified including end cap and mounting hardware.

- B. Product test reports from a qualified independent testing laboratory showing compliance of each component with requirements indicated.
- C. Maintenance data for wall protection system components for inclusion in the operating and maintenance manuals specified in Division 1.

1.4 QUALITY ASSURANCE

- A. Coordinate carpentry work to assure proper installation of solid fire-retardant wood blocking for all accessories. Use of toggle or expansion type anchors in gypsum board shall not be permitted.
- B. Coordinate accessory locations with other work to avoid interface and to assure proper and serving of accessory units.
- C. Provide products of same manufacturer for each type of accessory unit and for units exposed in same areas, unless otherwise acceptable to Architect.
 - 1. Material shall be UL classified: Identified upon shipment with appropriate marking and shall be supported by Underwriter's Laboratories, Inc. follow up procedures.
 - 2. Impact Strength: Provide assembled wall protection units that have been tested in accordance with the applicable provisions of ASTM F476.
 - 3. Chemical and stain resistance: Provide wall protection system components with chemical and stain resistance in accordance with ASTM D543.
 - 4. Color match: Provide wall protection components that are color matched in accordance with the following:
 - a. Delta Ecmc of no greater than 1.0 using CIELab color space.
 - b. Single source responsibility: Provide all components of the wall protection system manufactured by the same company to ensure compatibility of color, texture and physical properties.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the project site in unopened original factory packaging clearly labeled to show manufacturer.
- B. Store materials in original, undamaged packaging in a cool, dry place out of direct sunlight and exposure to the elements. A minimum room temperature of 40°F and a maximum of 100°F should be maintained.
- C. Material must be stored flat.

1.6 PROJECT CONDITIONS

- A. Materials must be acclimated in an environment of 65°-75°F for at least 24 hours prior to beginning the installation.
- B. Installation areas must be enclosed and weatherproofed before installation commences.

PART- 2PRODUCTS

2.1 MANUFACTURERS

- A. Interior surface protection products specified herein and installed on the submittal drawings shall be manufactured by:
 - 1. C/S Group, Inc.
 - 2. InPro Corp.
 - 3. MM Systems Corp.

2.2 MATERIALS

- A. Engineered PETG: Extruded material should be high impact polyvinyl chloride with shadow grain texture, nominal .078" thickness. Chemical and stain resistance should be per ASTM D543 standards as established by the manufacturer. Colors to be selected by Architect from one of manufacturer's standard color range.

2.3 CORNER GUARDS (CG.1)

- A. Engineered SM-20N surface mount, as manufactured by C/S Group. or equal. Surface mounted guards consisting of continuous retainer with snap-on vinyl cover. Color matched end caps to be provided for both partial and full height applications. Attachment hardware shall be appropriate for wall construction.
 - 1. 4'-0" high in locations with no handrail.
 - 2. Height: Bottom of handrail or chair rail to top of base.
 - 3. Provide end mount wall protectors as required.

2.4 END MOUNT WALL PROTECTORS

- A. Engineered SSM-20N/SS-10N and sheet backer, surface mount, as manufactured by C/S Group. or equal. Surface mounted guards consisting of continuous retainer with snap-on vinyl cover. Color matched end caps to be provided for both partial and full height applications. Attachment hardware shall be appropriate for wall construction.

1. 4'-0" high in locations with no handrail.
2. Bottom of handrail or chair rail to top of base.
3. Provide end mount wall protectors as required.

2.5 RIGID WALL PANELS

- A. Engineered rigid panel, as manufactured by C/S Group or equal. Panel shall be .040 thick roll product factory cut to 24" in height. Provide all required adhesives and accessories, in solid color to match. Vertical joint shall be allowed, color match caulked. Provide inside and outside corner trims as required.
 1. RWP- 1- Acrovyn Solid Color Collections
 2. RWP- 2- Acrovyn by Design Collection

2.6 DOOR FRAME GUARDS

- A. Engineered model G2 Custom formed door frame guard as manufactured by InPro Corp. Vacuum form to frame size. Height to be equal to top of chair rail. Provide adhesives as recommended by manufacturer.

2.7 FABRICATION

- A. General: Fabricate wall protection systems to comply with requirements indicated for design, dimensions, detail, finish and member sizes.

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Verification of conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
 1. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface preparation: Prior to installation, clean substrate to remove dirt, debris and loose particles. Perform additional preparation procedures as required by manufacturer's instructions.
- B. Provide wall backing as required per manufacturers recommendation in new and existing walls.
- C. Protection: Take all necessary steps to prevent damage to material during installation as required in manufacturer's installation instructions.

3.3 INSTALLATION

- A. Install the work of this section in strict accordance with the manufacturer's recommendations, using only approved mounting hardware for each wall type, adhesives etc. and locating all components firmly into position, level and plumb.
- B. Temperature at the time of installation must be between 65°-75°F and be maintained for at least 48 hours after the installation.
- C. Adjust installed end caps as necessary to ensure tight seams.

3.4 CLEANING

- A. General: Immediately upon completion of installation, clean guards and accessories in accordance with manufacturer's recommended cleaning method.
- B. Remove surplus materials, rubbish and debris resulting from installation as work progresses and upon completion of work.

3.5 PROTECTION

- A. Protect installed materials to prevent damage by other trades. Use materials that may be easily removed without leaving residue or permanent stains.

END OF SECTION 10 2600

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Section, apply to work specified in this section.
- B. Refer to other sections of the specification, drawings, and detail to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 WORK INCLUDED IN THIS SECTION

- A. Supply, deliver and set in place al new l food service equipment at identified locations, and level before and after final connections by related trades.
- B. Furnish and install all food service equipment as specified herein, including that which is reasonably inferred, with all related items necessary to complete work shown on contract drawings and/or required by these specifications
- C. Electrical Work
 - 1. Interwiring of food service equipment between components with equipment such as heating elements, switches, thermostats, motors, etc., complete with junction box as is applicable, ready for final connections
 - 2. Voltages shall be indicated on the contract drawings, any differences in electrical characteristics at job site from those shown on contract documents must be submitted th Architect for consideration prior to ordering equipment
- D. Plumbing Work:
 - 1. Furnish all equipment with faucets, sink waste assemblies, and trim as specified in this section
- E. Mechanical Work:
 - 1. Provide exhaust hoods with connection collars ready for final connection by HVAC section
 - 2. Provide stainless steel exposed ducts to ceiling for dish machine
- F. Existing Equipment:
 - 1. Contractor shall remove and store existing equipment at their expense in a controlled environment storage facility until such time as job site is ready for reinstallation.
 - 2. Relocated those items of existing equipment noted as being reset to new position as shown on plan drawings. Coordinate resetting so as to minimize disruptions of operation of kitchen operations,
 - 3. Remove remaining existing equipment from premises and dispose of as required.
 - 4. All piping taps etc. for set equipment shall be new

1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, which is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.
- C. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by Contract Documents. Substitutions require approval by Architect for use or implementation.
 - 1. Substitutions provisions are handled under Division 01 Section.

1.4 REFERENCES

- A. All Food Service Equipment provided and installed must comply with below agencies, state department of health and county or local laws and ordinance.
- B. American Society for Testing Materials (ASTM):
 - 1. ASTM A167, Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
 - 2. ASTM A446, Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.
 - 3. ASTM C1036, Specification for Flat Glass.
 - 4. ASTM C1048, Specification for Heat Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.
- C. American Welding Society (AWS).
- D. National Electrical Manufacturers Association (NEMA).
- E. National Fire Protection Association (NFPA 96).
- F. National Sanitation Foundation (NSF).

- G. Underwriters Laboratories Listing (UL).

1.5 SUBMITTALS

- A. Electronically submit (PDFs) assembly drawings, electrical and mechanical rough-in connection plans, details for plumbing, electrical, air conditioning and ventilation services for all kitchen equipment and brochures, catalog cut-sheets, specifications and operating characteristics for buy-out equipment. Clearly indicate any deviations from contract Documents, such as arrangement of piping, connections, wiring method of fabrication, manner of structural conditions, standard shop practices, or other reasons, and note in Cover Sheet accompanying submittals.
- B. Drawing of fabricated equipment shall not be less than $\frac{3}{4}$ " equal one foot scale.
- C. Rough-in drawings shall not be less than $\frac{1}{4}$ " equal one foot scale.
- D. Product Data: Provide data on appliances; indicate configuration, sizes, materials, finishes, locations, utility connections and locations.
- E. Samples: Submit samples of stainless steel and other finish materials for color selection.
- F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- G. Manufacturer's Certificate: Certify that exhaust system and tests meet or exceed specified requirements.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data:
 - 1. Operation Data: Provide manuals with a sequence of operation and utility connection diagram explaining system operation and corresponding to actual devices. After approval, submit 2 sets of three ring binders.
 - 2. Maintenance Data: Provide lubrication and periodic maintenance requirement schedules.

1.7 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Conform to applicable State and local codes for utility requirements.
 - 2. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories, Inc. as suitable for the purpose specified and indicated.
- B. Energy Ratings: Provide appliances with energy guide labels with energy cost analysis (annual operating costs) and efficiency information as required by Federal Trade Commission.
 - 1. Provide all appliances that are Energy Star Rated.

1.8 QUALIFICATIONS

- A. Installer: Must have a minimum of 5 years documented installation experience with projects similar to this project.

- B. Fabricator: Must specialize in manufacture of commercial food services equipment with minimum 5 years documented experience.
- C. Manufacturer: Must specialize in manufacturing products specified in this section with a minimum of 5 years documented equipment manufacturing experience.
- D. One site superintendent all be satisfactory to the Owner and Architect in all respects, and owner shall have the right to require Contractor to dismiss from the project any superintendent whose performance is not satisfactory to Owner and Architect except with another superintendent satisfactory to the Owner and Architect in all respects. At the request of the Architect, the Contractor's superintendent shall attend project meetings, whether the project meetings are prior to the start of the Contractor's work.
 - 1. Contractor shall provide a superintendent with experience in managing project of this size and complexity with minimum three (3) projects including projects completed on time per contract. Experience shall be documents in writing from end user and design consultant.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Store products clear of floor in a manner to prevent damage.
- B. Coordinate size of access and route to place of equipment installation.
- C. Coordinate equipment delivery and installation with all other trades.
- D. Contractor takes all responsibility for equipment damage incurred before, during and after installation, until Substantial Completion has been determined by Architect.

1.10 COORDINATION

- A. Coordinate existing equipment with Owner per Part 3 Existing Equipment.
- B. Coordinate with other trades to ensure existing equipment is disconnected prior to removal by this contractor. Supply and install all necessary drain traps, steam traps, vents, shut-offs, valves, pipe fittings, and/or other materials to complete final plumbing and electrical or steam connections between the rough-in and the connection or connections on each piece of equipment.
- C. Ductwork and ductwork connections from hoods unless otherwise indicated.
- D. Install all drain fittings, tailpieces, faucets, operating switches, and/or starters.
- E. Coordinate sequencing of equipment installation with other trades prior to installing any piece of equipment.
- F. Coordinate special conditions with other trades, i.e. floor depression, soda line conduit requirements, roof curbs, control wiring, etc.

1.11 WARRANTY

- A. Provide a one (1) year parts and labor guarantee on all new equipment and a 5-year parts guarantee on refrigeration components.
- B. Components of equipment subject to replacement prior to one year's use and those items which may fail due to

improper or inadequate periodic maintenance by the Owner/Operator are not intended to be included within the scope of warranty.

- C. For all commercially manufactured equipment that has refrigeration systems and semi-hermetic compressors, furnish an additional four (4) year warranty on all compressors.
- D. Guarantee/Warranty period shall commence with the date of Substantial Completion.
- E. Warranty includes all costs incurred for removal and re-installation of the replacement component or equipment.

PART-2 PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
 - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 - 2. All products shall be new. Use salvaged materials only where specifically directed to do so.
 - 3. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 - 4. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 - 5. Where products require color selection the Architect will make the selection.
 - 6. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 - 7. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product
- B. Product Selection Procedures:
 - 1. Products:
 - a. Non-restricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in

"Comparable Products" Article for consideration of an unnamed product.
 - 2. Manufacturers:
 - 3. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on

Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
1. Evidence that the proposed product does not require revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 5. Samples, if requested.
 6. All comparable products consideration must be submitted at the time of bidding. All other considerations after time of bid will not be considered.

2.3 MATERIALS / PRODUCTS OF MANUFACTURED EQUIPMENT

- A. All like types of equipment such as all refrigerated and heated cabinets, all ovens and all mixers shall be by the same manufacture.
- B. Except as may be specified otherwise under individual item specifications in the "Equipment Schedule," all items of standard manufactured equipment shall be complete in accord with manufacturer's standard specifications for specific unit or model called for including finishes, components, attachments appurtenances etc. except as follows
1. All items of standard equipment shall be that manufacture's latest model at time of delivery.
 2. Substitutions for manufactured equipment specified will be accorded consideration under terms set forth in "Comparable Products".
- C. Fabricated equipment Details are to be followed unless otherwise noted or specified.
1. Stainless steel shall be US standard gauges as called for 18-8 or 304 type, #4 finish.
 2. Galvanized iron shall be Armco or equal. Framework of galvanized iron shall be welded construction having weld smooth and where galvanizing has been burned off, touched up with high grad aluminum

bronze

3. Legs and cross rails shall be continuously welded, unless otherwise noted, and ground smooth
4. Bottom of legs at floor shall be fitted with sanitary stainless steel bullet type foot, with not less than 2' adjustment, unless otherwise specified.
5. Legs shall be fastened to equipment as follows:
 - a. To sinks by means of closed gussets, Gussets shall be stainless steel, reinforced with bushing, having set screws for securing legs.
 - b. To tables and drainboards with closed gussets which shall be welded to stainless steel hat sections or channels, 14 gauge or heavier, exposed hat sections having closed ends.
6. Bracing shall be welded to underside of tops
7. Closed gussets shall be 3" minimum diameter at top, continuously welded to frame members or to sink bottom
8. Sinks, unless otherwise specified shall be furnished with rotary type waste outlets without overflows where exposed furnish wastes chromium plated
9. Rolls shall be 1 – ½" diameter, except as detailed contrary, with corners bullnose ground and polished
10. Seams and joints shall be shop welded. Welds to be ground smooth and polished to match original finish.
11. Metal tops shall be one-piece welded construction, unless specified otherwise, reinforced on underside with stainless steel hat sections or channels welded in place. Cross bracing to be not more than 30" on centers. Sound deaden required.
12. Drawers to be 18 gauge stainless steel channel type housing and drawer cradle, both housing and cradle being reinforced and welded at corners, housing being secured to underside of table top and both housing and cradle being sized for and fitted with 19 gauge 20" x 20" x 5" deep stainless steel drawer insert having coved corners. Drawer insert shall be easily removable from cradle without tools or having to remove entire drawer. Drawers to have stainless steel fronts, provide with recessed flush type stainless steel pulls with locks keyed the same unless otherwise specified.
 - a. Support drawer on fabricated 14-gauge stainless steel interlocking channel solid Delrin ball bearing wheels. Support slides shall be load rated at 20 lb. per pair. Slides to be component Hardware S52 Series.
13. Enclosed cabinet type bases shall be made of formed steel sheets reinforced with formed steel sections to create a ridged structure. Steel shall be 18 gauge or heavier. Base shall be welded construction throughout with front rails. Mullions, etc. welded to appear as one-piece construction. All exposed sections of interior and exterior shall be stainless steel.
14. Doors shall be double cased, unless otherwise noted. Outer pans shall be 18 gauge with corners welded ground sooth and polished. Inner pans shall be 20 gauge, fitted toughly not outer pan with sound deadening material such as Celotex used as ore. Two pans shall be tack welded together with seam solid filled.

- a. Door shall finish approximately $\frac{3}{4}$ " thick and shall be fitted with flush recessed type stainless steel door pulls. Single pan type doors shall be reinforced and stiffened with closed hat sections.
 - b. Hinged doors shall be flush type mounted on heavy duty stainless steel piano or concealed hinges.
 - c. Hardware shall be solid materials and except where unexposed or specified contrary, of cast brass chrome plated. Stampings are not acceptable. Identify all hardware with manufacturer's name and number so that broken or worn parts may be ordered and replaced.
- 15. Fabricate sink compartments, with fully coved vertical and horizontal corners. Multiple compartment partition to be double thickness continuously welded sheet join at top. Front of multiple compartment sinks to be continuous on exterior. Bottoms shall be creased to drain.
- 16. Ends of all fixtures splash backs shelves, etc. shall be finished flush to walls or adjoining fixtures with enclosed splash.
- 17. Dish table drain tables, splash backs and turned up edges shall have radius bends in the all horizontal and vertical corners, coved at intersections
 - a. Rounded and coved corners or radius bends shall be $\frac{1}{2}$ " radius or longer
- 18. Shelves in fixtures with enclosed bases shall be turned up on back and sides and feathered slightly to insure tight fit to enclosure panels. Bottom shelves shall be made for easy removal unless otherwise noted.
 - a. Undershelves of tops to be coated with heavy bodied ruinous material compound for permanent, not flacking adhesion to metal. $\frac{1}{8}$ " thick, applied after reinforcing members have been installed drying without catching crevices.
- 19. Metal components, unless specified or noted otherwise to be the following gauges
 - a. Counter and table tops 14-gauge stainless steel Wall shelves, pipe leg undershelves, drawer fronts and legs, 16-gauge stainless steel, Enclosed cabinet bases, exhaust hoods, and out pan doors 18-gauge stainless steel. Sinks and drainboards, 14 guage stainless steel. Doors, inner pan 20-gauge stainless steel.
- 20. Heating equipment wherever electrical heating equipment or thermostat control for such equipment is specified. It shall be complete and of the materials size and rating specified with in equipment item or details. All such equipment shall be designed and installed to be easily cleaned or to be easily removed for cleaning.
 - a. Electrical appliances or heating element circuits for 120 volts shall not exceed 1560 watts, unless specifically shown contrary.
- 21. Switches and controls, shall be supplied by food service equipment contractor on each motor driven appliance or electrical heating unit suitable control switch of proper type in accord with underwriter's code.
 - a. All internal wiring for fabricated equipment items included, all electrical devices wiring controls switches, etc. built into or forming an integral part of these items shall be furnish and install by food service equipment contractor in his factory or building site which all items complete to

junction box for final connections to building lines by electrical contractor

- b. Provide standard 3 prong plugs to fit "U" slot grounding type receptacles, similar to NO 5262 for all equipment items powered by plugin into o110-120 volts, single phase AC. Proved suitable length 3 wire cord for equipment
- c. All equipment shall be complete with connection terminal as standardized by equipment manufacturers, expect where specified otherwise

22. Fit all doors when possible for refrigerated compartment with locking type latches, Provide master keys.

23. Laminated plastic whenever specified shall be Formica, Wilson – Art, Micarta or approved by architect. Veneer all material using urea base cement, waterproof and heatproof, Rubber base adhesives are not acceptable. Apply material directly over closed grained plywood such as mahogany or birch. Standard fir plywood is not acceptable. Face exposed surfaces and edges with 1/16" material and corresponding back faces with 1/32" reject material. Place top sheet on and over finished edge.

24. Gas equipment to be suitable for use with gas available at site and to be furnished FSEC with pressure regulators designed to work with incoming pressure.

- a. Where specified gas quick disconnects shall be furnished complete with gas valve, gas connector hose, quick disconnect fitting elbows, and restraining cable all AGA approved. Gas hose shall be flexible, braded or corrugated stainless steel with smooth plastic exterior coating or sleeve of heat shrink tubing.

25. Solid surface mater to be by Corian or Surell and approved by architect. Countertops at hot food areas shall be able to withstand 175 degree without deformation, cracking otherwise deteriorating. Color and pattern to be selected after bidding

- a. Installation shall be by a qualified install as approved by manufacturer and owner
- b. Contractor to submit bid based on 1/2" thick material, price group "E" (mid range), Colors to be selected after award of contract.

D. Sheet Steel: ASTM A446; 1.25 ounce per square foot galvanized coating.

E. Stainless Steel: ASTM A167; Type 304 commercial grade, No. 4 finish.

F. Glass: 3/16-inch float conforming to ASTM C1036 and ASTM C1048; exposed edges ground; cut or drilled to receive hardware.

G. Plastic Laminate: NEMA LD3; 0.050-inch-thick; color as selected by Architect.

H. Laminate Backing Sheets: LD3-BK20, 0.020-inch-thick, unfinished plastic laminate.

I. Finish Hardware: Manufacturer's standard.

J. Work Surfaces: As specified.

- K. Fittings: Sink drains with crumb cup and waste fittings, faucets, and electrical outlets.
- L. Service Outlet Covers and Escutcheons: Stainless steel.
- M. Service Accessories and Connections:
 - 1. Provide control switch or starter on each motor-driven appliance or heating element, under provisions of UL requirements.
 - 2. Provide internal wiring for equipment, including electrical devices, wiring controls, and switches to a common junction box.
 - 3. Provide suitable length of 4 wire cord with plugs to match building receptacles.
 - 4. Provide lamps for fixtures in equipment.
 - 5. Provide equipment with connection terminals, so that connections of plumbing, gas, steam, electrical, ventilation, and refrigeration services can be made. Where receptacles are specified for custom equipment, supply cut-outs and outlet boxes set in place accessible for connections of electrical work.

2.4 EQUIPMENT

- A. Provide rough-in hardware, supports and connections, attachment devices, closure panels, trim strips, and all accessories required for proper operation of equipment.
- B. Standard of Comparison: The specified equipment has been established to set a standard of quality and features.
- C. If substitutions require different utility/building conditions, electrical, plumbing, ventilation, etc., from those specified, a complete list of those changes for each item shall be included with the request for substitution. Any costs associated with these changes will become the responsibility of this Contractor.
- D. Verify direction of door swings.

2.5 FABRICATION

- A. General Requirements:
 - 1. Stainless Steel Fastenings and Fittings: Bolts and screws with countersunk flat heads at interior and exterior visible or accessible surfaces. Use concealed fastenings where possible
 - 2. Form edges smooth. Fabricate sheet material for work surfaces, facings, shelves, and drainboards of straight length in one continuous sheet when not over 12 feet in length.
 - 3. Fix leg-mounted units by dowelling to floor with 1/4-inch stainless steel pins, where vibration or oscillation is anticipated.
 - 4. Provide legs with stainless steel adjustable feet. Fasten legs to equipment securely and rigidly.
 - 5. Install rubber or nylon button feet or other protective device on bearing surface of any item positioned on a finished surface.

6. Isolate rotating or reciprocating machinery to prevent noise and vibration.
 7. Provide accommodation for installation of final connections by other trades and accessibility to components such as compressors, junction boxes, etc...
 8. Grind welds of stainless steel smooth and flush; polish to match adjacent surfaces.
 9. Cut and drill components for service outlets and fixtures.
 10. Provide access panels where required to access utilities.
 11. Shop assemble work where possible.
- B. Load Carrying Counter Surfaces: Reinforce frame support system and surfaces so that surfaces may safely support a load of 200 pounds concentrated on one square foot in any area or surface with no indentation showing on surface, and with permanent set not exceeding 0.005 inches.

2.6 FINISHES

- A. Metal (Except Stainless Steel): Degrease and phosphate etch followed by primer and minimum 2 coats factory baked epoxy enamel, color as selected by Architect from manufacturer's full range of standard and custom colors.
- B. Plastic Laminate: Color as selected by Architect from manufacturer's full range of standard and custom colors.
- C. Stainless Steel: Number 4 finish (unless indicated otherwise).
- D. Bituminous Paint: Sound deaden internal surfaces of metal work and underside of metal counters and sinks.

PART- 3 EXECUTION

3.1 EXAMINATION

- A. Verify all existing conditions and existing equipment requirements.
- B. Verify ventilation outlets, service connections, and supports are correct and in required location.
- C. Verify operational condition of existing equipment.
- D. Report equipment discrepancies or non-operational equipment to the Architect.

3.2 INSTALLATION

- A. Use anchoring devices appropriate for equipment and expected usage.
- B. Verify equipment is installed in accordance with the manufacturer's recommendations and requirement.
- C. Insulate to prevent electrolysis between dissimilar metals. Provide sealant to achieve clean joint without

crevices.

- D. Weld and grind joints in stainless steel work tight, without open seams, where necessary due to limitations of sheet sizes or installation requirements.
- E. Sequence installation and erection to ensure mechanical, plumbing and electrical connections are achieved in an orderly and expeditious manner.
- F. Cut, fit, and patch where necessary. Coordinate work with other trades.
- G. Cut and drill tops, backs or other elements for service outlets, fixtures, and fittings.
- H. Provide access panel or cutting and patching of items of this Section required for the installation or services of equipment.
- I. Remove and reinstall existing equipment required under this Section. Foodservice Equipment contractor shall verify condition of existing equipment prior to removal, if being reinstalled by this contractor or reused by Owner.
- J. Protect new and existing equipment during construction phase as required to prevent damage to equipment.

3.3 EXISTING EQUIPMENT

- A. The Owner reserves the right to keep any existing equipment, coordinate with Owner on removal and transportation of equipment to a location of their choice. It shall be the responsibility of this contractor to salvage equipment the Owner chooses not to retain.
- B. MEP disconnections by related trades, move, store and re-install equipment, ready for utility connection.
- C. Coordinate scope of work and timeline with Owner and other trades prior to removal of existing equipment.
- D. Clean and re-furbish existing equipment to be re-used to "like new" condition, as noted.
- E. It is the responsibility of this contractor to provide storage as required until the piece of equipment is installed or re-installed.

3.4 ADJUSTING

- A. Upon completion of installation, adjust new and existing equipment and apparatus to ensure proper working order and conditions.
- B. If a new piece of equipment is not functioning properly and determined to be non-repairable in the field it shall be removed and replaced with a new piece of equipment.
- C. Inspect all equipment and run each piece of equipment through a complete operating cycle to verify that equipment is fully operational.

3.5 CLEANING

- A. Remove masking or protective covering from stainless steel and other finished surfaces.
- B. Remove all packing materials and debris from jobsite.

- C. Wash and clean new and existing equipment.
- D. Polish glass, plastic, hardware and accessories, fixtures and fittings.

3.6 DEMONSTRATION AND TESTING

- A. Test existing and new equipment prior to demonstration.
- B. At completion of work, provide qualified and trained personnel to demonstrate operation of each item of equipment and instruct Owner in operating procedures and maintenance.
- C. Individuals performing demonstration shall be fully knowledgeable of all operating and service aspects of equipment.
- D. Start-up, test, and adjust new equipment. Authorized factory technicians shall start-up equipment requiring testing and balancing, i.e. hoods, pulping systems, equipment with remote components, etc.

PART- 4 LISTING OF FOOD SERVICE EQUIPMENT

4.1 ITEM 001 – Hot/Cold Food Well Unit

- A. Vollrath Company, Model FC-6HC-0208-AD (or equal) Hot/Cold Food Multi-Well Unit, Drop-in, Electric, individual pan design, with drain, (3) pan size for 12" x 20" pans, (1) control box, thermostatic hot controls for each well, stainless steel, 6400 watts hot, 2800 watts cold, NSF & UL listed. Provide each with the following
 - 1. 1 ea. 1-year warranty parts and labor
 - 2. 1 ea. Electric to be verified (208v/60/1-ph, 10.2 amps)
 - 3. 1 ea. Model 4358000-2 Control Panel Mounting Frame
 - 4. 4 ea. Adapter Bars

4.2 ITEM 002 – Electric Fryer

- A. Vulcan, Model 1ER50C (or equal), electric, (1) 50 lb. oil capacity full tank, 16 gauge stainless steel tank, front & sides, Computer Control Digital Read Temperature, 1-1/4" full port ball type drain valve, twin fry baskets, under-fryer drawer filtration, NSF, CE, CSA Star, EnergyStar. Provide with the following:
 - 1. 1 ea. 1 year parts and labor warranty
 - 2. 1 ea. Electric to be verified (480v, 50/60Hz, 3 phase, 17kw, hardwired connection)
 - 3. 2 ea. Stainless steel tank covers

4. 1 set Adjustable Casters, 6" adjustable swivel non-lock rear & lock front casters
5. 1 ea. Extra Set of Twin Fry Baskets (6-1/2"w x 13-1/4"d x 6"h)
6. 1 ea. Large Single Fry Basket (13"w x 13-1/4"d x 5-1/2"h)
7. 1 ea. 10" High stainless steel removable splash guard

4.3 ITEM 003 - Hand Sink

- A. Advance Tabco Model 7-PS-62 (or equal) Dimensions: 13(h) x 17.25(w) x 15.25(d) Hand Sink, wall model, 14" wide x 10" front-to-back x 5" deep bowl, 20-gauge 304 series stainless steel, splash mounted gooseneck faucet, knee valve, basket drain, wall bracket, NSF, cCSAus Paper towel & Soap dispensers by Owner. Provide each with the following:
 1. 1 ea. Model 7-PS-10 P-trap, heavy duty, 1-1/2", 17 gauge

4.4 ITEM 004 - Toaster

- A. Waring Commercial Model CTS1000 (or equal) Dimensions: 13(h) x 15-1/2(w) x 19.5(d) Heavy duty Conveyor Toaster, Super high output (450 slices per hour), brushed stainless steel construction, cool touch side panels, conveyor speed control NSF & UL listed. Provide each with the following
 1. 1 ea. 1-year parts and labor warranty
 2. 1 ea. Electric to be verified (120v/60/1-ph, 15.0 amps)
 3. 1 ea. Model 7-PS-10 P-trap, heavy duty, 1-1/2", 17 gauge

4.5 ITEM 005 – Single Door Reach-In Freezer

- A. True Manufacturing Co., Model T-23F-HC (or equal) Dimensions: 88.5(h) x 27(w) x 29.5(d), reach-in, self-contained capillary tube refrigeration, stainless steel exterior, clear coated aluminum interior, full-height solid doors, interior safety shielded lighting, electronic controller w/digital display, 1/2 hp, cUL, UL, NSF. Provide with the following:
 1. 1 ea. Standard warranty (for the United States & Canada Only): 3-year parts and labor; 5-year compressor
 2. 1 ea. Electric to be verified, 115v/60/1-ph, 3.7 amps, cord, NEMA 5-15P
 3. 1 ea. Verify door hinge, factory installed to correct side, standard
 4. 1 set Frame rail fitted casters, swivel, with locks on front set (4" diameter rubber tires) set of 4 (4" height)
 5. 2 ea. Additional Shelves

4.6 ITEM 006 – Refrigerated Chef Base

- A. Avantco Refrigeration, Model CBE-36-HC 36" (2) drawer (or equal) Dimensions: 25.825(h) x 36.325(w) x 32.125(d), automatic electric defrost, digital temperature control, removable magnetic drawer gaskets, 132lb. drawer capacity, stainless steel exterior, cUL, UL, NSF. Provide with the following:
1. 1 ea. Standard warranty (for the United States & Canada Only): 3-year parts and labor; 5-year compressor
 2. 1 ea. Electric to be verified, 115v/60/1-ph, 4 amps, cord, NEMA 5-15P.

4.7 ITEM 007 - 36" Griddle

- A. Vulcan, Model HEG36E (or equal) Dimensions: 15.3(h) x 36(w) x 24(d) HEG Series Heavy Duty Electric Griddle, 1/2" thick polished steel plate, manual controls, 4" stainless steel back and tapered side splashes, 3-1/2" wide front grease trough empties into large capacity grease drawer, 4" adjustable legs, heavy duty chromed thermostat knob guards, CSA Star, NSF. Provide with the following:
1. 1 ea. 1-year limited parts & labor warranty, standard
 2. 1 ea. Electric to be verified, (480v, 50/60Hz, 3 phase).
 3. 1 ea. Cutting board
 4. 1 ea. Condiment rail
 5. 1 ea. Banking strip

4.8 ITEM 008 – Sandwich Unit

- A. True Manufacturing Co., Model TSSU-48-12D-2-HC (or equal) Dimensions: 36.75(h) x 48.3(w) x 30.1(d), self-contained capillary tube refrigeration, stainless steel exterior, clear coated aluminum interior, (2) adjustable shelves, 11.75" full depth composite cutting board, Heavy-duty stainless steel drawer slides and rollers, 5" diameter casters with locks on front, CSA Star, NSF. Provide with the following:
1. 1 ea. Standard warranty (for the United States & Canada Only): 3-year parts and labor; 5-year compressor
 2. 1 ea. Electric to be verified, (115v/60/1-ph, 4 amps, cord, NEMA 5-15R).
 3. 1 ea. Sneeze guard
 4. 1 ea. Single overshelf

5. 1 ea. Exterior rectangular digital temperature display (factory installed)
6. 10ea. Pan dividers

4.9 ITEM 009 – Electric Fryer Holder

- A. Vulcan, Model FrymateVX15 (or equal), electric, Free standing, 18 gauge stainless steel cabinet, Stainless steel sloped drain top with removeable grease collector (dishwash safe), grease strip brackets NSF, CE, CSA Star, EnergyStar. Provide with the following:
 1. 1 ea. 1-year parts and labor warranty
 2. 1 ea. Electric to be verified (120v/60/1-ph, 9 amps, cord, NEMA 5-15P)
 3. 1 lt. Factory to supply cord & plug
 4. 1 set Adjustable Casters, 6" adjustable swivel non-lock rear & lock front casters
 5. 1 ea. ThermoGlo Food Warmer
 6. 1 ea. Stainless steel tank cover

4.10 ITEM 010 – Refrigerated Display Case

- A. Federal Industries, Model CGR3642 Dimensions: 42(h) x 36.13 (w) x 35.31(d), curved glass styling, tempered Thermopane tilt-out front glass, steel base construction, thermometer, removable scratch-resistant & rustproof white display deck, adjustable temperature control, light switch, adjustable leg levelers, 300k LED top light and shelf lights, UL Safety, UL Sanitation, NSF, cUL, DOE 2017. Provide with the following:
 1. 1 ea. Standard warranty (for the United States & Canada Only): 3-year parts and labor; 5-year compressor
 2. 1 ea. Electric to be verified (120v/60/1-ph, 4 amps, cord, NEMA 5-15P)
 3. 2 ea. Glass Shelves
 4. 1 ea. Rear wrapping board
 5. 1 ea. Reflective ends
 6. 1 ea. White Interior
 7. 1 ea. Castor Unit

4.11 ITEM 011 – Pastry Display Case

- A. Cal-Mil Plastic Products Inc., Sierra Square Pastry Case, Model 3610, Dimensions: 21(w) x 17(d) x 23.25(h), (3) 13 x 18 clear trays, vintage frame and wood base.

4.12 ITEM 012 – Turbo Chef

- A. Turbo Chef, Model i5 Touch (or equal), stainless steel front & top & sides, 304 stainless steel interior, 7-inch capacitive touch screen with tempered glass cover, Integral recirculating catalytic convertor for UL listed ventless operation, top-launched microwave system, Smart voltage sensor technology, self-diagnostics, cUL, UL, EPA 202, NSF. Provide with the following:
1. 1 ea. 1-year limited parts & labor warranty, standard
 2. 1 ea. Electric to be verified, (208/240v, 60Hz, 3-ph, 26amps)
 3. 1 ea. MDD-1005: Additional Year (PhD SAAS)
 4. 1 ea. MDD-1001 Initial Equipment connectivity parts
 5. 1 ea. Aluminum paddle (NGC-1478)
 6. 1 ea. Bottle Oven Cleaner (105704)
 7. 1 ea. Bottle Oven Guard (105703)
 8. 2 ea. Trigger Sprayers (103182)
 9. 2 ea. PTFE Baskets (NGC-1331)

4.13 ITEM 013 – Salad Bar Unit

- A. Beverage-Air, Model SPE60HC-S (or equal) Dimensions: 36.8(h) x 60.6(w) x 30.1(d), stainless steel front & top & sides with finished back, clear coated aluminum interior, (12) 4" deep 1/3 size polycarbonate pans, Locking divider bars, Self-closing doors with 120° stay-open feature, on cartridge style hinges, 6" Casters (2) with brakes, (4) epoxy-coated steel wire shelves, cUL, UL, NSF. Provide with the following:
1. 1 ea. Standard warranty (for the United States & Canada Only): 5-year parts and labor; 7-year compressor
 2. 1 ea. Electric to be verified, (115v/60/1-ph, 5.4 amps, cord, NEMA 5-15P).
 3. 1 ea. Sneeze guard panel for single side service
 4. 1 ea. Foldable tray slides
 5. 1 ea. Low profile casters
 6. 1 set Shelf dividers

7. 2 sets Pan supports
8. 1 set Door locks
9. 1 ea. Tray slide

4.14 ITEM 014 – Sneeze Guard

- A. BSI, Model DECO-101-N (or equal), Vertical Operator-Serve Food Shield, Size as indicated on plan and schedule, NSF. Provide with the following:
 1. 1 ea. Chrome Finish
 2. 1 ea. 1" Square tube
 3. 1 ea. ¼" tempered glass panels
 4. 1 ea. Undercounter installation (square tube)
 5. 2 ea. ¼" tempered glass end panels.

4.15 ITEM 015 – Coffee Brewing System

- A. Wilber Curtis Company, Model TP15T10A1100 (or equal) Twin server, 3-gallon total (1.5gal. per side), G3 digital control module, 3/8" water source inlet, cUL, UL, NSF. Provide with the following:
 1. 1 ea. 1-year limited parts & labor warranty, standard
 2. 1 ea. Electric to be verified, (220v/60/1-ph, 24 amps, hardwired connection).

4.16 ITEM 016 – Coffee Dispensing System (2 each)

- A. Wilber Curtis Company, Model TXSG15 ThermoProServer (or equal) Twin server, 1.5gal. per side, Provide with the following:
 1. 1 ea. 1-year limited parts & labor warranty, standard

4.17 ITEM 017 – Undercounter Double Door Refrigerator

- A. True Manufacturing Co., Model TUC-36-HC (or equal) Dimensions: 29.75(h) x 36.3(w) x 30.1(d), self-contained capillary tube refrigeration, stainless steel exterior, clear coated aluminum interior, Each door fitted with 12" long recessed handle, Positive seal self-closing doors with 90° stay open feature, UL, NSF. Provide with the following:
 1. 1 ea. Standard warranty (for the United States & Canada Only): 3-year parts and labor; 5-year

compressor

2. 1 ea. Electric to be verified (115v/60/1-ph, 2.0 amps, cord, NEMA 5-15P)
3. 2 ea. Barrel locks (factory installed). Requires one per door.
4. 1 set 2-1/2" diameter casters (to allow fit under countertop)
5. 1 ea. (4) Adjustable PVC coated wire shelves
6. 1 ea. Exterior rectangular digital temperature display (factory installed)
7. 1 ea. SPEC1 package

4.18 ITEM 018 –Iced Coffee Dispensing System

- A. Bunn-O-Matic Corporation, Model TDO-N-4 (or equal) Narrow Iced Beverage Dispenser, 4.0 gallon, Integrated lid retainer, integrated drip tray NSF . Provide with the following:
 1. 1 ea. 1-year limited parts & labor warranty, standard
 2. 1 ea. Drip Tray (Model No. 39626.0000)
 3. 1 ea. Faucet Assembly (Model No. 03260.0003)
 4. 1 ea. Drip Tray Cover (Model No. 39627.0000)
 5. 1 ea. Replacement Lid (Model No. 39624.0000)
 6. 1 ea. TDO-N Locater Guide (Model No. 39696.0000)

4.19 ITEM 019– Ice Drink Dispenser

- A. This item is to be furnished by Owner
- B. Contractor to coordinate installation and provide all connections as required, inclusive but not limited to piping, wiring, drains, etc.

4.20 ITEM 020 – Exhaust Hood

- A. Manufacturer: Halton Company
 1. Model #: KVE- PSP Wall Mounted
 2. Description: Exhaust Hood
 3. Dimensions: As shown on plans with a typical hanging height of 6'-8" above finished floor. Remote

Switch panel with Fan and light switches shall be remote mounted, verify location with Architect.

4. Furnish and install a complete kitchen exhaust canopy. The hood shall be an Exhaust canopy. Halton Model KVE-PSP Wall Mounted style as manufactured by the HALTON Company of Scottsville, Kentucky. The canopy shall bear either the ETL or Underwriters Laboratories U.L. label, for listed range hood without exhaust fire damper per standard 710 and be fabricated in compliance with NFPA-96-2001 and shall bear the National Sanitation Foundation seal of approval.
5. All exposed surfaces shall be 18-gauge stainless steel with a #4 brushed finish, double shell end walls and face construction. **Single wall construction will not be permitted. Hood shall be UL Listed and labeled for "zero clearance" at the end(s) of the hood as shown on drawings when mounted against a wall.** Unexposed surfaces are 18-gauge stainless steel. The installation shall be in accordance with the manufacturer's recommendations and conform to NFPA-96 guidelines and all applicable local codes. The hood height shall not exceed 24"H. The overall lengths of the hoods shall be as indicated on drawings and/or equipment schedule. Use of Capture Walls to create a seal between cooking equipment and wall shall not be used as they require cooking equipment to be located further from wall reducing isle space. Bottom edge of hood front panels to be square, chamfered front shall not be allowed as they reduce front overhang and jeopardize capture and containment over tall cooking equipment. **The use of S/S end panels shall not be permitted.** Hood to include s/s trim panels from top of hood to finished ceiling on all open sides. Hood shall be tapered as shown on contract drawings.
6. Seams and joints shall be welded liquid tight in accordance with National Fire Protection Association (NFPA) bulletin #96. Exposed external welds shall be ground and polished to match original material finish. The hood shall be Underwriters Laboratories (UL) Listed 710. Construction shall conform to the requirements of National Sanitation Foundation (NSF) standard 2 and the NSF seal shall be displayed on the front face of the hood. Hanger brackets shall be threaded ½-13 and located on approximately five foot centers.
7. Hood will include an active internal "Capture-Jet" System on all open sides of the hood that will allow for Capture and Containment of thermal plume at specified air volumes. The Capture Jet air shall be pulled into a 1" air plenum with the Capture-Jet fan and discharged through Capture-Jet ports that are located along the inside front, side and bottom edge of the hood at discharge velocity of 1800 FPM. Slot type, passive devices or "Short-Cycle" discharge is not acceptable.
8. Hood shall include recessed MUA ceiling plenums and diffusers extending 24" wide and entire length of the hood front as shown on drawings with a white powder coat finish to match the drop ceiling tiles in the kitchen. MUA plenums shall not exceed 150CFM/per lineal foot of plenum using 28% open perforation diffuser material to reduce possibility of air disturbance along the front edge of the hood.
9. Each canopy shall have a filter housing of the same material as the canopy liner. The filter housing shall be equipped with a concealed drip tray the full length of the canopy and with a grease cup for easy removal and daily cleaning. The hood shall be equipped with Halton KSA (High Efficiency) multi-cyclone Stainless Steel grease extractors. The KSA filters shall be NSF and UL classified. The particulate extraction efficiency is 93% on particulates of 5 microns and 98% on particles with a diameter of 10 microns or larger per ASTM F2519 method of test. The pressure loss over the extractor shall not exceed 0.50 inches W.C. at flow rates approved by UL for heavy load cooking. Sound levels shall not exceed an NC rating of 55. Baffle, adjustable or slot type extractors shall not be acceptable.

10. The airflows through the KSA extractors and the Capture Jet air chamber are to be determined through the integral T.A.B. (Testing and Balancing) ports located on the outside end of the exhaust plenum inside each hood section. It is the responsibility of the air balancer to adjust the exhaust volumes after installation with a Magnahelic Gauge or Shortridge Digital Anemometer and the hood TAB ports to match the Pressure vs Air Flow Curves card provided in each hood section.
11. The exhaust airflow will be calculated based on the convective heat generated by the appliances underneath each canopy. Submittal shall include convective heat calculations base on the input power of the appliance served and efficiency of hood system consistent with results of independent test based on ASTM Standards F-1704-05 Capture & Containment and F-2474-05 Heat Gain to Space. Final air volume calculations shall comply with the hood listing. The use of end panels or rear seals to achieve required airflows are not acceptable.
12. An illuminated hood light button and exhaust fan on/off button to be provided by hood manufacturer and installed flush mounted under the front lip of the hood as shown on contract drawings for ease of access.
13. Hood shall be provided with hood mounted temperature sensor and timer panel designed and installed to automatically activate the exhaust fan whenever cooking operation occurs. The activation of the exhaust fan shall occur through and interlock with the cooking appliances, by means of heat sensor, per IMC 2006 507.2.1.1 requirements.
14. Each hood shall be equipped with Halton Culinary LED Lights (HCL). Constructed from stainless steel frame and Aluminum hosing, the light fitting comprises flush mounted broad beam spots with a diffusion angle of at least 80°. Each light is comprised of a patented mixing chamber and a specific reflector. Both shall provide a good balance between direct and diffuse light components without dazzling the staff to mitigate eye fatigue. The shielding angle shall exceed DIN 12464-1 requirement and be at least 30°. The illuminance on the working surfaces shall be 50-foot candles with a CRI Color Rendering Index greater than 80. The wattage per fixture will be 14W, and provide code required 50-foot candles at the cooking surface. The LED's lifetime shall be 50,000 hours. The internal power supplies shall have at least the same lifetime. They shall enable switching on/off or dimming the light (0-100%) with one or several switches. The lights shall be supplied with vapor proof, grease proof, and heat proof UL-listed designed specifically for commercial kitchen hood application.
15. All light fixtures shall be wired in a concealed manner to a junction box on top of the hood for connection to the light switch. All wiring is in accordance with the National Electric Code (NFPA 70).

4.21 ITEM 52– Fire Protection System

A. Ansul R-102 (or equal) Ansul Fire Protection System

1. The hoods shall include factory installed complete Ansul R-102 fire suppression system. System shall include Ansul test and permit fees. The Ansul system cabinet shall be located as shown on contract drawings. Wiring from Ansul tanks located in cabinet to manual pull stations to be done by Contractor in field.
2. Ansul R-102 fire extinguishing system shall protect kitchen hood against grease fires by a completely automatic fire control system of the wet chemical type.

3. Fire detection system shall be capable of detecting fire in the hood, duct, or surface equipment and shall automatically discharge liquid extinguishing agent into the plenum chamber, exhaust duct collar, and cooking appliances areas to ensure against re-ignition or re-flash.
4. System components shall include a spring-loaded release mechanism, agent tank brass nozzles with blow off caps and stainless steel (chrome-plated) appliance drops, fusible link detector, wall mounted emergency pull stations, wall mounted Automan and cabinet, and a mechanical gas valve installed in the gas line serving the cooking equipment (valve provided by fire protections system manufacturer and installed in gas line by plumber.)
5. System installation shall be done by an authorized representative of the system manufacturer and conform to UL 300 requirements and local codes.
6. Automatic actuation shall be by means of fusible with no visible conduit. System shall include an electrically actuated release mechanism.
7. Microswitches shall be furnished as part of the fire protection system for tie in of building alarm and for makeup air/fire/fuel shut down.
8. All access openings, holes, sleeves, chases, etc., in building structure necessary to permit piping and control tubing to be run between system unit, ventilator and duct work are to be provided by the Contractor.
9. The Contractor is to furnish a control relay to detect operation of the system by connection to the microswitches supplied. The Contractor is to furnish and install all wiring required for the system specified.
10. All exposed piping and nozzles of fire protection system shall be chrome or Stainless steel sleeved.
11. All horizontal piping is to be done on the top of the ventilator unless otherwise specified.
12. Verify location of remote manual pull station.
13. Contractor to provide shunt trip breaker.

4.22 ITEM 022 – Cup Dispenser / Lid Organizer

- A. Serve-Sense, KleanTake, Countertop cup and lid dispenser, 8-slot, Dimensions: 12.25(w) x 23.8(d) x 25.5(h), color: black, Cup-capacity 8 - 44oz., Gasket dispenser mechanism, adjustable.

4.23 ITEM 023– Point-of-Sale Unit

- A. This item is to be furnished by Owner
- B. Contractor to coordinate installation and provide all connections as required, inclusive but not limited to power, data, etc.

4.24 ITEM 024 – Equipment / Work Table

- A. Custom Model by MARLO: (or equal) Size and shape as shown on drawings (approximately 50"(l) x 30"(d) x 36" high). Table shall be constructed of 14-gauge 304 stainless steel top with fully enclosed 6" high backsplash. Provide channel underbracing, cross bracing and sound deaden top. Provide with a tier of three (3) S/S drawers. 24" wide 16-gauge two tier over shelf remaining length of table, mounted on S/S tubular uprights with concealed fasteners. NSF & UL Listed.

4.25 ITEM 025– Shelving Units – (2Lot) Required

- A. Four tier Metro Model A----NK3 (or equal) Super Adjustable Super Erecta® Shelf, wire, Metroseal 3 (corrosion-resistant) finish, corner release system, with Microban® antimicrobial protection, NSF.
- B. Each shelving unit shall have four (4) Model 74PK3 (or equal) Super Erecta® SiteSelect™ Post, 74-5/8"H, adjustable leveling bolt, posts are grooved at 1" increments & numbered at 2" increments, double grooved every 8", Metroseal 3™ epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection. Shelving shall be provided as shown on drawing (No "S" clips allowed), it shall be the responsibility of this contractor to verify and adjust shelving sizes to insure proper fit.

PART- 5 CONDITIONS

5.1 EXISTING CONDITIONS:

- A. It is the responsibility of this contractor to fully review the existing conditions of the building and the new kitchen location. This contractor shall be familiar with access to the kitchen location, including equipment access by elevators, stairwells, corridors, openings, including access around the exterior of the building for a crane or hoisting equipment (if required). It will be the responsibility of this contractor to coordinate equipment installation with the owner, CM, GC, etc.

PART- 6 DETAILS OF CONSTRUCTION

6.1 DETAIL DRAWINGS

- A. The following details are a part of these specifications and shall be referred to for additional design requirements:

END OF SECTION 11 4000

PART- 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Refer to other sections of the specification, drawings and details to determine type and extent of work there is affecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and material required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. Work Included
 - 1. Plastic laminate wood cabinets.

1.3 QUALITY ASSURANCE

- A. Kitchen Cabinet Standard: ANSI A161.1.
- B. Field Measurements: Verify cabinet dimensions to field measurements, finish wall to finish wall.

1.4 SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturer's technical product data and installation instructions indicating materials, hardware and finishes used in fabrication of kitchen cabinets as required to show compliance with specifications.
- B. Shop Drawings:
 - 1. Submit shop drawings indicating location and size of each type of cabinet, accessories, materials, finishes, hardware types and locations, fillers, etc. Including fully dimensioned plans and elevations and indicate details of anchorage to countertop and to walls.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Protect cabinets during transit, delivery, storage and handling to prevent damage, soiling and deterioration.
- B. Do not deliver cabinets until painting, wet work, grinding and similar operations, which could be performed before installation of cabinets, have been completed in installations areas.

1.6 JOB CONDITIONS

- A. Conditioning:
 - 1. Comply with cabinet manufacturer's recommendations for temperature and humidity requirements in cabinet installation areas. Do not install cabinets until required temperature and relative humidity have been stabilized and will be maintained in installation areas.
 - 2. Maintain temperature and humidity in installation areas as required to maintain moisture content of installed cabinet work within a tolerance range of the optimum moisture content acceptable to cabinet manufacturer, from date of installation through remainder of construction period.

PART- 2 PRODUCTS

2.1 MANUFACTURERS

- A. Custom Millwork:
 - 1. Style: Similar to existing cabinetry which is to be removed, plastic laminate as per details on drawings.
 - 2. Plastic Laminate
 - a. Manufacturer: Wilson Art
 - b. Color: Silver Oak Ply #8203
 - c. Grain Orientation: Vertical

2.2 MATERIALS

- A. Accessories:
 - 1. Heat Shield Strips use where doors are near heat producing appliances.
 - 2. Door Pulls
 - a. Liberty 3in Stainless Steel, model #P13456L-SS-U1

3. Frame Hinge – Soft close.
 4. Shelf Pin – PINSHLF
- B. All other accessories as may be required.

PART- 3 EXECUTION

3.1 INSPECTION

- A. Inspect substrate and conditions under which cabinets are to be installed. Do not proceed until all unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Install cabinets plumb, level, true and straight with no distortions. Shim as required using concealed shims. Where kitchen cabinets abut other finished work, scribe and cut for accurate fit. Provide filler strips, scribe strips and molding as indicated or required and in finish to match cabinet face.
- B. Anchor cabinet securely in place with concealed (when door and drawer are closed) fasteners, anchored into structural support members of wall construction. Comply with manufacturer's instructions for support of units.
- C. Complete hardware installation and adjust doors and drawers for proper operation.

3.3 CLEANING AND PROTECTION

- A. Repair or remove and replace defective work as directed upon completion of installation.
- B. Clean exposed and semi-exposed surfaces, touch-up finish as required. Remove and refinish damaged or soiled areas.

END OF SECTION 12 3530

COUNTY OF ALBANY

REQUEST FOR BIDS SHAKER PLACE NURSING AND REHABILITATION CENTER



RFB #2024-150

SHAKER PLACE CAFÉ PROJECT

VOLUME 3

**ALBANY COUNTY DEPARTMENT OF GENERAL SERVICES
PURCHASING DIVISION
PAMELA O NEILL, PURCHASING AGENT
112 STATE STREET, ROOM 1000
ALBANY, NY 12207**

**ALBANY COUNTY SHAKER PLACE REHABILITATION
& NURSING CENTER CAFÉ RENOVATION
ALBANY, NEW YORK**

October 6, 2023

OWNER

County of Albany
Shaker Place Nursing Home
Albany, New York

ARCHITECT

Angerame Architects, P.C.
30 Essex Street
Albany, New York 12206
(518) 454-9300

STRUCTURAL ENGINEER

MRH Engineering, P.C.
20 Bayberry Drive
Queensbury, New York 12804
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**MECHANICAL/PLUMBING/
ELECTRICAL ENGINEER**

Engineered Solutions
646 Plank Road, #104
Clifton Park, New York 12065
(518) 280-2410

VOLUME 3

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PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including all General Conditions, Supplementary Conditions, Division 1 specification sections as well as Information to Bidders requirements that are included in the project documents, apply to the work of this Contract.

1.02 ALLOWANCES, ALTERNATES AND UNIT PRICES

- A. Refer to Division 1 specifications for allowances, alternates and unit prices required as part of this Contract.

1.03 INTENT

- A. The intent of the drawings and these specifications is to provide all systems complete and operative. Whether indicated on the drawings and/or included in the specification or not, provide all materials, equipment and labor usually furnished with such systems.

1.04 DEFINITIONS

- A. Provide: Furnish, install and connect.
- B. Furnish: Supply material only.
- C. EXR: Existing to remain.

1.05 SCOPE OF WORK

- A. Drawings and specifications are complementary and must be so interpreted to determine the full scope of work under this section. Wherever any material, article, operation or method is either specified or shown on the drawings, this Contractor is required to provide each item and perform each prescribed operation according to the designated quality, qualification or condition, furnishing all necessary labor equipment and incidentals.
- B. Specifically included, without limiting the generality of drawings and specifications are:
 - 1. Plumbing fixtures and trim indicated.
 - 2. Valves where indicated.
 - 3. Connection to equipment "by others" as indicated.
 - 4. Hot and cold water lines, recirculating lines.
 - 5. Sanitary drainage and vent lines.
 - 6. Connection to existing water and sewer mains.
 - 7. Thermal insulation on hot and cold water systems.
 - 8. Remove existing plumbing fixtures where indicated.
 - 9. Remove existing plumbing piping systems and equipment where indicated.
 - 10. Sprinkler system.
 - 11. Tests: This contractor shall furnish materials, equipment and labor and shall perform all work of testing of the plumbing systems as outlined hereinafter. Testing procedure shall include installation tests and operating tests.

1.06 TEMPORARY SERVICES

- A. Temporary Heat: In accordance with Architect's specifications and/or conditions, contractor shall have the permanent heating system capable of providing heat to the new work areas when required. The term heating system shall include all work or components necessary to operate heating system. For temporary usage, it is not required that this work be in a finished condition, i.e., covers in place, etc. Cost of fuel consumed for temporary heat from permanent systems only shall be paid by owner.
- B. The use of permanent system will be allowed only if the building is fully enclosed with no construction dust to clog heating/cooling coils, heat recovery components, fans, etc.
- C. At the completion of work, Contractor shall turn over to the Owner all equipment used for temporary heat in a new, as purchased condition. Contractor shall replace filters with new ones, clean all components which shall include: unit casings, ductwork, grilles, diffusers, etc., re-lubricate all moving parts, replace belts if required and perform any other work necessary (as determined by Architect and Engineer) to put equipment in a "new" condition.
- D. Contractor shall take all measures necessary to insure that dust, dirt, or debris does not enter air systems while in operation for temporary heat and shall change filters as often as necessary. Under no circumstances shall air handlers be allowed to operate with no filter in place.

1.07 CONTINUITY OF UTILITY SERVICES

- A. It is of paramount importance that each utility service operate continuously and without interruption. Whenever this contractor plans to make changes or alterations to any existing utility service, such plans shall result in no or minimum service interruption or inconvenience to Owner. This contractor shall plan and schedule any change or alteration to an existing utility service with Architect and Owner. Such planning, timing, and/or scheduling shall be approved by both these parties.

1.08 CODES AND STANDARDS

- A. All materials, equipment, and installations by this contract shall be in accordance with the latest editions of the following applicable requirements:
 - 1. 2020 International Building Code, including all applicable amendments supplements to the following:
 - a) 2020 International Building Code
 - b) 2020 International Existing Building Code
 - c) 2020 International Fire Code
 - d) 2020 International Plumbing Code
 - e) 2020 International Mechanical Code
 - f) 2020 International Fuel Gas Code
 - 2. 2020 Supplement to the New York State Energy Conservation Construction Code including all applicable amendments to the following:
 - a) 2020 International Energy Conservation Code
 - b) 2020 ASHRAE 90.1
 - 3. 2020 Uniform Code Supplement (May 12, 2020)
 - 4. Lead testing in school drinking water (10 CRRNY 67-4)
 - 5. Conform to requirements of NEMA.
 - 6. Liquefied Petroleum Gas Code - NFPA 58.
 - 7. Bear label of Underwriters Laboratories, Inc.
 - 8. National Electrical Code NFPA Article 70, latest edition.
 - 9. New York State Health Code.

10. Local Utility Standards.
11. Local Municipal and/or City Standards.
12. Industrial Code Rule #4 and #14 (12NYCRR 4 and 14) (Standards for Boiler Installation).
13. Conform with applicable requirements of ASTM - Regulations and Standards for Pipe and Pipe Fittings.
14. Be in accordance with USAS - Code for Pressure Piping, latest edition.
15. For external and internal pipe insulations, have flame spread rating of 25 or less and smoke developed rating of 50 or less when tested in accordance with ASTM Standard E84.
16. Sheetmetal and Air Conditioning Contractor's National Association, Inc. (SMACNA), latest editions.
17. Conform with applicable requirements of Standard for the Installation of Air Conditioning and Ventilating Systems, NFPA 90A, and Code for Safety to Life from Fire in Buildings and Structures, NFPA 101.
18. Be in accordance with design standards outlined in ASHRAE Handbooks, latest edition.
19. Conform to requirements of Owner's insurance carriers.

1.09 SUBMITTALS AND SUBMISSION REQUIREMENTS

- A. All submittals shall be in accordance with Division 1 requirements, the following requirements listed below, and also as indicated in each specification section. All submittals not complying with the listing above will be returned to the contractor without being reviewed. Rejection by Architect or Engineer of any items submitted shall require resubmittal of acceptable items.
1. Within (30) days after receiving signed contract or notice to proceed, submit to Architect for review complete descriptive dimensional data and ratings for equipment and materials proposed to be furnished and installed. Submit (8) copies of data unless otherwise specified by the architect.
 2. All materials submitted shall clearly state the job name and specification section(s) that it applies to.
 3. Any package containing more than one piece of equipment or material shall also contain a schedule clearly listing all items in submittal. Schedule page(s) shall also indicate project name and building name.
 4. All submittals must be clearly marked using nomenclature used in this specification for proper item identification, schedule of usage's, model numbers, construction materials, performance, data, etc.
 5. Projects involving multiple buildings must have the submittals separated by building. Submittals in which buildings are combined will not be accepted. (Exception: When specifically approved by engineer, basic materials may be submitted once.)
 6. The contractor shall verify and insure that dimensions and elevations of equipment and structures to be used conform to the space allocated for the equipment on the drawings, and complies with existing conditions.
 7. Submittals traced or copied from contract drawings are not acceptable and will be returned without review.
 8. In the event material and/or equipment is installed prior to obtaining approval of shop drawings, and in the sole opinion of the Owner's Agent, this material and/or equipment does not meet the specifications, the Contractor shall be liable for the removal and the replacement at no additional cost to the contract.

- B. Samples: When requested by Engineer, provide samples of both specified equipment and proposed substitutions for review by the Owner's Agent. Such equipment shall be delivered to a location designated, or erected at the job site as directed. When neither is physically possible, arrange for the Owner's Agent to visit an acceptable site where the proposed equipment can be inspected.
- C. Substitutions:
 - 1. Submittals for equipment or materials other than as specified shall be accepted for review by the Owner's agent.
 - 2. Approval of substitute equipment shall be based on functional, physical and aesthetic compatibility to the equipment specified as determined by the Owner's agent and approved by the engineer.
 - 3. Where substitute equipment is approved, the contractor shall be responsible for, and bear the cost of any necessary changes by his trade or other trades to make the system complete and operable.
 - 4. Contractor is fully responsible for providing coordination between all trades affected by equipment substitution.
 - 5. When requested, contractor shall submit layout drawings indicating new dimensions and arrangements of substituted equipment. Layout drawings shall indicate all revisions necessary for all services affected by substitution.

1.10 SUBSTANTIAL COMPLETION REQUEST FOR PUNCH LIST

- A. Contractor shall submit a letter in email form stating that the work is substantially complete and ready for Punch List review by Engineer.
- B. Contractor shall note which areas are substantially complete by Building (if multiple buildings) and by Area according to the Key Plan.
- C. Contractor shall list all items that are known to be incomplete at time of submission.
- D. If the request is for a partial Punch List, Contractor shall also include a list of room numbers/room tags.
- E. When letter is received by the Engineer, site review(s) will be coordinated with the Construction Manager, Clerk, Architect.

1.11 CUTTING AND PATCHING

- A. This contractor shall bear the cost of all cutting and patching required by and for the installation of this work. This contractor shall perform all cutting and patching unless otherwise indicated on drawings or if directed by the Architect.
- B. Patching of fire rated floors, walls, partitions, etc. shall be made using new materials equal to the fire rating of the existing.
- C. Should changes, omissions or errors in this contract's work require cutting, patching or making alterations in any portion of new construction, such work will be performed by GC at this Contractor's expense.

- D. Cutting and patching of roof surfaces and structures shall only be performed by a qualified contractor, as approved by the Architect. The work of this contract shall bear the cost of above mentioned cutting and patching. This contractor shall insure that existing roof warranties remain in force.
- E. This contractor shall furnish lintels, sized to accommodate structure above opening, where cutting and patching is to be performed on load bearing walls. Contractor shall obtain written approval for all lintels prior to installation.
- F. Cutting shall be done in a manner which will not adversely affect the strength of the building. Holes and openings shall be neatly cut so as to provide a finished appearance and shall be patched around the edge where required for a finished appearance. Provide temporary bracing, shoring, etc. as required.
- G. Patching shall be structurally sound and match the existing materials and finish of adjacent materials. Patching is required in finished areas, wherever existing work is removed, at the sides of openings, etc.
- H. At the completion of the work, all evidence of alteration will be as inconspicuous as possible.

1.12 FIELD INSPECTION

- A. As there are various conditions at the site which do not show on the accompanying drawings, or which are at variance with the conditions indicated on the drawings, it is important that each bidder visit the site and acquaint himself with existing conditions, and take these conditions into consideration when preparing his proposal. Each bidder shall obtain information or make any measurement desired. Lack of knowledge relative to existing conditions will not be allowed as a basis for extra compensation.
- B. This contractor and his subcontractors shall inspect existing equipment to remain prior to any of his new work in order to determine that all equipment is in good operating condition. If equipment is found to be lacking components, is inoperable, damaged, etc., contractor shall provide immediate written notice to the Owner. The Owner or his representative shall determine if any additional work is necessary and the method by which any work shall be performed.

1.13 INSTRUCTION SERVICES AND MANUALS

- A. Instructions:
 - 1. Provide competent personnel to remain at the jobsite for necessary time to instruct the Owner's personnel in proper operation and maintenance of installation made by this contractor.
 - 2. This contractor shall be responsible for notifying and instructing Owner's personnel on all equipment operations, maintenance requirements, etc. Furnish operating training session(s) for equipment listed.
 - 3. The Owner shall be responsible for establishing an operating and maintenance program for all equipment listed.
- B. The instruction shall include the following types of information:
 - 1. System overview
 - 2. Major component designation
 - 3. System operation procedures
 - 4. Maintenance scheduling and procedures
 - 5. Provide a list of spare components each system would normally require

- C. Services: Provide services required, for all equipment specified under this contract, for a period of (1) year after written acceptance by the Owner.
- D. Manuals: Submit (3) sets of Operation and Maintenance manuals. Each set shall contain the manufacturers' data, operating instruction parts catalog and maintenance procedures for each piece of equipment. Include normal maintenance servicing schedule to be performed by the Owner.
 - 1. For projects containing multiple buildings, manuals shall be submitted separately for each building.

1.14 PERMITS, CERTIFICATES AND FEES

- A. This Contractor shall obtain and pay for permits, certificates, fees etc. listed below. Costs for permits, fees etc. shall be included in the Base Bid amount.
 - 1. All required applications and permits to begin work
 - 2. Certificate of inspection including Third Party Agent
 - 3. All municipal connection charges
 - 4. All local utility charges (gas etc.)
 - 5. Fees and charges shall be obtained directly from the respective authority having jurisdiction.

1.15 REMOVAL, DISPOSAL AND HAZARDOUS MATERIALS

- A. All removed equipment shall be removed from the site and properly disposed of.
- B. All hazardous materials must be disposed of in compliance with ENCON and all other regulatory agencies.
- C. The Owner may wish to keep certain equipment, therefore, check with Owner before removals to determine what may be salvageable.

1.16 GAURANTEE

- A. Contractor shall guarantee all work furnished through this contract including work performed by sub-contractors, for a period of (1) year (unless otherwise noted), from the date of final acceptance. Contractor agrees to repair or replace any defective work or materials at no additional cost to the Owner. Contractor shall also pay for any damage to other work resulting from repairs to defects. Contractor shall furnish written guarantees to the Owner's agent in accordance with the general conditions.

1.17 INSTALLATION

- A. This contractor shall coordinate scheduling and installation of work with other contractors, sub-contractors and other trades. The contractor is also required to coordinate all work with owner supplied materials, direct contracts, and normal building operations, if any.
- B. All finished work shall be neat and workmanlike. All work of a special nature shall be performed by skilled and qualified workmen who can present credentials showing experience in said trade. New systems shall be delivered to Owner complete in perfect working order, tested and balanced in full accordance with plans and specifications. Existing systems shall function in same manner as before this work was performed. Any malfunctions which arise in existing systems as a result of demolition or alteration of parts of such systems shall be corrected.

- C. Layout of equipment, accessories and piping systems in plan is generally diagrammatic unless specifically dimensioned or detailed. Check project drawings and existing site conditions before installing work for interference's as governed by structural or other conditions. Owner reserves the right to make reasonable changes in location of equipment, accessories or piping systems prior to "roughing-in" without involving additional expense. Exact dimensions shown upon plans will be subject to verification and confirmation of exact conditions at site at time of construction. "Plus or minus" dimensions are shown upon drawing as a guide only. Exact surrounding conditions are governed by final equipment selection and/or other like details.
- D. Furnish all new equipment and materials as described herein. Any material, operation, method or device mentioned, listed or noted within this specification, if not specifically mentioned as furnished or installed by others, shall be furnished and installed by this contractor.

1.18 TESTING AND INSPECTION

- A. Inspections required for any ordinances, regulations, instructions, laws, rules, standards and practices that require any work to be inspected or tested shall be performed. Contractor shall give Owner, Architect and Engineer timely notice of readiness of work for inspection or testing and the date fixed for said inspection or testing.
- B. Third-Party Agency must inspect completed installation and present Owner with Certificate of Inspection showing approval.
- C. Required local or municipal inspection processed and present Owner with certificate indicating approval of such governing bodies.
- D. Contractor shall submit a written report to Architect, copy to Engineer, on results of each inspection or test on system or equipment supplied. Report shall contain all pertinent information, recommendations, approvals, additional work required, etc.
- E. Tests:
 - 1. After installations are completed and before insulation is applied, walls are closed, or trenches backfilled, all portions of the installation shall be tested in accordance with the procedures described herein.
 - 2. Provide hydrostatic pressure test for storm water sanitary and vent pipe with 10' or more developed length. Test pressure shall be a minimum of 10' water column at all points except the upper most portion of the roof vent or drain terminal. Piping shall be tested in sections with approved test plugs, duration of the test shall be one hour. In addition to the pressure test described above, Contractor shall provide a flow test for each section of the plumbing drainage systems to verify that there are no blockages. All pipes must be exposed during testing unless otherwise approved by Engineer.
 - 3. Interior domestic water piping shall be tested at 125 psi pressure. Contractor shall fill piping at the beginning of working day and maintain pressure for two hours with no pressure loss. If no leaks are found, the piping shall be allowed to remain under pressure overnight and then be inspected the next morning. No insulation shall be applied to the piping until the test is complete.

1.19 RECORD DOCUMENTS

- A. When required by general conditions or other Division 1 Section this Contractor shall prepare and turn over to Owner's agent record As-built documents. As-built drawings will include actual equipment location layout, service connections, ductwork and piping layouts, valve locations, etc.
- B. In all projects, contractor shall provide record drawings of all underground equipment and service runs. As-built drawings for underground work will include dimensions to actual locations finish grade elevations, and actual invert to underground structures equipment and service runs.

1.20 IDENTIFICATION AND NAMEPLATES

- A. Provide engraved plastic labels screwed to equipment furnished under this contract including control panels, starters, switches, panels, etc. Labels shall have black background, white letters; minimum letter height 3/8" high, self adhesive labels or punch tape type labels are not acceptable.

1.21 PENETRATIONS THRU FIRE RATED CONSTRUCTION

- A. All penetrations by this contract through rated construction shall be sealed fire safe by a UL listed approved method.
- B. All piping penetrations through walls, floors, etc. shall be sleeved.
- C. All piping penetrations through fire rated partitions, walls, floors, etc. shall be installed as follows; penetration shall be oversized 1/2" to 3/4" maximum. This contractor shall pack with fireproofing insulation, type FS cerablanket. Outside of penetrations (exposed surfaces around pipes and ductwork) shall be caulked and sealed with flame stop V, as manufactured by Flame Stop, Inc.; or an approved equal. Flame stop sealant shall be troweled smooth for finishing as required.

1.22 CONFINED SPACES

- A. All work in pipe tunnels, mechanical pits, well manholes, etc. shall be performed by skilled tradesman and laborers with current certification for working in confined space. Contractor shall bear all costs to provide all safety equipment, ventilation, etc. as required by State and Federal Regulations and shall obtain all necessary permits for such work.
- B. Contractor shall submit copy of current certifications and photo I.D. of all tradesman and laborers who will be working in confined spaces on this project.

1.23 COORDINATION DRAWINGS

- A. Before construction work commences, Contractors for all trades shall submit Coordination Drawings at not less than 1/4" = 1'-0" scale. Coordination Drawings are required throughout all areas for all trades. These drawings shall identify and show resolutions of trade conflicts. Mechanical Equipment Rooms shall be drawn early in the Coordination Drawing process, simultaneous with all other congested areas. Prepare Coordination Drawings as follows:
 - 1. HVAC Contractor will prepare the base plan Coordination Drawings showing all ductwork and all pertinent piping and equipment. The drawings shall be coordinated with cable tray, lighting fixtures, sprinklers, air diffusers, other ceiling mounted items, ceiling heights, structural work, maintenance clearances, electric code clearance, reflected ceiling plans, and other contract requirements. Reposition proposed locations of work after coordination drawing review by

the Owner and the Architect. Provide adjustments to exact size, location and offsets of ducts, pipes, conduit, etc., to achieve reasonable appearance objectives. Provide these adjustments as part of Base Bid Contracts. Minor revisions need not be redrawn.

2. HVAC Contractor will provide prints and CAD drawings and submit the base plan to all major trades' Contractors.
3. Electrical, Plumbing and Fire Protection Contractors will draft location of piping and equipment on the base plan, indicating areas of conflict and suggested resolutions.

END OF SECTION 22 0010

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including the General and Supplementary Conditions and Division 1 Specifications Sections, apply to the work of this section.
- B. Entire sprinkler system shall be designed to be in compliance with NFPA 13 and shall be approved by the Owners Insurance Underwriter prior to installation.

1.02 SUBMITTALS

- A. All items specified in this section.
- B. Prior to purchasing any equipment or materials, a list of their manufacturers shall be submitted.
- C. Scale drawings indicating invert and sleeve locations, stamped by a Professional Engineer.
- D. Scale drawings showing all piping with sizes, elevations and appropriate indication of coordination with other trades, dimensioned location of each sprinkler head, approval stamp of governing authority.
- E. Catalog information, factory assembly drawings and field installation drawings as required for a complete explanation and description of all items of equipment.
- F. Documents Will Not Be Accepted for Review Unless:
 - 1. They include complete information pertaining to appurtenances and accessories.
 - 2. They are submitted as a package where they pertain to related items.
 - 3. They are properly marked with service or function identification as related to the project, where they consist of catalog sheets displaying other items which are not acceptable.

1.03 NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS

- A. Applicable Publications: The following publications form a part of this specification.
 - 1. No. 13 Sprinkler System
- B. The drawings and information included in this specification are given as a guide only, and they, therefore, do not relieve this Contractor from providing all work and equipment necessary to complete the installation according to the requirements. The number and spacing of sprinkler heads, spacing and size of pipe, location and number of valves, methods of draining lines, alarm valves and all other details and work shall be as required by the ISO, Owner's Underwriters', NFPA, local authorities and all other governing authorities.
- C. In general, sprinklers are to be arranged for coverage in accordance with NFPA #13 for The hazard classification, shown on the plans and hydraulically designed with a uniform density. Variation in discharge from individual sprinklers shall not exceed 15%.

1.04 LAYOUT

- A. Sprinkler heads shall be installed symmetrically, centered in ceiling tiles and coordinated with ceiling light fixtures, diffusers, ductwork, etc.

1.05 FIELD INSPECTION

- A. As there are various conditions at the site which do not show on the accompanying drawings, or which are at variance with the conditions indicated on the drawings, it is important that each bidder visit the site and acquaint himself with existing conditions, and take these conditions into consideration when preparing his proposal. Each bidder shall obtain information or make any measurement desired. Lack of knowledge relative to existing conditions will not be allowed as a basis for extra compensation.
- B. This contractor and his subcontractors shall inspect existing equipment to remain prior to any of his new work in order to determine that all equipment is in good operating condition. If equipment is found to be lacking components, is inoperable, damaged, etc., contractor shall provide immediate written notice to the Owner. The Owner or his representative shall determine if any additional work is necessary and the method by which any work shall be performed.

1.06 CODES, PERMITS AND INSPECTIONS

- A. All work shall meet or exceed the latest requirements of all national, state, county, municipal and other authorities exercising jurisdiction over construction work at the project.
- B. All required permits and inspection certificates shall be obtained, paid for, and made available by the contractor at the completion of the work.
- C. Any portion of the work which is not subject to the approval of an authority having jurisdiction, shall be governed by the applicable sections of the overall National Fire Code, as published by the NFPA.
- D. Installation procedures, methods, and conditions shall comply with the latest requirements of the Federal Occupational Safety and Health Act (OSHA).

1.07 GUARANTEES AND CERTIFICATES

- A. All work shall be guaranteed to be free from leaks or defects. Any defective materials or workmanship as well as damage to the work of all trades resulting from the same shall be replaced or repaired as directed for the duration of stipulated guarantee periods.
- B. The duration of guarantee period following the date of acceptance of the work, shall be (1) one year.
- C. The date of acceptance shall be the date of the final payment for the work or the date of a formal notice of acceptance, whichever is earlier.
- D. Non-durable replaceable items do not require replacement after the date of acceptance. If received in writing, requests to have earlier acceptance dates established for these items will be honored.
- E. Certification shall be submitted attesting to the fact that specified performance criteria are met by all items of equipment.

1.08 RECORD DOCUMENTS

- A. When required by general conditions or other Division 1 Section this Contractor shall prepare and turn over to Owner's agent record As-built documents. As-built drawings will include actual equipment location layout, service connections, ductwork and piping layouts, valve locations, etc.

- B. In all projects, contractor shall provide record drawings of all underground equipment and service runs. As-built drawings for underground work will include dimensions to actual locations finish grade elevations, and actual invert to underground structures equipment and service runs.

PART 2 - PRODUCTS

2.01 PIPING & EQUIPMENT/SPRINKLER & ALARM EQUIPMENT

- A. Products of The Viking Corp., Reliable Sprinkler Corp, Grinnell Co., Inc. or other "equal" manufacturer selected from "List of Approved Equipment and Materials" published by Factory Mutual and shall bear UL approval stamp or label, where applicable. Piping and equipment shall also be listed by a testing agency.

2.02 PIPE, FITTINGS, HANGERS & ESCUTCHEONS

- A. Pipe: All piping material shall be Black Iron according to ASTM A-120 with 1", 1-1/4", 1-1/2", 2", 6" and above being Schedule 40 and 2-1/2" thru 5" being Schedule 10 ASTM A135. As manufactured by Wheatland Tube and US Steel.
- B. Fittings: Pipe 1" thru 2" threaded malleable iron Class 150, ANSI B1603. Pipe 2-1/2" thru 6" threaded malleable iron or Victaulic Quick Vic Rigid Coupling Style 107 for grooved end pipe with ductile iron housing enamel coated and grade EHP-EDPM.
- C. Hangers: All hangers shall and installation shall be in accordance with the requirements of Section NFPA 13 section 3-15. Provide longitudinal and lateral sway bracing. Provide welded flanges on riser at each floor AWS D10.9; Level AR-3.
- D. Escutcheon Plates: At pipe penetrations through wall (Where piping is exposed) provide heavy gauge chrome escutcheons with springs, snap/split retro fit.

2.03 VALVE SEALS, SIGNS, TAGS & CHARTS

- A. Seals: Provide brass cross-link chain, all brass padlock, with keys, copper wire and approved seal, for each manually operated shut-off valve required to be sealed in open position.
- B. Signs: Provide identification signs of standard design, fasten securely at designated locations as per requirements of insuring agency. This shall include "When bell rings...", hydraulic calculation signs, and Inspectors test.
- C. Tags: Provide brass tags about 2" in diameter; stamp with designating numbers, secure 12 gauge copper wire to spindle of all control valves.
- D. Charts: The Contractor shall provide two (2) copies of approved sprinkler system diagram and valve charts giving designating number, function, location of each valve, mounted in painted, glazed frames, hung where directed.

2.04 SPRINKLER HEADS

- A. Provide approved automatic spray sprinkler heads, Reliable Sprinkler Corporation; or equal.
- B. Provide heads and type as scheduled on the plans.

- C. Provide stock of six (6) extra sprinkler heads of each type with cabinet, two (2) sprinkler wrenches in accordance with NFPA Pamphlet No. 13.
- D. Style and finish of sprinkler heads must be selected and approved by the Architect. Submit one (1) sample of each head.

2.05 TEMPORARY PLUGGING

- A. At times when pipe laying is not actually in progress, the open ends of the pipes shall close temporarily with pipe plugs or by other means. If water is in the trench when work is resumed, the trench shall be dewatered and the plugs shall not be removed until all danger of water entering the pipe is past.

2.06 CLEANING LINES

- A. At the conclusion of the work, the Contractor shall thoroughly clean all new pipes by flushing with water or other means to remove dirt, stones, pieces of wood, etc. which may have entered during the construction period. If, after this cleaning, any obstructions remain, they shall be removed to the satisfaction of the Engineer and/or Water District. Pipes shall be flushed at a rate of 2.5' per second for a duration suitable to the Engineer and/or the Water District. The rates of flow required to produce 2.5' per second flushing velocity in different sizes of pipe are as shown in the following table:

Pipe Size (Inches)	Flow Required to Produce 2.5 FPS Velocity (Gallons per Minute)	Hydrant Opening Required At 40 PSI Residual
4	100	One - 2-1/2"
6	220	One - 2-1/2"
8	390	One - 2-1/2"

2.07 HYDROSTATIC TESTING

- A. Testing shall be done within 72 hours of conclusion of installation.
- B. Hydrostatic acceptance tests, consisting of a pressure test and a leakage test, shall be performed on all sections of all water systems installed after the trench has been backfilled. Hydrostatic presumptive tests may be performed when the system is partially backfilled to simply check the work, but acceptance of the system shall be based on hydrostatic test runs on the finished system after it is completely backfilled. All hydrostatic tests shall be performed in accordance with Section 4 of ANSI/AWWA C600-82.
- C. For the pressure test, the system shall be pressure tested by pressurizing to a minimum of 150 pounds per square inch, based on the elevation of the lowest point in the section under test and corrected to the elevation of the gauge. Provisions shall be made to relieve air trapped at high points in the system adjacent hydrants or through taps and corporations stops installed for this purpose by the contractor. After this pressure has been maintained successfully, with further pumping as required, for a period of at least (1) hour, the section under test shall be considered to have passed the pressure test and leakage tests shall then be performed.
- D. Leakage tests shall be performed under a minimum test pressure of 150 pounds per square inch, based on the elevation of the lowest point of the section under test and corrected to the elevation of the gauge. The test section should be limited to a maximum length of about 2000'. The leakage test duration shall be a minimum of two hours after the leakage rate has been stabilized.

- E. The maximum allowable leakage for a (2) hour test per 1000' length of different sizes and nominal laying lengths of pipe shall be as shown in the following table:

Pipe Size (Inches)	Allowable Leakage at 150 PSI (Gallons per 2 Hours per 1000' of Pipe)
3	0.56
4	0.74
6	1.10
8	1.48

- F. All water for tests shall be furnished and disposed of by the Contractor at his own expense. Source and/or quality of the water which the Contractor proposed to use in testing the lines shall be acceptable to the Water District.

2.08 STERILIZATION

- A. All pipes and fittings connected to and forming a portion of a potable water supply shall be sterilized and flushed in a manner acceptable to the Engineer and/or Water District. Sterilization shall be accomplished after the pipe has passed the pressure and leakage tests.
- B. Sterilization shall be performed in accordance with ANSI/AWWA C601-81 (excluding section 5.1 covering the tablet method).
- C. Sterilization shall be accomplished by applying a chlorine solution that will give a 50 ppm chlorine residual throughout the main being disinfected. The chlorine solution shall remain in the water mains for a minimum period of (24) hours. At the termination of this period, the chlorine residual shall be a minimum of 25 ppm. If the residual is less than 25 ppm, the entire procedure shall be repeated. The chlorine solution shall be thoroughly flushed out prior to placing the new section of the main in service. The chlorine solution shall be disposed of in a manner that will in no detrimental way affect fish, plant or animal life.
- D. After the water mains have been flushed with potable water to the satisfaction of the Engineer and/or Water District, samples of water from the mains shall be taken for bacteriological analysis.
- E. The number of samples and their collection point shall be reviewed with and be acceptable to the Superintendent of Water District. The testing laboratory that will do the bacteriological analysis shall be the responsibility of this contractor. The water samples shall test bacteriologically safe before the water mains are placed in service. Certification of testing is required.

2.09 SPRINKLER DRAINS AND TEST CONNECTION

- A. Provide all necessary drain valves, drain risers, capped nozzles, auxiliary piping, etc., as required to drain the system risers and mains and all trapped portions of the system. Drain valves which are not connected to drain pipes leading to floor drains shall be hose type. Provide inspectors test connections at end of system in accordance with NFPA #13.
- B. Note: Sprinkler contractor shall furnish and install all switches. Electrical contractor shall split system zone wire and tie to existing fire alarm system.

2.10 TESTS

- A. Subject sprinkler system to tests required by and in presence of representatives of agencies having jurisdiction.
- B. Provide instruments, equipment; pay expense incurred in making tests; obtain approvals, certificate.
- C. Where evidence of stoppage appears in piping or equipment, disconnect, clean, repair, reconnect obstructed parts; also bear cost of cutting, patching adjoining work necessitated by such cleaning, repairing.

PART 3 - EXECUTION

3.01 INTERIOR PIPING

- A. Run slightly off level to low points, provide drain valve.
- B. All water piping shall maintain electrical continuity with wedges and or straps.

END OF SECTION 22 0300

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.02 SUBMITTALS

- A. All valves other than design equipment.
- B. Operating and Maintenance Instruction Manual and Parts List.

PART 2 - PRODUCTS

2.01 VALVES

- A. General: Valves shall have following requirements:
 - 1. Working pressure stamped or cast on bodies.
 - 2. Ball valves, stem packing, serviceable without removing valve from line.
 - 3. All valves must comply with ANSI 372 for lead free plumbing products.
- B. Make
 - 1. Gate, globe and check valves: Walworth, Stockham, Milwaukee, Nibco.
 - 2. Butterfly Valves: Nibco, Milwaukee, Stockham, Watts.
 - 3. Ball valves: Nibco, Apollo, Milwaukee, Jomar.
 - 4. Balancing valves: Calibrated manual balance valves with memory stop.
 - 5. For convenience in designating type, design, etc., certain numbers are given hereinafter as "Design Equipment."
- C. Valve Types:
 - 1. Ball Valves:
 - a) 2" and Smaller: Bronze body 2-piece full port with chrome plated bronze ball. TFE seats and seals, 600 psi WP, W.O.G. screwed ends; Nibco Model #T-685-80-LF, conforms to MSS SP-110, ANSI 372.

PART 3 - EXECUTION

3.01 GENERAL

- A. Provide valves of type called for and where shown and/or specified, and where required to service equipment whether or not shown.
- B. Provide at all major building or systems sections whether or not shown.
- C. Install all valves with stems at or above horizontal positions and all swing check valves in horizontal position only.

- D. Ball valves may be used in place of gate valves for water service through 2" size at contractor's option, unless otherwise noted.
- E. Provide new valves (size to match existing) for any existing non-operational valves which are required to allow for new installations to be made.

3.02 PLUMBING SYSTEM

- A. Install valves on all branch lines leaving mains and serving two fixtures or more; to isolate each piece of equipment or fixture, for future connections and where indicated.
- B. Use balancing valves on domestic water re-circulation lines.

END OF SECTION 220523

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.02 IDENTIFICATION

- A. Pipe Identification Markers: Furnish and install pipe identification markers on all piping installed under this contract, to consist of self-adhesive labels of black letters imprinted on color coded background indicating pipe fill and direction of flow. Lettering shall be 2" high on pipes 3" in diameter and over and 3/4" high on pipes under 3". Markers shall be applied to pipe, or to insulation in case of insulated pipes, on 15' centers, at branch take-offs and at each valve, whichever is closer.

- B. Refer to schedule below for piping system, background color and lettering color.

- C. Pipe Identification Schedule

	<u>System I.D.</u>	<u>Background</u>	<u>Lettering</u>
1.	Domestic Cold Water	Green	White
2.	Domestic Hot Water	Yellow	Black
3.	Domestic Hot Water Recirculation	Yellow	Black
4.	Sanitary Sewer	Green	White
5.	Sanitary Sewer Vent	Green	White
6.	Condensate Drainage	Yellow	Black
7.	Fire Protection Water	Red	White
8.	Fire Sprinkler Water	Red	White

- D. Equipment Nameplates and Valve Tags: Identify each valve, control entity or piece of equipment with stamped brass or engraved plastic nameplate permanently attached by riveting, wiring, etc. Set up complete identification system in accordance with Owner's Physical Plant Department. Each drain plug or valve shall be tagged "DRAIN". Embossed and/or pressure sensitive plastic tape labels shall not be acceptable. Furnish engraved 2" x 1" black rigid laminated plastic nameplate for each motor starter to EC for mounting. Furnish framed valve chart indicating valve number, location and usage for all valves installed under this contractor.

END OF SECTION 220553

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.02 SUBMITTALS

- A. Manufacturer data for all materials used in Contract.
- B. Submit schedule of insulation applications.
- C. Samples, only when requested.

1.03 QUALIFICATIONS

- A. Installation of thermal insulation shall be made by competent mechanics regularly employed by and under the direct supervision of a qualified, approved insulation subcontractor.
- B. All materials shall be installed per manufacturer's written recommendations and specifications.
- C. All insulation, jackets, adhesives, and coatings, unless specifically modified, shall comply with the following:
- D. Any treatment of jackets or facings for flame and smoke safety must be permanent. Water soluble treatments prohibited.
- E. Insulation, including finishes and adhesives on the exterior surfaces of ducts, pipes, and equipment, shall have a flame spread rating of 25 or less and a smoke developed rating of 50 or less as determined by an independent testing laboratory in accordance with American Society for Testing and Materials Standard E 84, NFPA 255 and UL 723. Also, same shall comply with NFPA 90A, when installed in air plenums.
- F. Work shall not commence until building is enclosed and roofs are watertight. Obtain approval from Architects before commencing work.

PART 2 - PRODUCTS

2.01 PIPE INSULATION (RIGID TYPE)

- A. Pre-formed rigid sectional pipe covering, with factory applied jacket. Material, jacket type and thickness as specified hereinafter.
- B. Insulation Material: Fiberglass.
- C. Conductivity: Maximum thermal conductivity (k), on a flat surface, shall be 0.25 Btu/sq. ft. hr. °F/inch mean temperature.
- D. Jackets: White Kraft outer surface bonded to aluminum foil and reinforced with fiberglass yarn permanently treated for fire and smoke safety and to prevent corrosion of the foil.

2.02 ACCEPTABLE MANUFACTURERS

- A. Fiberglass: Johns-Manville, CGS, (Certainteed), Owens-Corning, Knauf.
- B. Adhesives: Benjamin Foster or equivalent. Benjamin Foster (BF) numbers are used, unless otherwise noted, for convenience in designating quality of adhesive.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

- A. "Concealed" is generally intended to mean Work within or behind various construction elements, either fixed or removable, or in crawl spaces or trenches, which are not exposed to view when project is complete.
- B. "Exposed" is generally intended to mean anything exposed to view when project is complete; as opposed to "concealed."
- C. Provide Thermal Insulation:
 - 1. Insulation is required on all piping unless otherwise indicated on Contract Documents.
 - 2. Only on clean, dry surfaces and after piping ductwork and equipment have been tested and found to be tight.
 - 3. On cold surfaces with continuous unbroken vapor seal.
 - 4. All exposed surfaces shall be white.
 - 5. Pipes individually insulated.
 - 6. Domestic cold water, hot water and hot water return piping-hanger installed around piping insulation. Provide insulation shields.
 - 7. On Sanitary drains for fixtures accessible to the disabled.
 - 8. On all roof drain bodies and storm water piping.
- D. Miscellaneous:
 - 1. Install insulation on exposed hot and cold plumbing piping to within 18" of fixture or equipment connection.
 - 2. Insulate hot and cold piping longer than 18" located inside sink cabinets, under counters, under tables, etc.

3.02 PIPE INSULATION (RIGID TYPE)

- A. Apply insulation on all systems piping including fittings, flanges, unions, strainers, and other miscellaneous attachments installed in piping system, whether exposed or concealed, except where omitted or specified to contrary.
- B. Any piping in exterior walls, spaces, overhangs, attics, or where subject to freezing: Insulate pipe with double the thickness specified. Where in wall chases: In addition to the above, pack chase with loose glass fiber insulation.
- C. Hanger Shields: Required on all piping.

D. Joints in Section Pipe Covering Made as follows:

1. Standard: Longitudinal laps and butt joint sealing strips cemented with BF 85-20 or Armstrong 520. May be stapled with outward clinching staples where concealed or recovered. Factory applied pressure sensitive adhesive lap seal may be used at contractor's option. Adhesive shall be in two strips -- one, applied to the longitudinal jacket and the other on the opposing jacket surface.
2. Vapor barrier: Provide for all cold services. Longitudinal laps and 4" vapor barrier strip at butt joints shall be sealed with white BF 85-20 or Armstrong 520. Seal ends of pipe insulation at valves, flanges, and fittings and at butt joint approximately every 21' with white BF 85-20.

E. Fittings, Valves and Flanges:

1. Concealed & Exposed: Premolded fitting covers of the same material and thickness as the adjacent pipe insulation and finished with glass cloth applied and coated with BF 30-36 "Seal-Fas".
2. Optional: In lieu of the standard method above, the Contractor has the option of using "Zeston" methods, or Ceel-Tite System provided:
 - a) Appearance and workmanship are acceptable to the Architects.
 - b) Insulation values at least as great as specified must be maintained.
 - c) Application details and manufacturer specifications shall be followed and are hereby made a part of the Contract Documents.

3.03 PIPE INSULATION MATERIALS

A. Schedule of Piping Insulation:

Schedule of Piping Insulation

Service	Material	Insulation Thickness
Domestic Cold-Water	Glass Fiber	All Sizes – 1"
Domestic Hot Water	Glass Fiber	105-140 deg. F = 1" 141-180 deg. F = 1.5"
Domestic Hot Water Recirculation	Glass Fiber	105-140 deg. F = 1" 141-180 deg. F = 1.5"
Roof Drains, Storm and Drainage Piping	Glass Fiber	All Sizes – 1/2"
Condensate Drainage Piping	Glass Fiber	All Sizes – 1/2"

- B. Note: Jacket material, finish, fitting covers, etc. (for all piping) shall be as specified for "exposed" and/or "concealed" application. Color shall always be white unless specifically approved otherwise.
- C. Insulation Covers for Piping and Pipe Fittings: Provide PVC (Zeston) type insulation covers for all exposed insulated pipe and pipe fittings, other than Mechanical Rooms. Cover shall be fastened with a vandal resistant system and as specified.
- D. Cover system shall be installed from floor to ceilings, complete. In areas where a ceiling is not present cover system shall be provided from the floor to 10' 0" above finished floor.

END OF SECTION 22 0715

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.02 SUBMITTALS

- A. All items specified in this section under Part 2 - Products.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All pipe and fittings new and marked with manufacturer's name; comply with applicable ASTM and ANSI Standards.
- B. All water piping fittings must comply with ANSI 372 for lead free plumbing products.

2.02 COPPER PIPE AND FITTINGS

- A. Pipe: Hard temper, ASTM B-88; Type K, L, M, or DWV, as called for. Soft temper only in specific cases. Plans show copper tube sizes.
- B. Tees, Elbows, Reducers: Wrought copper or cast bronze; solder end connections; ASTM B-62, ANSI B16.22. mechanical fittings ASTM B-88
- C. Unions and Flanges: 2" and smaller use unions, solder type, cast bronze, ground joint, 150# swp; 2-1/2" and over use flanges, cast bronze, companion type, ASME drilled, solder connection, 150 swp. Bolts shall be same as for steel pipe.
- D. Press Fittings: Bronze or copper shall conform to the material requirements of ASME B16.18 or ASME B16.22, and the performance requirements of IAPMO PS117, and ICC LC1002. Press fittings 1/2-inch thru 4-inch for use with ASTM B88 copper tube type K, L, or M and 1/2-inch up to include 1-1/4-inch annealed copper tube. Press fittings shall have either an EPDM, FKM, or HNBR sealing element and integral detection feature intended to identify un-pressed fittings. 2-1/2-inch thru 4-inch shall have a 420 stainless steel grip ring, PBT separator ring, EPDM or FKM sealing element and integral detection feature. Sealing elements shall be factory installed and shall be verified for the intended use.
 - 1. Note: Only Press fittings with EPDM sealing element that conform to NSF 61-pw shall be installed in a potable water system.
 - 2. Acceptable Manufacturers: Veiga ProPress, ApolloPRESS or Nibco.

2.03 SOIL PIPE AND FITTINGS

- A. All cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and be listed by NSF International.
- B. Pipe: ASTM A-74 service weight cast iron, coated.

- C. Fittings: Service weight type with neoprene gasket of same manufacturer as piping, acceptable for piping buried only in earth.
- D. No-Hub (Above Grade Only):
 - 1. Pipe: ASTM C-564 no-hub cast iron, coated.
 - 2. Fittings: Cast iron no-hub pattern with heavy-duty rubber gasket and stainless steel clamp assembly. Mission Rubber or equal. ASTM # 1540, ASTM C564.

2.04 DIELECTRIC PIPE FITTINGS

- A. Tensile strength, Federal Specification WW-U-531A, union or flange design, 250 psi pressure rating, threaded or solder joint, constructed to prevent gasket from squeezing into internal opening.
- B. Make: Epco or equivalent.

2.05 HANGERS, INSERTS AND SUPPORTS

- A. Hangers, Inserts, Clamps, Etc.: Carpenter & Patterson, Central Iron, Elcen, Fee & Mason, Grabler and Grinnell.
- B. Hangers: Adjustable, steel clevis type, cadmium plated or galvanized except where in contact with copper piping. Copper plated or PVC coated where in contact with copper piping.
- C. Hanger Shields: Required on all piping.

- D. Spacing Schedule:

Pipe Size	Steel (ft)	Copper (ft)	No-Hub Cast Iron *	Rod Size
3/4" to 1"	12	6	Each	3/8"
1-1/4" to 1-1/2"	12	6	Horizontal	3/8"
2" to 4"	12	10	Joint	1/2"

*Cast iron "No-Hub" to be supported on all sides of fittings & Joints

- E. Piping systems with material not listed in above schedule shall be supported and protected in accordance with manufacturer's recommendations and as approved.
- F. Inserts: Equal to Grinnell Fig. #281, maximum loading 1000 lbs., galvanized finish, and Fig. #285, maximum loading 400 lbs. Use approved beam clamps if possible.
- G. Supports:
 - 1. For Weights Under 1000 lbs.: Support all Contract Work with approved type "Drill-In" inserts equal to "red Head," "unistrut," beam clamps or other structurally approved support. The factor of safety shall be at least four (4). Follow manufacturer's recommendations.
 - 2. For Metal Decks: Drill hole through for hanger rods and imbed a bolted plate in concrete or use Phillips "Red Head" devices designed for this application. All cases must have safety factor of four (4).

2.06 PIPING ACCESSORIES

- A. Escutcheon Plates: Steel or cast iron polished chrome, split hinge type with setscrew, when used at ceiling and floor locations. Special high plates where required for extended sleeves. Chrome plated in vicinity of all fixtures. Provide escutcheons at all pipe penetrations thru ceilings, floors and walls exposed to view.

2.07 SLEEVES

- A. Standard Type: Schedule 40 black steel pipe sleeves, two pipe sizes larger than the pipe, required for all structural surfaces.
- B. Sheet metal sleeves permitted only for nonstructural surfaces and existing construction. Sheet metal sleeves shall be 18 gauge minimum and shall be properly braced to prevent collapsing.

2.08 SEALING ELEMENTS

- A. Waterproof Type: Synthetic rubber material with zinc plated bolts equal to "Link-Seal" Series 200, 300 or 400.

2.09 PIPING MATERIALS (PLUMBING)

- A. Water Distribution Piping:
 - 1. Copper tubing Type "L" ASTM B75, ASTM B88, ASTM B251, ASTM B 447. Lead-free soldered joints or mechanical joints.
- B. Above Grade Drainage & Vent Piping:
 - 1. Cast-iron soil piping with no-hub connections ASTM A74, ASTM A888.

PART 3 - EXECUTION

3.01 EQUIPMENT AND SYSTEMS

- A. All equipment and systems as shown on the drawings or specified herein shall be installed in accordance with the provisions of each applicable section of these Specifications and all local and state codes and regulations having jurisdiction.
- B. All work shall be installed in a workmanlike manner as determined by Architects.
- C. Accurately establish grade and elevation of all piping before setting sleeves. Install piping without springing or forcing (except where specifically called for), making proper allowance for expansion and anchoring. Arrange piping at equipment with necessary offsets, unions, flanges, valves, to allow for easy part removal and maintenance, as approved.
- D. Offset piping and change elevation as required to coordinate with all other trades.
- E. Avoid contact with any part of other mechanical or electrical systems.
- F. Provide adequate means of draining and venting all units, risers, circuits and systems.
- G. Conceal all piping unless otherwise specified.

- H. Install piping and connections approximately as indicated or directed, straight, plumb, direct, parallel and close to building walls, partitions, ceiling, in general, with groups of pipes parallel to each other and close to structural members allowing for insulation and access for servicing valves, etc. Horizontal piping to be installed as high as possible without sags.
- I. Coordination with other trades: Check Contract Drawings with all others, anticipate and avoid interference with other installations. Obtain decision or approval from Architect for proposed group installation and before proceeding, and for clearances in structure and finish.
- J. Fixture branches exposed only as required for final connections.
- K. Over Electrical Equipment: Prohibited. Special cases may be permitted with approval of Architect, protecting copper drip pan.
- L. Ream pipes after cutting and clean before installing. Cap or plug equipment and pipe openings during construction. Install piping parallel with lines of building, properly spaced to provide clearance for insulation. Make all changes in direction and branch connections with approved fittings. All cleanout plugs, bushings and nipples, required for gauge and instrument installation shall be brass. Do not install valves, unions and flanges in inaccessible locations.
- M. Materials used within a system and between systems shall be consistent. If this is not possible, install approved dielectric fittings.

3.02 HANGERS, INSERTS AND SUPPORTS

- A. No piping shall be supported by wires, band iron, chains, or from other piping, nor by vertical expansion bolts. Support piping with individual hangers from concrete inserts, approved welded supports, or beam clamps of proper configuration and loading design requirements for each location; replace if not suitable. Follow manufacturer's safe loading recommendations. Always obtain approval.
- B. Suspend with rods of sufficient length for swing and of size as previously scheduled, using four (4) nuts per rod. Use rods and nuts having electroplated zinc or cadmium (0.005" minimum) finish.
- C. Provide additional approved structural steel members, having one coat rustproof paint, where required for proper support.
- D. Provide oversized hangers where insulation/supports must pass between pipe and hanger.
- E. Hangers, when attached to joists, shall only be placed at the top or bottom chord panel point. Only concentric type hangers are permissible; "C" type not permitted.
- F. Riser Clamps: Provide riser clamps for each riser at each floor. Allow for escutcheon plates.

3.03 PIPE CONNECTIONS

- A. Solder Connections: Use only 95/5 nonacid flux and clean off excess flux. Also remove excess solder from piping.
- B. Threaded Connections: For steel pipe and brass pipe. Clean out tapering threads, made up with pipe dope; screwed until tight connection. Pipe dope must be approved for application.
- C. Dielectric Pipe Fittings: Protect fittings from excessive heat.

3.04 SLEEVES

- A. All underground pipes and conduits, regardless of their contents, shall be provided with sleeves at the foundation wall and shall be sealed at the section of entry into the building with a material that will form a gas-proof barrier.
- B. Provide for all pipes passing through floors, walls or ceilings.
- C. Extend 1/8" above floor in all finished areas except those with floor drains or in Penthouse; use steel pipe sleeves 2" above floor in excepted areas. Use steel pipe sleeves in all bearing walls, structural slabs, beams and all other structural surfaces, and where specifically called for.
- D. Sleeves, where installed in walls of shafts, shall be as small as practical, consistent with insulation, etc., so as to preserve fire rating of shaft walls.
- E. Fill abandoned sleeves with concrete.
- F. Where floors are membrane waterproofed, use flashing clamp device on sleeves equivalent to Josam Series 1880 "Riser Sleeve".

3.05 ESCUTCHEON PLATES

- A. Provide polished chrome escutcheon plates for all exposed piping passing through floors, walls or ceilings, in all rooms except Mechanical Rooms.
- B. Cut plates if necessary to fit conditions.

3.06 SLEEVE PACKING

- A. Tightly seal void space at all sleeves throughout building as follows:
 - 1. Interior locations: Firmly pack with fiberglass, the space between sleeve and pipe, then neatly caulk with caulking gun and approved material.
 - 2. Exterior walls above grade: Use sealing element.
 - 3. Exterior walls below grade: Use sealing element.
 - 4. Cored holes: Method shall be approved or use sealing element.
 - 5. Fire rated, partitions and floor slabs: Use fire rated sealing elements, materials and methods.
 - 6. Waterproofed floors without membrane: Use Architects' approved sealing element, device or compound.
 - 7. Waterproofed floors with membrane: Use Architects' approved sealing element, device or compound.

3.07 TESTS

- A. Refer to Section 220010 for testing of plumbing systems.

3.08 PIPE LINE SIZING

- A. Pipe sizes indicated on Contract Documents are to be maintained. Pipe size changes made only as approved by Engineer, or required by State or local codes.
- B. Where discrepancy in size occurs, the larger size shall prevail, unless otherwise directed by the Architects.

END OF SECTION 221116

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.02 SUBMITTALS

- A. All items specified under Part 2 - Products of this Section, including pipe and fittings.

PART 2 - PRODUCTS

2.01 WATER PIPING

- A. Refer to Section 221116 - Piping Systems and Accessories; for acceptable materials.

2.02 DISINFECTION

- A. The Contractor shall disinfect the entire hot and cold water system. This shall include all hot water circulation piping and connecting supply mains. Renovations to existing piping systems shall be isolated with new valves by Contractor for testing of new system only.
- B. Use the purging and disinfecting procedure proscribed by the authority having jurisdiction or, in case a method is not proscribed by that authority, the procedure described in either AWWA C651, or AWWA C652, or as described below.
- C. A chlorine solution shall be injected into and circulated through the entire hot and cold water system. Operate all hot and cold water faucets, flush valves, mixing valves and metering valves. Duct tape all metering valves to hold in on position. Continue flow of water from system until a determined uniform chlorine count of 50 ppm is reached. Then shut off all flow and let systems stand full.
- D. Tube test samples of hot and cold water in each fixture area every 8 hours to determine chlorine residual content.
- E. If the chlorine residual content drop is more than 10% in any 24 hour period, system must be injected with additional chlorine and Step A repeated. This shall continue until a 95% chlorine residual level remains over 24 hours.
- F. After the system test has been accepted by the Architect or Engineer, the entire system shall be drained and refilled. It is important that if the building has a septic system all water must be drained on to paved areas of parking lots. The Contractor shall install all necessary valves at low points and furnish any pumps and drain piping to accomplish this.
- G. Prior to final test, the system should be flushed through plumbing fixtures until any concentrated chlorine odor is undetectable.
- H. A final test of both hot and cold water shall be taken at the furthest point of the system by a certified testing agency. Full bacteria and metals test shall be performed to verify the water meets all potable drinking water standards.

PART 3 - EXECUTION

3.01 PIPING

- A. Run slightly off level to low points; provide drain valves.
- B. Provide shock arrestors where shown, or specified.
- C. Branch headers serving flush valves; full size as shown.
- D. Provide dielectric pipe fittings when connecting to piping system of dissimilar metals.
- E. Supply piping to all fixtures, faucets and flush valves shall be anchored to prevent movement.
- F. Provide and install necessary wood or metal backing material to secure piping, flush valves, faucets, etc.
- G. Piping shall be run to avoid all electrical panels and equipment.

END OF SECTION 22 1127

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.02 SUBMITTALS

- A. All items specified in this Section under Part 2 - Products.

PART 2 - PRODUCTS

2.01 FLOOR DRAINS AND FLOOR SINKS

- A. Acceptable Manufacturers: Jay R. Smith, Josam, Zurn or Wade.
- B. FD-1: Zurn #ZN-415 floor drain, dura coated cast iron body with bottom outlet. Combination membrane clamp and adjustable collar. 5" polished brass nickel bronze round top. Provide with Rector-Seal Sure-Seal Trap Guard
- C. FS-1: Zurn #Z-1910-P-25 Sani-Flor receptor 8"x8"x6" deep cast iron body and square slotted medium duty grate, with white acid resisting porcelain enamel interior and top complete with white acid resisting enamel bucket.

2.02 CLEANOUTS

- A. Acceptable Manufacturers: Jay R. Smith, Josam, Zurn or Wade.
- B. FCO-1: Zurn #ZN-1400 level-trol adjustable floor cleanout D.C.C.I. body with polished nickel bronze scoriated top, gas and water tight. ABS tapered thread plug and scoriated round top adjustable to finished floor
- C. WCO: Zurn #Z-1446 cleanout with round stainless-steel wall access cover.
- D. BCO: Zurn #1445 cleanout tee.

PART 3 - EXECUTION

3.01 CLEANOUTS

- A. Install cleanouts out of traffic patterns; provide offset from unnecessary stress on basin at these points.
- B. Do not locate under doors or under equipment, or behind cabinets.

END OF SECTION 22 1130

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including all General Conditions, Supplementary Conditions, Division 1 specification sections as well as Information to Bidders requirements that are included in the project documents, apply to the work of this Contract.

1.02 ALLOWANCES, ALTERNATES AND UNIT PRICES

- A. Refer to Division 1 specifications for allowances, alternates and unit prices required as part of this Contract.

1.03 INTENT

- A. The intent of the drawings and these specifications is to provide all systems complete and operative. Whether indicated on the drawings and/or included in the specification or not, provide all materials, equipment and labor usually furnished with such systems.

1.04 DEFINITIONS

- A. Provide: Furnish, install and connect.
- B. Furnish: Supply material only.
- C. EXR: Existing to remain.
- D. MC: Mechanical Contractor-note MC and HC (Heating Contractor) shall be interchangeable for all drawings and specifications.

1.05 SCOPE OF WORK

- A. This Contractor shall do all work, furnish all labor, tools and equipment necessary for all the MECHANICAL work all as indicated on the drawings and specified herein.
 - 1. Removal of existing equipment as indicated on drawings.
 - 2. All cutting and patching.
 - 3. Heating boiler, complete with accessories and controls.
 - 4. Replacement burner packages, associated controls, fuel piping as required for each boiler and new hot water heater.
 - 5. Roof top units, complete with curbs, etc. Flashing by G.C.
 - 6. Variable refrigerant system, complete with all accessories.
 - 7. Boiler breeching, supports and accessories
 - 8. Underground heating fuel storage tank, fuel piping, vent piping, valves, and all accessories.
 - 9. Converter and steam specialties.
 - 10. Central station air handling units.
 - 11. Air cooled condenser units;
 - 12. Unit ventilators.
 - 13. Chillers, complete with piping and accessories.
 - 14. Cooling towers, complete with piping and accessories.
 - 15. Fan coil units.
 - 16. Ductless split air conditioning units, complete with piping, controls, supports and accessories.
 - 17. Cabinet unit heaters, complete with piping, controls, supports and accessories.
 - 18. Convectors, complete with piping and accessories.

19. Fin tube radiation, complete with piping and accessories.
20. Electric fin radiation, complete with accessories.
21. Unit heaters, complete with piping, supports and accessories.
22. Duct coils, complete with piping and installation accessories.
23. Circulating pumps complete with motors, controls, supports and accessories.
24. Exhaust fans, complete with accessories, curbs, etc., flashing by GC.
25. Humidifiers, complete with piping and accessories and supports.
26. Drain water condensate pump, complete with piping, tank, accessories and support.
27. Pipe fittings, hangers, supports, valves, and piping specialties as required to make complete heating system.
28. Refrigeration piping, fittings, valves, etc.
29. All diffusers, registers and grilles complete with accessories.
30. All louvers provided by Contractor.
31. Sound traps.
32. Galvanized ductwork (or specialty ductwork where noted) to serve supply, relief and exhaust systems complete with control devices and accessories, unless otherwise noted.
33. Welding hood, including exhaust fan, complete with motors and accessories.
34. Insulation both thermal and acoustical to serve piping, breeching, ductwork systems, equipment, housings and accessories.
35. Temperature control system complete to serve all MECHANICAL equipment and systems complete with accessories.
36. Testing and balancing of all heating, ventilating and air conditioning installations to include sheetmetal ductwork, air conditioning supply and exhaust systems, heating and cooling systems and temperature control system. Balancing shall include NC ratings as described herein.
37. Special testing and balancing requirements for existing MECHANICAL equipment to include repair of existing equipment as required to obtain air flow as indicated on drawings.
38. Servicing of heating, ventilating and air conditioning facilities are required for guarantee period. Provide competent factory trained men at site for purpose of instructing Owner's personnel in proper operation and maintenance of all new MECHANICAL facilities.
39. Concrete pads, 4" high unless otherwise noted on drawings, to provide housekeeping elevation for boilers, pumps and such other equipment as shown on drawings that require a pad. Coordinate installation of pads with GC to insure secure bonding of pads to floor structure. This contractor shall be responsible for installation of pads.
40. Temporary heat as required by Architect's Special Conditions.

1.06 TEMPORARY SERVICES

- A. Temporary Heat: In accordance with Architect's specifications and/or conditions, contractor shall have the permanent heating system capable of providing heat to the new work areas when required. The term heating system shall include all work or components necessary to operate heating system. For temporary usage, it is not required that this work be in a finished condition, i.e., covers in place, etc. Cost of fuel consumed for temporary heat from permanent systems only shall be paid by owner.
- B. The use of permanent system will be allowed only if the building is fully enclosed with no construction dust to clog heating/cooling coils, heat recovery components, fans, etc.
- C. At the completion of work, Contractor shall turn over to the Owner all equipment used for temporary heat in a new, as purchased condition. Contractor shall replace filters with new ones, clean all components which shall include: unit casings, ductwork, grilles, diffusers, etc., re-lubricate all moving parts, replace belts if required and perform any other work necessary (as determined by Architect and Engineer) to put equipment in a "new" condition.

- D. Contractor shall take all measures necessary to insure that dust, dirt, or debris does not enter air systems while in operation for temporary heat and shall change filters as often as necessary. Under no circumstances shall air handlers be allowed to operate with no filter in place. All duct in the work area shall be sealed so no dust or debris will enter duct.

1.07 CONTINUITY OF UTILITY SERVICES

- A. It is of paramount importance that each utility service operate continuously and without interruption. Whenever this contractor plans to make changes or alterations to any existing utility service, such plans shall result in no or minimum service interruption or inconvenience to Owner. This contractor shall plan and schedule any change or alteration to an existing utility service with Architect and Owner. Such planning, timing, and/or scheduling shall be approved by both these parties.

1.08 CODES AND STANDARDS

- A. All materials, equipment, and installations by this contract shall be in accordance with the latest editions of the following applicable requirements:
1. 2020 New York State Building Code, including all applicable amendments supplements to the following:
 - a) 2020 International Building Code
 - b) 2020 International Existing Building Code
 - c) 2020 International Fire Code
 - d) 2020 International Plumbing Code
 - e) 2020 International Mechanical Code
 - f) 2020 International Fuel Gas Code
 2. 2020 Supplement to the New York State Energy Conservation Construction Code, including all applicable amendments to the following:
 - a) 2020 International Energy Conservation Code
 - b) 2013 ASHRAE 90.1
 3. 2020 Uniform Code Supplement (May 12, 2020)
 4. New York State Department of Environmental Conservation.
 5. Conform to requirements of NEMA.
 6. Bear label of Underwriters Laboratories, Inc.
 7. National Electrical Code NFPA Article 70, latest edition.
 8. New York State Health Code.
 9. Local Utility Standards.
 10. Local Municipal and/or city standards.
 11. Industrial Code Rule #4 and #14 (12NYCRR 4 and 14) (Standards for boiler installation).
 12. AMBA Boiler Rating.

13. ASME Boiler Pressure Vessel Code.
14. ASHRAE Standard 15.
15. Conform with applicable requirements of ASTM - Regulations and Standards for Pipe and Pipe Fittings.
16. Be in accordance with USAS - Code for Pressure Piping, latest edition.
17. For external and internal duct insulations, have flame spread rating of 25 or less and smoke developed rating of 50 or less when tested in accordance with ASTM Standard E84.
18. Sheetmetal and Air Conditioning Contractor's National Association, Inc. (SMACNA), latest editions.
19. Conform with applicable requirements of Standard for the Installation of Air Conditioning and Ventilating Systems, NFPA 90A, and Code for Safety to Life from Fire in Buildings and Structures, NFPA 101.
20. Conform to requirements of ASHRAE 90.1, latest edition.
21. Be in accordance with design standards outlined in ASHRAE Handbooks, latest edition.
22. Conform to requirements of Owner's insurance carriers.

1.09 SUBMITTALS & SUBMISSION REQUIREMENTS

- A. All submittals shall be in accordance with Division 1 requirements, the following requirements listed below, and also as indicated in each specification section. All submittals not complying with the listing above will be returned to the contractor without being reviewed. Rejection by Architect or Engineer of any items submitted shall require resubmittal of acceptable items.
 1. Within (20) days after receiving notice to proceed, submit to Architect for review complete descriptive dimensional data and ratings for equipment and materials proposed to be furnished and installed.
 2. All materials submitted shall clearly state the job name and specification section(s) that it applies to.
 3. Any package containing more than one piece of equipment or material shall also contain a schedule clearly listing all items in submittal. Schedule page (s) shall also indicate project name and building name.
 4. All submittals must be clearly marked using nomenclature used in this specification for proper item identification, schedule of usages, model numbers, construction materials, performance, data, etc.
 5. Projects involving multiple buildings must have the submittals separated by building. Submittals in which buildings are combined will not be accepted. (Exception: When specifically approved by engineer, basic materials may be submitted once.)

6. The contractor shall insure that dimensions of equipment to be used conform to the space allocated for the equipment on the drawings.
 7. Submittals traced or copied from contract drawings are not acceptable and will be returned without review.
 8. In the event material and/or equipment is installed prior to obtaining approval of shop drawings, and in the sole opinion of the Owner's Agent, this material and/or equipment does not meet the specifications, the Contractor shall be liable for the removal and the replacement at no additional cost to the contract.
- B. Samples: When requested by Engineer, provide samples of both specified equipment and proposed substitutions for review by the Owner's Agent. Such equipment shall be delivered to a location designated, or erected at the job site as directed. When neither is physically possible, arrange for the Owner's Agent to visit an acceptable site where the proposed equipment can be inspected.
- C. Substitutions (where allowed within the project):
1. After bid award if there are any units/piping/equipment the contractor would seek to substitute on, they must indicate in writing the specific equipment.
 2. All substitutions shall be clearly highlighted, and in bold print, on the front cover of any submittal that it is a substitution.
 3. Substitutions received after 45 days will not be considered.
 4. Supporting documentation shall be provided describing why the item is an equal and listing the major difference.
 5. Submittals for equipment or materials other than as specified shall be accepted for review by the Owner's agent.
 6. Any substitution should be sent in as an RFI and reviewed prior to bid for acceptance. If the unit is submitted after the bid date, the submittal may be rejected without review.
 7. Approval of substitute equipment shall be based on performance, dimensional, functional, physical and aesthetic compatibility to the equipment specified as determined by the Owner's agent and approved by the engineer. Any substitution shall meet any scheduled performance and characteristics noted within its particular specification section.
 8. Where substitute equipment is approved, the contractor shall be responsible for, and bear the cost of any necessary changes by his trade or other trades to make the system complete and operable, including but not limited to any design fees and structural or steel changes required to implement a substituted unit.
 9. Contractor is fully responsible for providing coordination between all trades affected by equipment substitution.
 10. When requested, contractor shall submit layout drawings indicating new dimensions and arrangements of substituted equipment. Layout drawings shall indicate all revisions necessary for all services affected by substitution.

1.10 SUBSTANTIAL COMPLETION REQUEST FOR PUNCH LIST

- A. Contractor shall submit a letter in email form stating that the work is substantially complete and ready for Punch List review by Engineer.
- B. Contractor shall note which areas are substantially complete by Building (if multiple buildings) and by Area according to the Key Plan.
- C. Contractor shall list all items that are known to be incomplete at time of submission.
- D. If the request is for a partial Punch List, Contractor shall also include a list of room numbers/room tags.
- E. When letter is received by the Engineer, site review(s) will be coordinated with the Construction Manager, Clerk, Architect.

1.11 CUTTING AND PATCHING

- A. This contractor shall bear the cost of all cutting and patching required by and for the installation of this work. This contractor shall perform all cutting and patching unless otherwise indicated on drawings or if directed by the Architect.
- B. Patching of fire rated floors, walls, partitions, etc. shall be made using new materials equal to the fire rating of the existing.
- C. Should changes, omissions or errors in this contractor's work require cutting, patching or making alterations in any portion of new construction, such work will be performed by GC at contractor's expense.
- D. Cutting and patching of roof surfaces and structures shall only be performed by a qualified contractor, as approved by the Architect. The work of this contract shall bear the cost of above mentioned cutting and patching. This contractor shall insure that existing roof warranties remain in force.
- E. This contractor shall furnish lintels, sized to accommodate structure above opening, where cutting and patching is to be performed on load bearing walls. Contractor shall obtain written approval for all lintels prior to installation.
- F. Cutting shall be done in a manner which will not adversely affect the strength of the building. Holes and openings shall be neatly cut so as to provide a finished appearance and shall be patched around the edge where required for a finished appearance. Provide temporary bracing, shoring, etc. as required.
- G. Patching shall be structurally sound and match the existing materials and finish of adjacent materials. Patching is required in finished areas, wherever existing work is removed, at the sides of openings, etc.
- H. At the completion of the work, all evidence of alteration will be as inconspicuous as possible.
- I. If the MC has a duct or pipe going through a wall where the GC made an opening for the MC, the MC shall be responsible to infill the space between the duct/pipe and wall. Also refer to section 1.22 Penetrations through fire rated construction.

1.12 FIELD INSPECTION

- A. As there are various conditions at the site which do not show on the accompanying drawings, or which are at variance with the conditions indicated on the drawings, it is important that each bidder visit the site and acquaint himself with existing conditions, and take these conditions into consideration when preparing his proposal. Each bidder shall obtain information or make any measurement desired. Lack of knowledge relative to existing conditions will not be allowed as a basis for extra compensation.
- B. This contractor and his subcontractors shall inspect existing equipment to remain prior to any of his new work in order to determine that all equipment is in good operating condition. If equipment is found to be lacking components, is inoperable, damaged, etc., contractor shall provide immediate written notice to the Owner. The Owner or his representative shall determine if any additional work is necessary and the method by which any work shall be performed.

1.13 INSTRUCTION SERVICES AND MANUALS

- A. Instructions:
 - 1. Provide competent personnel to remain at the jobsite for necessary time to instruct the Owner's personnel in proper operation and maintenance of installation made by this contractor.
 - 2. This contractor shall be responsible for notifying and instructing Owner's personnel on all equipment operations, maintenance requirements, etc. Furnish operating training session(s) for equipment listed.
 - 3. The Owner shall be responsible for establishing an operating and maintenance program for all equipment listed.
- B. Training Session: A training session shall be held for each system and/or item listed below: (Note: For Temperature Controls refer to Temperature Control Sections for training requirements.)

Item	Description	Training Hours For Each Bldg
1.		
2.		
3.		

- C. The instruction shall include the following types of information:
 - 1. System overview
 - 2. Major component designation
 - 3. System operation procedures
 - 4. Maintenance scheduling and procedures
 - 5. Provide a list of spare components each system would normally require
- D. Services: Provide services required, for all equipment specified under this contract, for a period of (1) year after written acceptance by the Owner.
- E. Manuals: Submit (3) sets of Operation and Maintenance manuals. Each set shall contain the manufacturers' data, operating instruction parts catalog and maintenance procedures for each piece of equipment. Include normal maintenance servicing schedule to be performed by the Owner.
 - 1. For projects containing multiple buildings, manuals shall be submitted separately for each building.

1.14 DELEGATED DESIGN

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit three paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.
- C. At completion of work, contractor to submit written report of acceptance by service representative and/or qualified third party testing agency that systems are installed in accordance with manufacturer's details and requirements.
- D. Delegated Design Systems:
 - 1. Seismic Restraint of Mechanical Systems
 - 2. xxx

1.15 PERMITS, CERTIFICATES AND FEES

- A. This Contractor shall obtain and pay for permits, certificates, fees etc. listed below and as required. Costs for permits, fees etc. shall be included in the base bid amount.
 - 1. All required applications and permits to begin work
 - 2. Certificate of inspection including Third-Party Agency.
 - 3. All municipal connection charges
 - 4. All local utility charges (power, telephone, cable, etc.)
 - 5. Fees and charges shall be obtained directly from the respective authority having jurisdiction
 - 6. Fees and charges for hazardous waste hauling as required by DOT, DEC, etc.

1.16 REMOVAL, DISPOSAL AND HAZARDOUS MATERIALS

- A. All removed equipment shall be removed from the site and properly disposed of.
- B. All hazardous materials must be disposed of in compliance with ENCON and all other regulatory agencies. The contractor shall provide the owner with written chain of custody reports and final destination of disposal.
- C. The Owner may wish to keep certain equipment, therefore, check with Owner before removals to determine what may be salvageable.
- D. Unless otherwise noted, all equipment to be removed shall have all accessories and supports

removed with it, whether indicated or not. In addition, any refrigeration containing equipment that is shown for removal shall have all refrigerant evacuated from the system and properly disposed of and all refrigerant piping removed from the site. Refrigerant recovery shall be performed by a technician certified in the maintenance, service, repair, and disposal of refrigerant containing equipment per EPA.

- E. Any equipment, piping or ductwork that has been removed in the project and has left an opening and/or anchor points in a floor, wall or roof shall have the openings and voids infilled to match existing conditions.

1.17 GUARANTEE

- A. Contractor shall guarantee all work furnished through this contract including work performed by sub-contractors, for a period of (1) year (unless otherwise noted), from the date of final acceptance. Contractor agrees to repair or replace any defective work or materials at no additional cost to the Owner. Contractor shall also pay for any damage to other work resulting from repairs to defects. Contractor shall furnish written guarantees to the Owner's agent in accordance with the general conditions.

1.18 INSTALLATION

- A. This contractor shall coordinate scheduling and installation of work with other contractors, sub-contractors and other trades. The contractor is also required to coordinate all work with owner supplied materials, direct contracts, and normal building operations, if any.
- B. All finished work shall be neat and workmanlike. All work of a special nature shall be performed by skilled and qualified workmen who can present credentials showing experience in said trade. New systems shall be delivered to Owner complete in perfect working order, tested and balanced in full accordance with plans and specifications. Existing systems shall function in same manner as before this work was performed. Any malfunctions which arise in existing systems as a result of demolition or alteration of parts of such systems shall be corrected.
- C. Layout of equipment, accessories and piping systems in plan is generally diagrammatic unless specifically dimensioned or detailed. Check project drawings and existing site conditions before installing work for interference's as governed by structural or other conditions. Owner reserves the right to make reasonable changes in location of equipment, accessories or piping systems prior to "roughing-in" without involving additional expense. Exact dimensions shown upon plans will be subject to verification and confirmation of exact conditions at site at time of construction. "Plus or minus" dimensions are shown upon drawing as a guide only. Exact surrounding conditions are governed by final equipment selection and/or other like details.
- D. Furnish all new equipment and materials as described herein. Any material, operation, method or device mentioned, listed or noted within this specification, if not specifically mentioned as furnished or installed by others, shall be furnished and installed by this contractor.

1.19 STORAGE OF MATERIALS

- A. For all ductwork, piping and insulation brought to the jobsite, it shall be protected from all environmental elements. This shall include, but not limited to, water, dust, chemicals and other hazardous materials. It shall be stored within a protected area in the building.
- B. All ductwork onsite shall have a wrap on it to prevent the duct from having any dust, debris or other

hazardous materials from becoming adhered to the interior of the duct. No duct may be stored where it could be rained on. Also refer to section 233330, low velocity ductwork, for additional information.

- C. All insulation on the jobsite will be stored in an area that will protect it from weather damage.

1.20 START UP

- A. A start up shall be performed for all new MECHANICAL equipment (MECHANICAL equipment shall be defined here as any MECHANICAL unit that requires power or a temperature controls connection). The manufacturers representative will be onsite and unit operation will be verified, including but not limited to air flow, heating and cooling setpoints are attained and unit functions within manufacturers parameters. A written report shall be furnished to the architect.

1.21 TESTING AND INSPECTION

- A. Inspections required for any ordinances, regulations, instructions, laws, rules, standards and practices that require any work to be inspected or tested shall be performed. Contractor shall give Owner, Architect and Engineer timely notice of readiness of work for inspection or testing and the date fixed for said inspection or testing.
- B. Third-Party Agency must inspect completed installation and present Owner with Certificate of Inspection showing approval.
- C. Required local or municipal inspection processed and present Owner with certificate indicating approval of such governing bodies.
- D. Contractor shall submit a written report to Architect, copy to Engineer, on results of each inspection or test on system or equipment supplied. Report shall contain all pertinent information, recommendations, approvals, additional work required, etc.

1.22 RECORD DOCUMENTS

- A. When required by general conditions or other Division 1 Section, this Contractor shall prepare and turn over to Owner's agent record As-built documents. As-built drawings will include actual equipment location layout, service connections, ductwork and piping layouts, valve locations, etc.
- B. In all projects, contractor shall provide record drawings of all underground equipment and service runs. As-built drawings for underground work will include dimensions to actual locations finish grade elevations, and actual invert to underground structures equipment and service runs.

1.23 IDENTIFICATION AND NAMEPLATES

- A. Provide engraved plastic labels screwed to all MECHANICAL equipment furnished under this contract including but not limited to: pumps, air handling units, rooftop units, exhaust fans, condensing units, control panels, starters, switches, panels, etc. Labels shall have black background, white letters; minimum letter height 3/8" high, self adhesive labels or punch tape type labels are not acceptable.

1.24 PENETRATIONS THRU FIRE RATED CONSTRUCTION

- A. All penetrations by this contract through rated construction shall be sealed fire safe by a UL listed approved method.

- B. All piping penetrations through walls, floors, etc. shall be sleeved.
- C. All ductwork penetrations shall be furnished with trim frames.
- D. All piping and ductwork penetrations through fire rated partitions, walls, floors, etc. shall be installed as follows; penetration shall be oversized 1/2" to 3/4" maximum. This contractor shall pack with fireproofing insulation, type FS cerablanket. Outside of penetrations (exposed surfaces around pipes and ductwork) shall be caulked and sealed with flame stop V, as manufactured by Flame Stop, Inc.; or an approved equal. Flame stop sealant shall be troweled smooth for finishing as required.

1.25 CONFINED SPACES

- A. All work in pipe tunnels, mechanical pits, well manholes, etc. shall be performed by skilled tradesman and laborers with current certification for working in confined space. Contractor shall bear all costs to provide all safety equipment, ventilation, etc. as required by State and Federal Regulations and shall obtain all necessary permits for such work.
- B. Contractor shall submit copy of current certifications and photo I.D. of all tradesman and laborers who will be working in confined spaces on this project.

1.26 COORDINATION

- A. Layouts of duct and piping systems shown on contract drawings are diagrammatic. Actual duct and piping layouts shall be coordinated in the field by the contractor. Ductwork shop drawings shall be submitted for approval (see next section for coordination drawings if applicable). Coordinate with other trades and with existing conditions, as required for proper installation of all systems. Contractor shall verify that ductwork and piping layouts are coordinated with all other construction trades which might cause a conflict. Any changes due to systems not being properly coordinated shall be the contractor's responsibility.
- B. All offsets, elbows, duct/pipe transitions, air vents, drains and accessories required to accommodate field changes found during coordination drawings are the responsibility of the contractor at NO additional cost.
- C. NOTE: Ductwork and piping drawings will NOT be given to the contractor since it is expected of the contractor to field verify and draw the ductwork and piping.
- D. Refer to section 013100 Project management and coordination for obtaining cad files from the architect.
- E. All offsets, elbows, duct/pipe transitions, air vents, drains and accessories required to accommodate field changes found during shop drawings are the responsibility of the contractor at NO additional cost.

1.27 COORDINATION DRAWINGS

- A. Before construction work commences, Contractors for all trades shall submit Coordination Drawings at not less than 1/4" = 1'-0" scale. These drawings shall identify and show elevations of all trades and resolutions of trade conflicts. Mechanical Equipment Rooms shall be drawn early in the Coordination Drawing process, simultaneous with all other congested areas.
- B. Prepare three-dimensional component conflict analysis (building information modeling - BIM) as part of coordination drawings. Refer to section 013100 Project management and coordination for obtaining

revit models from the architect (if available). Resolve component conflicts prior to submittal. Indicate where conflict resolution requires modification of design requirements by Architect.

- C. Contractor shall perform the final coordination review. As each coordination drawing is completed, Contractor will meet with Architect to review and resolve conflicts on the coordination drawings.
- D. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
- E. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
- F. Indicate dimensions shown on drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- G. Additional design, drafting and/or engineering time to fully complete the coordination drawings shall not be considered an additional cost to the project and shall be part of the contract.
- H. Show the sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
- I. Architect will review coordination drawings to confirm that, in general, the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make suitable modifications and resubmit.
- J. Coordination drawings shall be required for all boiler rooms and mechanical rooms.
- K. Prepare Coordination Drawings as follows:
 - 1. Coordination drawings shall be required in the following areas:
 - a)
- L. Mechanical Contractor will prepare the base plan Coordination Drawings showing the building, all ductwork and all pertinent piping and equipment. The drawings shall be coordinated with cable tray, lighting fixtures, sprinklers, air diffusers, other ceiling mounted items, ceiling heights, structural work, maintenance clearances, electric code clearance, reflected ceiling plans, and other contract requirements. Reposition proposed locations of work after coordination drawing review by the owner and the architect. Provide adjustments to exact size, location and offsets of ducts, pipes, conduit, etc., to achieve reasonable appearance objectives. Provide these adjustments as part of Base Bid Contracts. Minor revisions need not be redrawn.
- M. Mechanical Contractor will provide prints and CAD drawings and submit the base plan to all major trades' Contractors.
- N. Electrical, Plumbing and Fire Protection Contractors will draft location of piping and equipment on the base plan, indicating areas of conflict and suggested resolutions.
- O. All offsets, elbows, duct/pipe transitions, air vents, drains and accessories required to accommodate field changes found during coordination drawings are the responsibility of the contractor at NO additional cost.

P. Coordination meetings will be held as necessary as determined by the architect.

END OF SECTION 23 0005

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections apply to work in this section.

1.02 SUBMITTALS

- A. Schedule of valves and service.
- B. Product data for all valves.

1.03 REFERENCE STANDARDS AND CODES

- A. All installations and materials shall conform to applicable 2020 New York State Building Code, and local building and plumbing codes.
- B. All installations shall conform to requirements of Owner's Insurance carriers.
- C. Refer to the latest edition and applicable sections of the following:
 - 1. Underwriters Laboratories (UL)
 - 2. American Society of Testing and Materials (ASTM)
 - 3. American National Standards Institute (ANSI)
 - 4. American Society of Mechanical Engineering (ASME)
 - 5. Code for Pressure Piping B31.9 - Building Services Piping
 - 6. American Welding Society (AWS)
 - 7. National Fire Protection Association (NFPA)
 - 8. Manufacturer's Standardization Society of the Valve and Fitting Industry (MSS)

1.04 GENERAL REQUIREMENTS

- A. Ensure valves are dry and internally protected against rust and corrosion. Store valves indoors. Maintain valve temperature higher than the ambient dew point temperature. If outdoor storage is necessary, support valves off the ground or pavement in watertight enclosures.
- B. Protect valve ends against damage to threads, flange faces and weld-end preps.
- C. Do not use hand-wheels and stems as lifting or rigging points.
- D. All valves and terminal water specialties shall be same size as upstream piping, unless otherwise indicated.
- E. Furnish valves with pressure and temperature ratings as specified and required to suit system pressures and temperatures.
- F. Furnish valves with either threaded, flanged or solder-joint end connections as specified.
- G. Furnish chain wheel operators for valves 6" and larger when valve is to be mounted 8' or higher above finished floor elevations.

PART 2 - PRODUCTS

2.01 VALVE SCHEDULE

A. Note: Specialty valves specified in other sections.

	<u>Pipe Fill</u>	<u>Pipe Size</u>	<u>Valve Type</u>
1.	Heating Hot Water	Up to 2"	BV-1
2.	Heating Hot Water	2-1/2" & Over	WV-1
3.	Heating Hot Water	Up to 2"	CBV-1
4.	Heating Hot Water	2-1/2" & Over	CBV-2
5.	Heating Hot Water	Up to 2"	CKV-1
6.	Heating Hot Water	2-1/2" & Over	CKV-2
7.	Chilled Water	Up to 2"	BV-1
8.	Chilled Water	2-1/2" & Over	WV-1
9.	Chilled Water	Up to 2"	CBV-1
10.	Chilled Water	2-1/2" & Over	CBV-2
11.	Chilled Water	Up to 2"	CKV-1
12.	Chilled Water	2-1/2" & Over	CKV-2
13.	Steam (30 psig & above)	Up to 2"	GV-3
14.	Steam (30 psig & above)	2-1/2" & Over	GV-4
15.	Steam (below 30 psig)	Up to 2"	GV-1
16.	Steam (below 30 psig)	2-1/2" & Over	GV-2
17.	Steam Throttling (30 psig & above)	Up to 2"	GLV-3
18.	Steam Throttling (30 psig & above)	2-1/2" & Over	GLV-4
19.	Steam Throttling (below 30 psig)	Up to 2"	GLV-1
20.	Steam Throttling (below 30 psig)	2-1/2" & Over	GLV-2
21.	Steam Condensate	Up to 2"	BV-1
22.	Steam Condensate	2-1/2" & Over	WV-2
23.	High Temp. Hot Water	Up to 2"	GV-3
24.	High Temp. Hot Water	2-1/2" & Over	GV-4
25.	Condensate Drain	Up to 2"	BV-1
26.	Condensate Drain	2-1/2" & Over	WV-1
27.	Cold Water Makeup	Up to 2"	BV-1
28.	Cold Water Makeup	Up to 2"	CKV-1
29.	Cold Water Makeup	2-1/2" & Over	CKV-2
30.	Cold Water Makeup	2-1/2" & Over	WV-1
31.	Cooling Tower Water	Up to 2"	BV-1
32.	Cooling Tower Water	2-1/2" & Over	WV-1

B. Valve Types

1. BV-1: Ball valve, size as required, sweat or threaded ends, forged bronze body, hard chrome plated ball, glass reinforced durafill seats, PTFE stem packing, 600 psi WOG non-shock, 150psi WSP for 1/4"-2", 450°F (@50psi) maximum temperature. Brass body is not acceptable and will be rejected. Series #B6000, B6001, Watts Regulator Co.; or equal.

2. CBV-1: Circuit balancing valve, size as required for nominal 3ft WG pressure drop. Note: the submitted pressure drop shall not exceed 2ft. The TAB contractor shall balance to 3ft. Y-pattern Style design and all metal parts of nonferrous, pressure die cast, nonporous Ametal copper alloy and high strength resin hand-wheel and sleeve. Provides a positive shut-off. Provision for connecting a portable differential pressure meter. Each meter connection shall have pressure/ temperature readout ports. Rubber O-ring disc to ensure positive shut-off. Valve shall provide multi-turn, 360° adjustment, digital handwheel with hidden memory feature to set the valve with precision tamper-proof setting. Model STAD, rated at 300 psig, 250°F, TA Hydronics; or equal.
3. CBV-2: Circuit balancing valve, size as required for nominal 2 ft WG pressure drop. Flanged, Y-pattern Style design with ductile iron body and other metal parts of nonferrous copper alloy and high strength resin hand-wheel and sleeve. Provides a positive shut-off. Provision for connecting a portable differential pressure meter. Each meter connection shall have pressure/ temperature readout ports. Rubber O-ring disc to ensure positive shut-off. Valve shall provide multi-turn, 360° adjustment, digital handwheel with hidden memory feature to set the valve with precision tamper-proof setting. Model STAF, rated at 250 psig, 250°F, TA Hydronics; or equal.
4. CKV-1: Check valve, bronze body, bronze disc. rated at 200 psi, non-shock for 2" and smaller. Nibco Model #T-413; or equal.
5. CKV-2: Check valve, iron body, bronze disc. rated at 200 psi, non-shock, flanged connections for 2-1/2" and larger. Nibco Model #F-918; or equal.
6. FCV-1: **ADJUSTABLE** Automatic flow control valves. Valve gpm shall be factory set and shall automatically limit flow to within 5% of specified rate. For 3/4" to 2" valves flow cartridge shall be removable from valve housing without the use of special tools to provide access without breaking main piping. Cartridge flow rates shall be externally adjustable while system is in operation with 41 flow rate settings range per cartridge. A true design operating pressure (psid) range of 4.4 – 58 psi is required. Each valve should have 2 P/T ports. All automatic flow control valves shall be provided by single source with certified flow tests. Internal wear surfaces of the valve cartridge shall be stainless steel. The cartridge body shall have machined threads to compensate for the spring free height. Fixed shims are not acceptable. Cartridges shall be color coded to determine model type and GPM Range and a flow rate chart for external adjustment of flow rate settings shall be provided. For 3/4" to 2" valves, valve assembly shall consist of Y type body and O-ring union. 2-1/2" to 6" valves shall be flanged wafer style valves and shall be externally adjustable while system is in operation with 51 flow rate settings per valve insert. Static pressure rating of 580 psi with a temperature rating of 248 F. Valve shall be E-just, by FlowCon International.; B&G; or approved equal. **NOTE: It is the intent that an externally adjustable valve is used to simplify installation, so the balancer can set the flow and ensure that the correct flow is achieved.**

7. FCV-2: **NON-Adjustable**, Automatic flow control valves. Valve gpm shall be factory set and shall automatically limit flow to within 5% of specified rate. For 3/4" to 2" valves flow cartridge shall be removable from valve housing without the use of special tools to provide access without breaking main piping. A true design operating pressure (psid) range of 4.4 – 58 psi is required. Each valve should have 2 P/T ports. All automatic flow control valves shall be provided by single source with certified flow tests. Internal wear surfaces of the valve cartridge shall be stainless steel. The cartridge body shall have machined threads to compensate for the spring free height. Fixed shims are not acceptable. Cartridges shall be color coded to determine model type and GPM Range and a flow rate chart for external adjustment of flow rate settings shall be provided. For 3/4" to 2" valves, valve assembly shall consist of Y type body and O-ring union. 2-1/2" to 6" valves shall be flanged wafer style valves. Static pressure rating of 580 psi with a temperature rating of 248 F. Valve shall be Griswald K-valve; or approved equal.
8. GLV-1: Globe valve, size as required, Class 150, bronze body, renewable composition disc, threaded ends, Figure #B29, Stockham Valve Co.; or equal. Provide Babbitt adjustable Sprocket Rim, complete with guide arm, guard ring, rust proof chain. Furnish with chain length as shown on drawing. Figure #659, #656, Jenkins Co.; or equal.
9. GLV-2: Globe valve, size as required, Class 125, iron body, renewable seat and disc, flanged ends, rated for steam, Figure #613, Jenkins Co.; or equal.
10. GLV-3: Globe valve, size as required, Class 250, bronze body, renewable composition disc and bronze seat ring, threaded ends, Figure #801, Jenkins Co.; or equal.
11. GLV-4: Globe valve, size as required, Class 250, iron body, renewable seat and disc, bronze disc and seat ring, rated for steam, flanged ends, Figure #923, Jenkins Co.; or equal.
12. GV-1: Gate valve, size as required, Class 125, bronze body, solid wedge, traveling stem threaded ends, rated for steam, rated at 200 psig and 353 F, T-113, Nibco; or equal.
13. GV-2: Gate valve, size as required, Class 125, iron body, OS & Y, flanged ends, bronze trim, rising stem, rated for steam service, Figure #F-617, Nibco; or equal.
14. GV-3: Gate valve, size as required, Class 200, bronze body, monel seats, bronze wedge, rising stem, threaded ends, Figure #B-144, Stockham Valve Co.; or equal.
15. GV-4: Gate valve, size as required, Class 300, steel body, OS & Y, flanged ends, bolted bonnet, Figure #30-GPFU-S, Stockham Valve Co.; or equal.
16. ROM-1: Provide a portable computerized balancing instrument capable of indicating pressure differential and temperature measurement across a system component. Instrument to contain a micro computer and a sensor unit with pressure sensor, measurement valve and connections. TA Hydronics Model TA CBI: or approved equal. Contractor shall provide (1) unit per project and turn over to Owner at project completion.
17. WV-1: Butterfly valve (HW, CHW as indicated) 2" – 12" size as required,. One piece cast iron **LUG** style body ANSI class 125/150, extended neck, Stainless Steel disc with polished edges, one piece stainless steel stem, triple function molded-in EPDM seat, upper and lower stem bearings, NBR (Buna) upper stem seal, bubble-tight shutoff, temperature range of -20o F to 250o F, pressure rating of 250 psi bi-directional. Keystone Figure 222; or equal.
 - a) Grooved end valve: 300 psi CWP suitable for bidirectional and dead-end service at full rated pressure. Body shall be grooved end black enamel coated ductile iron conforming to ASTM A536. Disc shall be electroless nickel plated ductile iron with

blowout proof 416 stainless steel stem. Disc shall be offset from the stem centerline to allow full 360 degree seating. Seat shall be pressure responsive EPDM. Valve shall be complete with ISO flange for actuation mounting. Valve operators shall be lever handle or gear operator, available with memory stop feature, locking device, chainwheel, or supplied bare. Basis of Deign: Victaulic S/761

18. WV-2: Butterfly valve (HTHW, LPS as indicated), size as required. High performance valve, double off-set design, carbon steel body, lug type, 316SS disc and 17-4SS stem, RTFE seat, TFE packing, Temperature range up to 500o F, and pressure rating of 285 PSI bi-directional. Keystone Figure 36 or equal.

PART 3 - EXECUTION

3.01 GENERAL

- A. Install all valves per manufacturers recommendations.

END OF SECTION 23 0523

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary conditions and Division 1 Specification Sections, apply to work of this section.

1.02 SUBMITTALS:

- A. Description of intended testing procedures.
- B. Blank data forms indicating all intended test data points.
- C. Written statement of coordination with sheetmetal contractor.
- D. Written statement of coordination with piping contractor.
- E. Written statement of acceptance of location and quantity of air and water balancing devices.
- F. Pre-balance information from existing systems, where required.

1.03 QUALIFICATIONS

- A. Acceptable Subcontractors are:
 - 1. Member contractors of "Associated Air Balance Council".
 - 2. Member contractors of "National Environmental Balancing Bureau".
- B. Procedures and Methods: Follow written procedures published, one or more of following:
 - 1. Associated Air Balance Council (AABC).
 - 2. National Environmental Balancing Bureau (NEBB).

1.04 SCOPE OF WORK

- A. Contractor shall perform testing, balancing and adjusting work on all new and existing equipment shown on plans, listed in this section and as required by applicable sections of the specification.
Note: All existing equipment used in new or renovated systems is required to be tested adjusted and balanced.
- B. Note: Air side systems shall be balanced prior to water balance.
- C. Testing, adjusting and balancing is required for all of the following:
 - 1. Air Side Equipment:
 - a) Air Handling Units
 - b) Supply, Return, Exhaust and Relief Duct Systems
 - c) Terminal Equipment
 - d) Diffusers, Registers and Grilles
 - 2. Hydronic Equipment:
 - a) Pumps
 - b) Air Handling Unit Coils
 - c) Terminal Equipment Coils
 - d) Piping Distribution Systems
 - e) Terminal Radiation Units

1.05 GENERAL REQUIREMENTS

- A. It shall be responsibility of the Contractor to place all systems in satisfactory operating condition, including providing services of approved adjusting and balancing subcontractor regularly engaged in this type of work.
- B. Furnish set of Bid Documents to subcontractor within ten (10) days after award of contract.
- C. Adjusting and balancing shall be accomplished as soon as possible after systems are complete and before Owner takes possession.
- D. All systems must conform with the following noise criteria:
 - 1. Areas shall have NC30 to 35.
- E. Initial adjustment and balancing to quantities indicated on design drawings and thereafter as required to satisfy job conditions to satisfaction of the Architects.
- F. Adjusting and balancing shall be accomplished under appropriate outdoor temperature conditions.
- G. Immediately prior to subcontractor's arrival on project:
 - 1. Adjust all balancing cocks and dampers open.
 - 2. Place all equipment in operating condition.
 - 3. Clean all strainers.
 - 4. Remove all temporary air filters and install design filters.
- H. During course of the adjusting and balancing work:
- I. Maintain qualified personnel at project at all times for system operation, trouble shooting, assistance, etc.
- J. Change pulleys and belts as required to meet system performance requirements. Adjustable sheaves shall not be operated at extreme end of adjustment. Replace adjustable sheaves with proper size to operate approximately in mid-range.
- K. Perform necessary mechanical adjustments in conjunction with balancing procedure.
- L. Replace all flow balancers in new and existing systems that cannot be manipulated to satisfy balancing requirements.

1.06 JOB VISIT

- A. Balancing subcontractor shall visit job prior to concealment of work and advise location of dampers, test connections, etc.; advise Architects by letter.
- B. Make any changes or additions of types, locations, etc. of balancing facilities.

1.07 FINAL REPORT

- A. Upon completion, all information shall be inserted in report form listing all items required by specifications. Entire report shall be typewritten and shall be submitted to Architect and Engineer for approval. Results shall be guaranteed. Provide (3) hard copies and electronically submit to architect.

- B. Complete balancing analysis on all individual equipment and systems as specified shall be included in report.
- C. Contractor shall be subject to recall to site to verify report information before approval of report by Architects.
- D. Record action taken to adjust all systems to meet design specifications.
- E. Report on condition of installations (i.e. - complete/inoperative etc.)
- F. Final reports which do not contain all data required by this section will be rejected. Contractor will be required to retest and resubmit for all applicable systems with missing information.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Provide all tools, ladders, recording meters, gauges, thermometers, velometers, anemometers, Pitot tubes, inclined gauge manometers, magnehelic gauges, amprobes, voltmeters, psychrometers, tachometers, etc. required to execute the work. Instruments used shall be accurately calibrated.
1. **NOTE: IF VFD IS PROVIDED, CONTRACTOR SHALL USE VFD FOR BALANCING OF AIR OR HYDRONIC EQUIPMENT. SYSTEM TO BE BALANCED WITH TDV COMPLETELY OPEN.**

PART 3 - EXECUTION

3.01 AIR AND HYDRONIC SYSTEMS

- A. Preparation:
 1. Examine bid documents and notify Architects of any questions regarding balancing, within 30 days after receipt of bid.
 2. The balancing subcontractor shall review sheetmetal shop drawings and mark the location of all required balancing dampers before duct fabrication.
 3. Written notice of coordination between Contractor and balancing contractor to be submitted to Architect and Engineer.
- B. Requirements for Air-Side Testing, Adjusting & Balancing:
 1. Air Handling Equipment:
 - a) Record all drive information (i.e. - sheave type, belt size, motor data).
 - b) Test and adjust fan rpm to design requirements.
 - c) Record RPM and final sheave position.
 - d) Test and record motor no load, and full load amperes, and determine operating brake horsepower.
 - e) Test and record inlet and discharge static pressures.

- f) Test, adjust and record SA, RA, OA and relief air flows for design recirculated air cfm.
 - g) Test, adjust and record SA, RA, OA and relief air flows for full design outside air cfm. Make special effort to test and record total relief cfm air.
 - h) Test and record entering and leaving air temperatures. (D.B. heating and cooling)
 - i) Test and record equipment sound levels in closest occupied space.
2. Ductwork & Air Distribution Systems:
- a) Adjust all main supply, exhaust and return air ducts to proper design cfm, supply, exhaust, return and relief.
 - b) Test and adjust each diffuser, grille, and register to within 10% of design requirements.
 - c) After grilles, diffusers and registers are set at final CFM, check and record sound levels at occupant level at all locations.
 - d) Each grille, diffuser, and register shall be identified as to location and area.
 - e) Size, type and manufacturer of diffusers, grilles and registers, and all tested equipment shall be identified and listed; manufacturer's ratings on all equipment shall be used to make required calculations.
 - f) Readings and tests of diffusers, grilles and registers shall include required fpm velocity and test resultant velocity, required cfm and test resultant cfm after adjustments.
3. Terminal Units:
- a) Adjust terminal units to cfm.
4. Fans (Supply & Exhaust):
- a) Record all drive information (i.e. - sheave type, belts, size, motor data).
 - b) Test and adjust fan rpm to design requirements.
 - c) Record cfm, rpm and final sheave position.
 - d) Test and record motor no load and full load amperes and determine operating brake horsepower.
 - e) Test and record inlet and discharge static pressures.
 - f) In cooperation with control manufacturer's representative, make mechanical adjustments of automatically operated dampers to operate as specified, indicated, and/or noted; subcontractor shall check these damper control operations for proper calibrations and list those requiring adjustment by control installers.
 - g) All diffusers, grilles and registers shall have air patterns adjusted to minimize drafts in all areas.

- h) A record of all final settings shall be made, preferably at each piece of equipment by an appropriate approved mark or if necessary by description on the report schedule.
- i) Record all space temperatures. If space temperatures vary more than 2°F from thermostat setting readjust air flows to obtain proper temperature.

C. Requirements for Water Systems Testing, Adjusting & Balancing:

1. Initial Procedure:
 - a) Examine bid documents and notify Architects of any questions regarding balancing, within 30 days after receipt of bids.
 - b) Air systems shall be examined first.
 - c) Open all manual valves to full open position; close coil bypass stop valves; set automatic control valves to full coil flow.
 - d) Examine water in system and determine if water has been treated and cleaned.
 - e) Check expansion tank and/or compression tanks to determine if they are not air bound or water logged and system is full of water and a proper minimum fill pressure.
 - f) Check all air vents at high points of water systems and determine if they are installed and operating freely.
 - g) Balance terminal units furthest from pumps, work towards pumps. Final balance pump flow control valve(s) last.
2. Pumps:
 - a) Prior to balancing ensure all strainers and dirt pockets have been cleaned.
 - b) Check pump rotation.
 - c) Set hot water pumps to proper gallons per minute delivery.
 - d) Record and check the following items at each heating element:
 - (1) Pressure drop across bypass valve.
 - (2) Pump operating suction and discharge pressures & final TDH.
 - (3) List all mechanical specifications of pumps.
 - (4) Rated and actual running amperage of pump motor.
3. Piping Distribution System:
 - a) Test and adjust all flow control devices.
 - b) Record final settings and distribution gpm.
 - c) Test and record pressure on non adjustable flow control valves. Verify pressure is within control range on valve.
4. Hydronic Coils (HW, CHW):
 - a) Set all temperature controls so all coils are calling for full flow.

- b) After adjustments to coils are made, recheck settings at pumps and readjust as required.
 - c) Read pressure and differential across coils and set flow rate on coil for full heating; set pressure drop across bypass valve to match coil full flow pressure drop.
 - d) Record and check the following items at each heating element:
 - (1) Inlet water temperature.
 - (2) Leaving water temperatures.
 - (3) Pressure drop.
 - e) Check water temperatures at outlet side of heating coils; Note: drop of temperature from source.
 - f) Upon completion of flow reading and adjustment of coils, mark all settings and record data. Show on schematic sketch form wherever practical.
5. Heat Exchangers:
- a) Check operation of any automatic bypass or diverting valves.
 - b) Check and set operating temperatures of heat exchanger to design requirements.
 - c) Record all flows, pressure drops and temperature across heat exchanger.
6. Fin Tube Radiation:
- a) Test, adjust and record gpm for fin tube unit.
 - b) For units not equipped with balancing valve, adjust flow across fin tube using temperature drop method.
 - c) Record flows or temperature drop readings and flow calculations.

3.02 STEAM SYSTEMS

A. Preparation:

- 1. Examine bid documents and notify Architects of any questions regarding balancing, within 30 days after receipt of bids.
- 2. Air systems shall be balanced first.

B. Initial Procedure:

- 1. Open all manual valves to full open position; close coil bypass stop valves; set automatic control valves to full coil flow. Examine steam in system and determine if desired flow is attainable.
- 2. Set all temperature controls so all coils are calling for full flow.
- 3. Check operation of any automatic bypass or diverting valves.
- 4. Check all steam traps and determine they are installed and operating freely.

C. Flow Adjustments:

1. Check steam temperatures at outlet side of heating coils; Note: drop of temperature from source.
2. Upon completion of readings and adjustment at coils, mark all settings and record data. Show on schematic sketch form wherever practical.
3. Fin radiation balancing valves shall be set by temperature drop across the fin. Drop shall be consistent with drop and heat output as specified herein.

D. Final Check:

1. After procedure is complete, thoroughly clean all strainers, dirt pockets, traps, etc.

END OF SECTION 23 0593

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 WORK INCLUDED

- A. Insulate all ducts and as required by contract documents.

1.03 REFERENCES

- A. Test standards and reports for evaluating and rating performance of fire rated shaft enclosures and zero inch clearance ratings for duct wrap systems for compliance to Code.
 - 1. ISO 6944-1985, 'Fire Resistive Tests - Ventilation Ducts'.
 - 2. ASTM E 2336, 'Standard Test Methods for Fire Resistive Grease Duct Enclosure Systems'.
 - 3. ASTM E 814 (UL1479), 'Fire Tests of Through-Penetration Fire Stops Standard'.
 - 4. ASTM E 84, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
 - 5. ASTM C 1338, 'Fungi Resistance of Insulation Materials and Facings Standard'.
 - 6. NFPA 96 'Standard for Ventilation Control & Fire Protection of Commercial Cooking Operations'.

1.04 SUBMITTALS

- A. Manufacturer data for all materials used in contract. Submit schedule of insulation applications.

PART 2 - PRODUCTS

2.01 DUCTWORK INSULATION

- A. **NOTE: IF A CONDITION IS NOT LISTED BELOW, IT SHALL BE INSULATED WITH 2" RB.**
- B. All exhaust fan and relief hoods shall have the void between the duct and the curb completely insulated with FB insulation.
- C. All relief/intake hoods, goosenecks, louvered penthouses and any other ductwork that has exterior termination that have exposed surfaces inside the building shall be insulated as outside air ductwork.

D. The following is a schedule for ductwork insulation:

	Duct System & Location	Type	Thickness	Notes
1.	Outside Air, Relief Air, and Exhaust Air Ducts & Plenum Exposed to Air at Outside Ambient Temperatures (For All Air Handling and Energy Recovery Units), Energy Recovery Exhaust:			
	a) Concealed Spaces	FB	3"	(2)
	b) Exposed Spaces	RB	2"	(1)
2.	Supply & Return Duct:			
	a) Concealed Spaces	FB	2.2"	(2)(4)
	b) Exposed Spaces	RB	2"	(1)(4)
3.	Return Duct within a plenum ceiling	NONE		(6)
4.	Exhaust Fan Ductwork	FB	3"	(2)(5)
	a) Between the backdraft or mechanical damper and the space (ductwork having room conditioned ductwork), no insulation is required. All other exhaust ductwork (or if there is no damper present) shall be insulated as outside air ductwork.			
	b) This does not apply to energy recovery units, refer to above for all energy recovery units.			
5.	Crawlspace	FB	2.2"	(2)(3)
6.	Kitchen Exhaust & Grease Duct	FRI	3"	(1)
7.	Duct Coils (coil & duct 3'-0" min. upstream & downstream, including the coil)	FB	2.2"	(2)
8.	VAV coils (boxes are lined, coils need to be insulated)	FB	2.2"	(2)
9.	All Exterior Ductwork	ERB	3"	(3)(7)(8)(9)

Schedule Notes [some notes might not be used]:

- (1) Weld pins with tapered joints.
- (2) Stapled edge with mechanical fasteners on ducts over 24" wide.
- (3) Provide insulation whether duct is lined or not
- (4) Ducts with internal liner do not require additional insulation unless otherwise noted. This does not apply to special 14 gauge supply duct.
- (5) Exhaust duct exposed to air at ambient temperature must meet the requirements listed above.
- (6) Provide continuous, water tight jacketing over all exterior ductwork.
- (7) For ductwork over 24" wide, pitch insulation towards sides of duct.
- (8) Pitch insulation at equipment connections away from equipment to prevent pooling and intake of water.
- (9) Exterior insulation is not required on return ductwork contained within areas with a ceiling acting as a plenum return – provide exterior insulation per schedule on return ductwork when outside of areas of plenum return.

- E. Duct insulating materials shall be as follows:
1. FB: Flexible fiberglass blanket type duct wrap with factory applied foil faced jacketing reinforced with fiberglass scrim laminated to UL rated kraft. Minimum thickness = 2.2in. Insulation shall be 1-lb/ft³ with a thermal conductivity (k-value) of 0.27 Btu x in/(hr x ft² x °F) at 75°F mean temperature when compressed. Provide with 2" stapling tab. Provide Type #75, Johns Manville; or equal.
 2. FRI: Fireproof insulating material, non-asbestos, biosoluble, patented inorganic fire resistant blanket duct wrap insulation encapsulated with a scrim-reinforced foil, blanket thickness of 1.5" for kitchen exhaust grease duct applications marked with manufacturer's logo and UL and Intertek markings. Design use limit of 2192°F. Flame spread <25; smoke developed <50. Maximum flame spread 0 and smoke developed 0. R value of 4.15 and density of 6 pcf. Insulation shall be UL listed for 2 hour barrier. Duct wrap by 3M Fire Protection Products Duct Wrap 615+; or equal. Use with tape: High performance filament tape, 1" wide. Aluminum foil tape: 4" wide (for sealing cut blanket edges and seams). 3M No. 898; or equal.
 - a) UL 2221 – Standard for tests of fire resistive grease duct enclosure assemblies.
 - b) UL 1978 – Standard for grease ducts.
 - c) NFPA 96 – Standard for ventilation control and fire protection of commercial cooking operations.
 - d) NFPA-90A – Standard for the installation of air conditioning and ventilating systems.
 3. RB: Factory fabricated rigid fiberglass board with factory applied white kraft facing bonded to aluminum foil, reinforced with fiberglass yarn. Minimum thickness = 2in. Temperature limit 450°F unfaced side, 3.0 lb./cu. ft. density. Thermal conductivity (k-value) of 0.23 Btu x in/(hr x ft² x °F) at 75°F mean temperature. Insulation to have a R value of 4.3 per inch. Type #814, Johns Manville; or equal.
 4. ERB: Furnish and install 3" thick, closed-cell polyisocyanurate foam core board with foil facing on all ductwork segments and fittings installed outside of the building. Board shall have a R-value of 19 (for a 3" thick sheet). Board shall act as a vapor barrier with a vapor permeance of 0.05 perms. Provide Johns Manville AP Foil Faced; or equal.
- F. Jacketing Material shall be Venture Clad 1579GCW-E as manufactured by Venture Tape; or approved equal. To be applied over all exterior ductwork insulation or exterior lined ductwork, and as noted elsewhere.
1. Jacketing material shall have a 24.0 mils thickness, 13-ply embossed aluminum made with (2) layers of aluminum foil, a layer of polyester film, an outer layer of tedlan film and an acrylic pressure sensitive adhesive layer.
 2. Jacketing material to provide a 10 year membrane warranty, to be UV resistant and have zero permeability.

PART 3 - EXECUTION

3.01 INSTALLATION OF DUCTWORK INSULATION

- A. All insulation, jacketing and accessories are to be installed in strict accordance with manufacturer's instructions.

- B. Flexible Blanket Insulation (FB): Insulation shall be tightly wrapped around ductwork with all circumferential joints butted and longitudinal joints overlapped minimum of 2".
1. Adhere insulation to metal with 4" wide strips of insulation bonding adhesive at 8" on center and, on ductwork over 24" wide, additionally secure insulation to bottom with pins welded to duct 18" on center. On circumferential joints, secure 2" flange of facing using 9/16" flare door staples applied 6" on center and tape with 3" wide foil reinforced kraft tape. On longitudinal joints, secure overlap in the same manner. All pin penetrations or punctures in facing shall be similarly taped. If single blanket or sufficient thickness is not available, install two layers of equal thickness with vapor barrier facing on outer layer only.
- C. Fireproof Insulating Material (FRI): Install two layers of 1.5" thick wrap with 4" overlap applied directly to the duct. Overlap perimeter and longitudinal joints 3" or 4" on both layers. Fiberglass filament tape may be used as a temporary hold until metal banding is in place on exterior layer. Install fire resistive duct wrap insulation in direct contact with ductwork to manufacturer's instructions and referenced standards. For duct widths greater than 24", weld insulation pins to bottom of horizontal ducts on a 12"x10.5" maximum grid spacing. Welded insulation pins to one of the wider sides of all vertical ducts on a 12"x10.5" maximum grid spacing. Impale duct wrap insulation over pins and secure with speed clips to prevent blanket sag. At duct access doors: Install duct wrap to manufacturer's instructions and procedures. Firestopping at fire separations:
1. Firestop all wrapped ductwork penetrating fire rated concrete floors, gypsum board, block and concrete wall assemblies and gypsum board shaftwall assemblies using UL and/or Intertek firestop system listings appropriate for the applicable duct wrap system.
 2. Kitchen exhaust grease ducts: Fire resistive duct wrap insulation to be continuous through wall or floor penetrations. Maximum 3" clearance permitted between outer layer of duct wrap insulation and edge of opening. Fill annular space between edge of opening and wrapped duct with pieces of 3M duct wrap insulation or mineral wool insulation firmly packed into opening. Compress to percentage stated in firestop listing to minimum depth of 4". Recess packing material below surface on both sides of walls or top side only for floors to depth stated in firestop listing. Seal over packing material using 3M firestop sealant to depth stated in firestop listing, flush with top side of floor and both sides of wall surfaces.
- D. Rigid Board Insulation (RB): Impale insulation over pins welded to duct on 21" centers, cut to extend 1/8" beyond face of board and cover with vapor seal mastic and self-locking cap. Seal all edges and butt joints with 5" wide strips of self-sealing pressure sensitive tape matching surface and finish of duct insulation.
- E. Exterior Ductwork Insulation. Polyisocyanurate Board (ERB): Apply adhesive according to manufacturer's recommended coverage rates per area. Insulation to be adhered to ductwork with weld pins with tapered joints and adhesive, see below. Impale insulation over pins welded to duct on 21" centers, cut to extend 1/8" beyond face of board and cover with vapor seal mastic and self-locking cap. Seal all edges and butt joints with 5" wide strips of self-sealing pressure sensitive tape matching surface and finish of duct insulation. Insulation is to be applied to ductwork with joints tightly butted. All joints shall be fitted to eliminate voids. Any voids are to be eliminated by refitting or replacing sections of insulation.
1. Provide polyisocyanurate board on top, sides and bottom of duct with adhesive.
 2. For ducts over 24", apply sloped polyisocyanurate insulation (Hunter board H-shield; or equal) over Polyisocyanurate insulation to provide a 12/1 pitch in the center of the duct to prevent snow buildup. Attach Polyisocyanurate insulation together with adhesive.

3. Insulate bottom of duct first, full width of duct.
 4. Insulate sides next, same height as duct plus thickness of bottom sheet insulation.
 5. Insulate top full width of duct plus thickness of side sheets both sides.
 6. This contractor shall have a manufacturer's insulation representative instruct his personnel on the installation of this insulation and must be on the site the first day to review the installation.
- F. Jacketing: Jacket to be applied to all surfaces of insulation and duct. Jacket to overlap previous section by minimum of 2".

END OF SECTION 23 0713

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 SUBMITTALS

- A. Schedule of all materials used.
- B. Product data for all materials.

1.03 WORK INCLUDED

- A. Insulate all pipes as required by contract documents.

PART 2 - PRODUCTS

2.01 PIPING INSULATION

- A. **NOTE: IF A CONDITION IS NOT LISTED BELOW, IT SHALL BE INSULATED WITH 1-1/2" TYPE A OR TYPE B, DEPENDING ON THE PIPE.**

- B. The following is a schedule for pipe insulation:

		Pipe Diameter		Type	Notes
		Up To 1-1/4"	1-1/2" & Larger Insulation		
System Type		Min. Insulation Thickness			
1.	Steam (Low Pressure)	2"	3"	A	(1)(2)(3)(6)
2.	Steam (High Pressure)	2"	3"	C	(1)(2)(3)(6)
3.	Condensate	2"	3"	A	(1)(2)(3)(6)
4.	Heating Hot Water	1-1/2"	2"	A	(1)(2)(3)(5)(6)
5.	High Temp Hot Water	2"	3"	C	(1)(2)(3)(6)
6.	Chilled Water	1-1/2"	1-1/2"	A	(1)(2)(3)(5)(6)
7.	Dual Temp	1-1/2"	2"	A	(1)(2)(3)(5)(6)
8.	Condensate Drain	1/2"	1/2"	B	(4)
9.	Condenser Water	1/2"	1"	A	(1)(2)(3)
10.	Cold Water Make-up	1/2"	1/2"	A	(1)(2)
11.	Refrigerant Suction, Liquid Piping and Hot Gas Bypass				
	a) INTERIOR	1/2"	1/2"	B	(4)(7)
	b) EXTERIOR	1"	1"	B	(4)(5)

Schedule Notes:

- (1) Pre-Molded PVC Fitting Covers: Zeston, Inc.; or equal.
- (2) Self-seal lap.
- (3) Staples-outward clinching.
- (4) Foamed plastic pipe insulation adhesive; Armstrong Co.; 520 adhesive; or equal as required to ensure there are no gaps in insulation.

- (5) Exterior insulation shall be covered with exterior jacketing (venture clad) as specified hereinafter. All piping shall be supported to prevent sagging of the pipe, provide supports as required.
- (6) Furnish high impact strength PVC piping jacketing, as specified hereinafter, for all exposed piping in all finished spaces.
- (7) Provide manufacturers pre-insulated line sets with flare connections where possible. Provide rubber insert cushy clamps for all unistrut piping risers and hydra-zorb insulation unistrut cradles for horizontal piping. Ensure all piping is insulated with no gaps.

C. Equipment Insulation:

1. All hot water and chilled water fittings, valves, water specialties, flanges, air separators and pumps shall be insulated per this section, NO EXCEPTIONS!
2. Note: Do not run any insulation through pitch pockets.
3. Note: All insulation requirements of this section shall apply to flexible expansion joints (EXP-1).

2.02 MATERIALS FOR PIPING INSULATION

A. Pipe insulating materials shall be as follows:

1. Type A: Fiberglass pipe insulation jacketed with a reinforced vapor retarder jacket and factory applied longitudinal acrylic adhesive closure system. Insulation shall have a maximum service temperature of 850°F with a thermal conductivity (k-value) of 0.23 Btu x in/(hr x ft² x °F) at 75°F mean temperature per ASTM C518 and UL rated for maximum flamespread of 25 and smoke developed of 50. Johns Manville. Micro-Lok; or equal.
2. Type B: Closed Cell Foam Pipe Insulation. Insulation shall have a maximum service temperature of 300°F with a thermal conductivity (k-value) of 0.28 Btu x in/(hr x ft² x °F) at 75°F mean temperature per ASTM C518 and UL rated for a maximum flamespread of 25 and smoke developed of 50.
 - a) Pre-slit foamed plastic pipe insulation with slit positioned at side and vapor sealed with adhesive on all joints. AP Armaflex Tube Insulation; or equal.
3. Type C: High Temp. Pipe Insulation. Johns Manville, Thermo-12/Gold calcium silicate; or equal. Insulation shall have a maximum service temperature of 1,200°F with a thermal conductivity (k-value) of 0.37 Btu x in/(hr x ft² x °F) at 100°F mean temperature per ASTM C518 and UL rated for a maximum flamespread of 0 and smoke developed of 0.

B. High Impact Strength Jacketing: Furnish PVC jacketing and fitting covers, conforming to ASTM E-84; flame spread 25, smoke developed 50, white high gloss finish, 0.02" minimum thickness.

C. Furnish pre-molded PVC jacketing and fitting covers, lo-smoke type, as manufactured by Proto Corp.; or an approved equal.

D. Exterior Jacketing: Material shall be Venture Clad 1579GCW-E as manufactured by Venture Tape; or approved equal. To be applied over all exterior piping, and as noted elsewhere.

1. Jacketing material shall have a 24.0 mils thickness, 13-ply embossed aluminum made with (2) layers of aluminum foil, a layer of polyester film, an outer layer of tedlan film and an acrylic pressure sensitive adhesive layer.

2. Jacketing material to provide a 10 year membrane warranty, to be UV resistant and have zero permeability.

PART 3 - EXECUTION

3.01 PIPING INSULATION INSTALLATION

A. Type of Insulation Listed and Methods of Installation:

1. Fiberglass Pipe Insulation (A): Butt joints sealed with 3" wide strips of jacket material with factory applied pressure sensitive adhesive, laps and strips applied over clean dry surfaces and all longitudinal and circumferential seams rubbed hard with blunt steel edge. Cover valves, fittings, flanges, etc. with pre-formed fiberglass fittings and premolded PVC plastic jackets.
2. Closed Cell Foam Pipe Insulation (B): Insulate fittings, valves and flanges with mitered and fitted sections of foamed plastic pipe insulation positioned and fastened by adhesive on all joints.
3. Calcium Silicate Pipe Insulation (C): Secure insulation with stainless steel bands at 12-inch (300-mm) intervals, and tighten bands without deforming insulation materials. Apply a skim coat of mineral-fiber, hydraulic-setting cement to insulation surface. When cement is dry, apply flood coat of lagging adhesive and press on one layer of glass cloth or tape. Overlap edges at least 1 inch (25 mm). Apply finish coat of lagging adhesive over glass cloth or tape. Thin finish coat to achieve smooth, uniform finish.

B. Special Requirements:

1. Heating piping hangers shall be applied directly to piping. Cut-out insulation for hanger and cover with jacketing. Insulation shall be "butt-up" to hanger as tightly as possible.
2. Cooling/refrigeration piping insulation shall be continuous and have no breaks, insulation shield shall be applied between insulation and hanger.

END OF SECTION 23 0719

PART 1 – GENERAL

1.01 RELATED SECTIONS

- A. The General Conditions of the Contract, Supplementary Conditions, and General Requirements are part of this specification and shall be used in conjunction with this section as part of the contract documents. Consult the above for further instructions pertaining to this work. The Contractor is bound by the provisions of Division 0 and Division 1.

1.02 STATE CONTRACT

- A. All controls will be by _____ under state contract.
- B. This section applies to the portion of _____ equipment and controls that will be supplied for this project via _____'s NYS OGS contract.
- C. Equipment will be shipped FOB factory and will be unloaded, inspected, stored, and installed by the Mechanical Contractor.
- D. The pre-purchased _____ equipment and _____ controls shall include start-up services, temperature controls, control engineering, controls installation and wiring, operating manuals, training and warranty for parts on equipment and controls. See other specification sections for additional requirements. All other warranty services are by the installing contractor.

1.03 CONNECTION TO EXISTING CONTROL SYSTEM (*If Necessary*)

- A. All new control equipment must integrate seamlessly with existing _____ DDC system. All new digital controllers are required to communicate fully with the existing temperature control network.
- B. All new controllers provided under this project must be connected to the existing BAS System. Extend network (including software) as required to provide a fully integrated control system.
- C. BAS System Contractor shall modify programming in host computer to accept all new equipment and I/O points.
- D. Contractor must visit site to inspect existing equipment required for operation of new systems. If existing miscellaneous equipment is not of sufficient size or is not functioning properly, contractor must include replacement or refurbishment in his bid.

1.04 ACCEPTABLE MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. XXX
 - 2. XXX
- B. If the Contractor is proposing to provide a product by a Manufacturer other than those listed above, the Contractor must, at least 10 days prior to bid opening, to obtain the approval of the Owner for the equal manufacturer, along with provided 5 references of sites where the company has performed projects to similar type.

1.05 SOFTWARE UPGRADES / SERVER UPGRADES

- A. At the completion of the project, the contractor shall ensure that all software is at its latest available revision and that all hardware (servers, workstations, laptops, etc.) shall be capable of meeting all requirements to ensure that the (OWNER) has been furnished with a completely updated system.
- B. If replacement of existing hardware is required due to compatibility with the latest revision of software, it shall be the responsibility of this contractor to provide new hardware.

1.06 CONTROL SYSTEM DESCRIPTION

- A. Provide labor, controls materials, controls equipment and services as required for a complete BACnet Building Automation System (BAS), to perform the functions described in this Section. Controls System shall be Web-based and accessible either directly connected and/or through the owners IP LAN network.
- B. It is the BAS manufacturer's responsibility to provide all the design, engineering, and field coordination required to ensure all equipment sequence of operations are met as specified and the designated BAS operators have the capability of managing the building mechanical system.
- C. The BAS shall meet BACnet communication standards to ensure the system maintains "interoperability" to avoid proprietary arrangements that will make it difficult for the Owner to consider other BAS manufacturers in future projects. These open protocol communication standards are discussed in more detail later in this specification.
- D. BAS controllers shall be listed by BACnet Testing Laboratories (BTL) with appropriate classification.
- E. Direct Digital Control (DDC) technology shall be used to provide the functions necessary for control of mechanical systems and equipment on this project.
- F. The BAS shall accommodate simultaneous multiple user operation. Access to the control system data should be limited only by the security permissions of the operator role. Multiple users shall have access to all valid system data. An operator shall be able to log onto any workstation on the control system and have access to all appropriate data.
- G. The BAS manufacturer shall provide all hardware and software necessary to implement the functions and sequence of operations specified.

1.07 SUBMITTAL REQUIREMENTS

- A. BAS manufacturer shall provide shop drawings and manufacturers' standard specification data sheets on all hardware and software being provided for this project. No work may begin on any segment of this project until the Engineer has reviewed submittals for conformity with the plan and specifications. Five (5) copies are required. All shop drawings shall be provided to the Owner electronically once they have been approved and as-built drawings have been completed.
- B. Quantities of items submitted shall be reviewed by the Engineer. Such review shall not relieve the BAS manufacturer of furnishing quantities required based upon contract documents.
- C. Provide the Engineer with any additional information or data which is deemed necessary to determine compliance with the specifications or which is deemed valuable in documenting and understanding the system to be installed.

- D. Submit the following within 45 days of contract award:
1. A complete bill of materials of equipment to be used indicating quantities, manufacturers and model numbers.
 2. A schedule of all control valves including the valve size, pressure drop, model number (including pattern and connections), flow, CV, body pressure rating, and location.
 3. A schedule of all control dampers including damper size, pressure drop, manufacturer, and model number.
 4. Note: schedule of valves and dampers shall be submitted independently of other submittals; do not combine with other submittals.
 5. Provide all manufacturers' technical cut sheets for major system components. When technical cut sheets apply to a product series rather than a specific product, the data specifically applicable to the project shall be highlighted or clearly indicated by other means. Include:
 - a) Building Controllers
 - b) Custom Application Controllers
 - c) Application Specific Controllers
 - d) Operator Workstations
 - e) Portable Operator Terminals
 - f) Auxiliary Control Devices
 6. Room schedule including a separate line for each VAV box and/or terminal unit indicating location and address.
 7. Samples of graphic display screen types and associated menus.
 8. Provide proposed Building Automation System architectural diagram depicting various controller types, workstations, device locations, addresses, and communication cable requirements.
 9. Provide detailed termination drawings showing all required field and factory terminations, as well as terminal tie-ins to DDC controls provided by mechanical equipment manufacturers. Terminal numbers shall be clearly labeled.
 10. Provide points list showing all system objects and the proposed object names.
 11. Provide a sequence of operation for each controlled mechanical system and terminal end devices.
 12. Provide a BACnet Protocol Implementation Conformance Statement (PICS) for each BACnet system level device (i.e. Building Controller & Operator Workstations) type. This defines the points list for proper coordination of interoperability with other building systems if applicable for this project.
- E. Project Record Documents: Upon completion of installation, submit PDF of record (as-built) documents. The documents shall be submitted for approval prior to final completion and include:
1. Project Record Drawings - These shall be as-built versions of the submittal shop drawings. One set of electronic drawing files shall be provided.

2. Testing and Commissioning Reports and Checklists signed off by trained factory (equipment manufacturers) and field (BAS) commissioning personnel.
3. Operating and Maintenance (O & M) Manuals - These shall be as-built versions of the submittal product data. In addition to the information required for the submittals, Operating & Maintenance manual shall include:
 - a) Names, address and 24-hour/7-day per week telephone numbers of Contractor personnel managing and installing equipment, along with service personnel responsible for supporting the ongoing warranty and services of the control system.
 - b) Procedures for operating the BAS including logging on/off, alarm management, generation of reports, trends, overrides of computer control, modification of setpoints, and other interactive system requirements.
 - c) Description of the programming language including syntax, statement descriptions, algorithms, calculations, point database creation and modification, program creation and modification, and operator use of the editor.
 - d) Explanation of how to design and install new points, new DDC controllers, and other BAS hardware.
 - e) Preventative Maintenance and calibration procedures; hardware troubleshooting; and hardware repair and/or replacement procedures.
 - f) Documentation of all software program logic created for Custom Programmable Controllers including the overall point database. Provide one set of magnetic media containing files of the software and point database.
 - g) One set of electronic media containing files of all operator color graphic screens for the project.
 - h) A list of recommended spare parts including pricing, manufacturer, supplier, and part numbers.
 - i) Documentation, installation, and maintenance information for all third party hardware/software products provided including personal computers, printers, hubs, sensors, valves, etc.
 - j) Original issue media for all software provided, including operating systems, programming language, operator workstation software, and graphics software.
 - k) Licenses, Guarantee, and Warranty documents for all equipment and systems.

1.08 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

A. Section 232113 – Hydronic Piping

1. Control Valves
2. Temperature Sensor Wells and Sockets
3. Hydronic Pressure Taps
4. Hydronic Flow Meters

B. Section 233300 – Ductwork Accessories

1. Automatic Dampers
2. Airflow Stations

1.09 DEFINITIONS

Term	Definition
UCP	Unitary Controller
ACP	Air Handler Controller
BACnet/BACnet Standard	BACnet communication requirements as defined by the latest version of ASHRAE/ANSI 135 and approved addenda.
Control Systems Server	A computer(s) that maintain(s) the systems configuration and programming database.
Controller	Intelligent stand-alone control device. Controller is a generic reference to building controllers, custom application controllers, and application specific controllers.
Direct Digital Control	Microprocessor-based control including Analog/Digital conversion and program logic.
Gateway	Bi-directional protocol translator connecting control systems that use different communication protocols.
Local Area Network	Computer or control system communications network limited to local building or campus.
Master-Slave/Token Passing (MS/TP)	Data link protocol as defined by the BACnet standard.
Point-to-Point	Serial communication as defined in the BACnet standard.
Primary Controlling LAN	High speed, peer-to-peer controller LAN connecting BCs and optionally AACs and ASCs. Refer to System Architecture below.
Protocol Implementation Conformance Statement (PICS)	A written document that identifies the particular options specified by BACnet that are implemented in a device.
Router	A device that connects two or more networks at the network layer.
Wiring	Raceway, fittings, wire, boxes and related items.

1.10 CODES AND STANDARDS

- A. Codes and Standards: Meet requirements of all applicable standards and codes, except when more detailed or stringent requirements are indicated by the Contract Documents, including requirements of this Section.
1. Underwriters Laboratories: Products shall be UL-916-Energy Management Systems for BAS components & ancillary equipment
 2. Underwriters Laboratories: Products shall be UL-873 Temperature Indication & Regulating Equipment.
 3. Federal Communications Commission –Part 15- Subpart J.
 4. All products shall be labeled with the appropriate approval markings. System installation shall comply with NFPA, NEMA, Local and National Standards.
 5. ASHRAE/ANSI 135-2012 (BACnet) - (System Level Devices) - Building Controllers shall conform to the listed version of the BACnet specification in order to improve interoperability with various building system manufacturers' control systems and devices.

6. ASHRAE/ANSI 135-2012 (BACnet) - (Unit Level Devices) - Unit Controllers shall conform to the listed version of the BACnet specification in order to improve interoperability with various building system manufacturers' control systems and devices.

1.11 QUALITY ASSURANCE

A. BAS Manufacturer Qualifications

1. The BAS manufacturer shall have an established business office within 100 miles of the project site and must provide 24 hours/day, 7 days/week response in the event of a customer warranty or service call.
2. The BAS Manufacturer shall have factory trained and certified personnel providing all engineering, service, startup, and commissioning field labor for the project from their local office location. BAS manufacturer shall be able to provide training certifications for all local office personnel upon request.
3. The BAS shall be provided by a single manufacturer and this manufacturer's equipment must consist of operator workstation software, Web-based hardware/software, Open Standard Protocol hardware/software, Custom application Programming Language, Graphical Programming Language, Building Controllers, Custom Application Controllers, and Application Specific Controllers. All other products specified herein (i.e., sensors, valves, dampers, actuators, etc.) need not be manufactured by the BAS manufacturer listed in this specification.

1.12 SYSTEM PERFORMANCE

A. Performance Standards. The BAS system shall conform to the following:

1. Graphic Display. The system shall display a graphic with a minimum of 20 dynamic points. All current data shall be displayed within 10 seconds of the operator's request.
2. Graphic Refresh. The system shall update all dynamic points with current data within 10 seconds.
3. Object Command. The maximum time between the command of a binary object by the operator and the reaction by the device shall be 5 seconds. Analog objects shall start to adjust within 5 seconds.
4. Object Scan. All changes of state and change of analog values shall be transmitted over the high-speed network such that any data used or displayed at a controller or workstation will be current within the prior 10 seconds.
5. Alarm Response Time. The maximum time from when an object goes into alarm to when it is annunciated at the workstation shall not exceed 10 seconds.
6. Program Execution Frequency. Custom and standard applications shall be capable of running as often as once every 5 seconds. The Contractor shall be responsible for selecting execution times consistent with the mechanical process under control.
7. Programmable Controllers shall be able to execute DDC PID control loops at a selectable frequency from at least once every 5 seconds. The controller shall scan and update the process value and output generated by this calculation at this same frequency.

8. Multiple Alarm Annunciations. All workstations on the network shall receive alarms within 5 seconds of each other.
9. Reporting Accuracy. Table 1 lists minimum acceptable reporting accuracies for all values reported by the specified system.
 - a) Table 1: Reporting Accuracy (*applicable to the project*)

Measured Variable	Reported Accuracy
Space Temperature	±1°F
Ducted Air	±2°F
Outside Air	±2°F
Water Temperature	±1°F
Delta –T	±0.25°F
Relative Humidity	±5% RH
Water Flow	±5% of full scale
Air Flow (terminal)	±10% of reading
Air Flow (measuring stations)	±5% of reading
Air Pressure (ducts)	±0.1 "W.G.
Air Pressure (space)	±0.01 "W.G.
Water Pressure	±2% of full scale *Note 1
Electrical Power	5% of reading *Note 2
Carbon Monoxide (CO)	± 50 PPM
Carbon Dioxide (CO2)	± 50 PPM

Note 1: for both absolute and differential pressure

Note 2: * not including utility supplied meters

1.13 WARRANTY REQUIREMENTS

A. Warranty all work as follows:

1. BAS system labor and materials shall be warranted free from defects for a period of twelve (12) months after final completion acceptance by the Owner. BAS failures during the warranty period shall be adjusted, repaired, or replaced at no charge to the Owner. The BAS manufacturer shall respond to the Owner's request for warranty service within 24 hours of the initiated call and will occur during normal business hours.
2. At the end of the final start-up/testing, if equipment and systems are operating satisfactorily to the Owner and Engineer, the Owner shall sign certificates certifying that the BAS is operational, and has been tested and accepted in accordance with the terms of this specification. The date of Owner's acceptance shall be the start of the warranty period.
3. Operator workstation software, project specific software, graphics, database, and firmware updates shall be provided to the Owner at no charge during the warranty period. Written authorization by the Owner must be granted prior to the installation of these updates.
4. The BAS manufacturer shall provide a web-accessible Users Network for the proposed System and give the Owner free access to question/answer forum, user tips, upgrades, and training schedules for a one year period of time correlating with the warranty period.

1.14 SYSTEM MAINTENANCE

- A. Perform Building Automation System preventative maintenance and support for a period of 1 year (beginning the date of substantial completion).
 - 1. Make a minimum of 2 complete Building Automation System inspections, in addition to normal warranty requirements. Inspections to include:
 - a) System Review – Review the BAS to correct programming errors, failed points, points in alarm, and points that have been overridden manually.
 - b) Seasonal Control Loop Tuning – Control loops are reviewed to reflect changing seasonal conditions and/or facility heating and cooling loads.
 - c) Sequence of operation verification – Systems all verified to be operating as designed and in automatic operation. Scheduling and setpoints are reviewed and modified.
 - d) Database back-up
 - e) Operator coaching
 - 2. Technician shall review critical alarm log and advise owner of additional services that may be required.
 - 3. Technician shall provide a written report to owner after each inspection.
- B. Do not assign or transfer maintenance service to agent or subcontractor without prior written consent of owner.

1.15 OWNERSHIP OF PROPRIETARY MATERIAL

- A. Project specific software and documentation shall become the owner's property upon project completion.

1.16 SEQUENCE OF OPERATION

- A. Unit Shut Down
 - 1. All units connected to FACP shall be shut down in the event of fire. (By EC via fire alarm system).
 - 2. All units with low limit controllers (freezestats) shall be shut down if supply air temperature drops below 35°F. Shut down includes closing OA dampers, shut down fan, open control valve (or face damper).
 - 3. All low limit controls shall be hard wired to break fan controls. Wiring low limit through DDC is not permitted to break fan controls. Wiring from LC-1 to DDC system is for alarm purposes only.
 - 4. When low limit control is activated, send auxiliary alarm signal to DDC unit controller. DDC system shall annunciate alarm condition.
 - 5. **All temperature control valves and dampers will be spring return and shall fail to the "Safe" position for that system.**

6. **Bypass valve application will be size for 50% of the pump capacity of that system.**
- B. Remote Monitoring:
1. Provide all software necessary to monitor all sensors, equipment status and alarm conditions at operate workstation and local second tier controllers.
 2. Provide all software necessary to recognize, process and record alarm conditions as required by Owner.
- C. Occupied/Unoccupied Cycle:
1. Each system with DDC controls shall function as an individual D/N zone with individual event times for start/stop.
 2. Stagger initial start times to prevent simultaneous occupied cycle activation for all equipment.
 3. In unoccupied cycle, when room sensor override button is pushed, start software timer (setpoint 2 hours) to provide Day (occupied) cycle for a software selectable period of time after which system reverts to Night (unoccupied) cycle.
 4. While software timer is operating ignore additional override switch signals. System shall ignore switch signals initiated when area is in occupied cycle.
- D. Morning Warm-Up: Provide software routine to initiate morning warm-up when outdoor conditions dictate, warm-up schedule shall be adaptive (i.e. optimize energy usage). During morning warm-up for classrooms and shop areas with motion detector, the detector is overridden until room occupied temperature setpoint is reached, duration (2) hours (adjustable).
- E. Refer to drawings for unit specific sequences.

PART 2 – PRODUCTS

2.01 GENERAL DESCRIPTION

- A. The Building Automation System (BAS) shall use us an open BACnet architecture and DDC controllers that are certified by BACnet Testing Laboratories (BTL) with the appropriate classifications. The BAS shall be capable to integrae to third-party devices and applications. The system shall be for use on the the Internet, or intranets using off the shelf, industry standard technology compatible with the owner provided network.
- B. The Building Automation System (BAS) shall consist of the following:
1. BACnet Testing Laboratories Certified Controllers
 2. Portable Operator Terminal(s)
 3. Networking processing, data storage, and communications equipment
 4. Other controls components required for a complete and working BAS
- C. The Building Automation System (BAS) shall be modular in nature, and shall permit expansion of both capacity and functionality through addition of sensors, controllers, actuators, and operator devices, whilre reusing existing controls equipment.

2.02 BAS ARCHITECTURE

A. Communication Network

1. This project shall be comprised of a high speed Ethernet network utilizing BACnet/IP communications between System Controllers and Workstations. Each System Controller shall function as a BACnet Router to each unit controller providing a unique BACnet Device ID for all controllers within the system. Communications between System Controllers and sub-networks of Custom Application Controllers and/or Application Specific Controllers shall be as defined below.
2. Each System Controller shall perform communications to a network of Custom Application and Application Specific Controllers using BACnet/Zigbee (802.15.4) as defined by the Zigbee Standard.
 - a) Each communication interface shall be Zigbee Building Automation Certified product as defined by the BACnet Standard and the Zigbee Alliance.
 - b) Each System Controller shall function as a BACnet Router to each unit controller providing a unique BACnet Device ID for all controllers within the system.
 - c) Wireless equipment controllers and auxiliary control devices shall conform to:
 - (1) IEEE 802.15.4 radios to minimize risk of interference and maximize battery life, reliability, and range.
 - (2) Communication between equipment controllers shall conform to ZigBee Building Automation (ZBA) standard as BACnet tunneling devices to ensure future integration of other ZBA certified devices.
 - (3) Operating range shall be a minimum of 200 feet (60 m); open range shall be 2,500 ft. (762 m) with less than 2% packet error rate.
 - (4) To maintain robust communication, mesh networking and two-way communications shall be used to optimize the wireless network health.
 - (5) Wireless communication shall be capable of many-to-one sensors per controller to support averaging, monitoring, and multiple zone applications.
 - (6) Certifications shall include FCC CFR47 - RADIO FREQUENCY DEVICES - Section 15.247 & Subpart E.
3. Each System Controller shall perform communications to a network of Custom Application and Application Specific Controllers using BACnet/MSTP (RS485) as defined by the BACnet standard.

B. Integrator Panel:

1. The BAS System shall include appropriate hardware equipment and software to allow bi-directional data communications between the BAS and the 3rd Party manufacturers' control panels. The BAS shall receive, react to, and return information from multiple building systems, including equipment manufacturers' integral packaged controls that do not have the BACnet protocol.
2. All data required by the application shall be mapped into the BAS database, and shall be transparent to the operator.
3. Point inputs and outputs from the third-party controllers shall have real-time interoperability with the BAS such as: Control Software, Energy Management, Custom Process Programming, Alarm Management, Historical Data and Trend Analysis, and Local Area Network Communications.

BACNET Protocol Integration:

4. The neutral protocol used between systems will be BACnet and must comply with the ASHRAE BACnet standard 135.
 5. A complete Protocol Implementation Conformance Statement (PICS) shall be provided for all BACnet system devices.
 6. The ability to command, share point object data, change of state data, and schedules between the host and BACnet systems shall be provided.
- C. The Controls Contractor shall provide all communication media, connectors, repeaters and network switches routers necessary for the high speed Ethernet communications network.

2.03 OPERATOR USER INTERFACE

- A. Furnish 1 PC based operator interface as shown on the system drawings. Each operator web interface shall be able to access all information in the system. Operator interfaces shall reside on the same dedicated high-speed IP network as the System Controller(s).
1. Each operator interface PC shall include the following:
 - a) Hardware type
 - (1) PC or Laptop
 - b. Minimum Hardware
 - (1) Pentium Core 2 DUO or better
 - (2) 4 GB RAM
 - (3) 100 GB hard drive space
 - c. Internet Browser compatibility outlined in the following sections.
- B. Operator web interface
1. The operator web interface shall be accessible via a web browser without requiring any “plug-ins” (i.e. JAVA Runtime Environment (JRE), Adobe Flash).
 2. The operator web interface shall support the following Internet web browsers:
 - a) Internet Explorer 11.0+
 - b) Firefox 47.0+
 - c) Chrome 51.0+
 3. System Security
 - a) Each operator shall be required to login to the system with a user name and password in order to view, edit, add, or delete data.
 - b) User Profiles shall restrict the user to only the objects, applications, and system functions as assigned by the system administrator.
 - c) Each operator shall be allowed to change their user password.
 - d) The System Administrator shall be able to manage the security for all other users.
 - e) The system shall include pre-defined “roles” that allow a system administrator to quickly assign permissions to a user.

- f) User logon/logoff attempts shall be recorded.
 - g) The system shall protect itself from unauthorized use by automatically logging off following the last keystroke. The delay time shall be user definable.
 - h) All system security data shall be stored in an encrypted format.
 - i) The system shall support Active Directory for user set-up and management.
 - j) The system shall track and record all user log-in activity and all changes done at the enterprise level including who made the change, when, what was changed, previous value and new value.
4. Database
- a) Database Save: A system operator with the proper password clearance shall be able to archive controller back-ups on the designated Enterprise operator web interface PC.
 - b) Database Restore: The system operator shall also be able to clear a panel database and manually initiate a download of a specified database to any panel in the system.
 - c) Database Limits. The system operator shall have the ability to set limits on Alarm Log, Global Point Control Log, System Log, and User Change Log to manage database size.
5. On-line Help and Training
- a) Provide a context sensitive, on line help system to assist the operator in operation and configuration of the system.
 - b) On-line help shall be available for all system functions and shall provide the relevant data for each particular screen.
6. System Diagnostics
- a) The system shall automatically monitor the operation of all network connections, building management panels, and controllers
 - b) The failure of any device shall be annunciated to the operators.
7. Customizable Navigation Tree
- a) The Enterprise operator web interface shall include a fully customizable navigation tree that shall allow an operator to do the following:
 - (1) Move and edit any of the nodes of the tree.
 - (2) Move entire groups to any area of the tree
 - (3) Change the name of any node in the tree
 - (4) Create custom nodes for any page in the web interface including graphics, data log views, schedules, and dashboards.
 - (5) Support navigation from multi-building to single building view.
 - (6) Provide the ability to assign graphics to any node in the tree.
 - (7) Ability to create folders and assign and change hierarchy of nodes of the tree.

8. Equipment & Application Pages
 - a) The Enterprise operator web interface shall include standard pages for all equipment and applications. These pages shall allow an operator to obtain information relevant to the operation of the equipment and/or application, including:
 - (1) Animated Equipment Graphics for each major piece of equipment and floor plan in the System.
 - (2) Alarms relevant to the equipment or application without requiring a user to navigate to an alarm page and perform a filter.
 - (3) Historical Data (As defined in Data Log section below) for the equipment or application without requiring a user to navigate to a Data Log page and perform a filter.
 - (4) View of all custom graphical programming for supported controllers in real time.
 - (5) View and management of all points for equipment and applications.
 - (6) Support documents that have been assigned for that equipment.
 - (7) Live data view for any selected points.
 - (8) Touch friendly design for all action buttons, navigation, and spacing.
9. System Graphics. Enterprise operator web interface shall be graphically based and shall include at least one graphic per piece of equipment or occupied zone, graphics for each chilled water and hot water system, and graphics that summarize conditions on each floor of each building included in this contract. Indicate thermal comfort on floor plan summary graphics using colors to represent zone temperature relative to zone set point.
 - a) Functionality. Graphics shall allow operator to monitor system status, to view a summary of the most important data for each controlled zone or piece of equipment, to use point and-click navigation between zones or equipment, and to edit set points and other specified parameters.
 - b) Graphic imagery – graphics shall use 3D images for all standard and custom graphics. The only allowable exceptions will be photo images, maps, schematic drawings, and selected floor plans.
 - c) Animation. Graphics shall be able to animate by displaying different Image lies for changed object status.
 - d) Alarm Indication. Indicate areas or equipment in an alarm condition using color or other visual indicator.
 - e) Format. Graphics shall be saved in an industry-standard format such as BMP, JPEG, PNG, or GIF. Web-based system graphics shall be viewable on browsers compatible with World Wide Web Consortium browser standards. Web graphic format shall require no plug-in (such as HTML and JavaScript) or shall only require widely available no-cost plug-ins (such as Active-X and Macromedia Flash).
10. Custom Graphics
 - a) The operator interface shall be capable of displaying custom graphics in order to convey the status of the facility to its operators.
 - b) Graphical Navigation. The Enterprise operator web interface shall provide dynamic color graphics of building areas, systems and equipment.

- c) Graphical Data Visualization. The Enterprise operator web interface shall support dynamic points including analog and binary values, dynamic text, static text, and animation files.
 - d) Custom background images. Custom background images shall be created with the use of commonly available graphics packages such as Adobe Photoshop. The graphics generation package shall create and modify graphics that are saved in industry standard formats such as GIF and JPEG.
- 11. Graphics Library. Furnish a library of standard MECHANICAL equipment such as chillers, air handlers, terminals, fan coils, unit ventilators, rooftop units, and VAV boxes, in 3-dimensional graphic depictions. The library shall be furnished in a file format compatible with the graphics generation package program.
- 12. Document Support. The Enterprise operator web interface shall support the ability to import support files into a support files library.
 - a) Imported support files can include the following types of document formats: pdf, docx, xlsx, pptx, jpeg, tif, bmp, png, jpg, gif.
 - b) All imported support files can be associated directly with equipment or family types that can then be accessed directly from standard pages.
- 13. Manual Control and Override
 - a) Point Control. Provide a method for a user to view, override, and edit if applicable, the status of any object and property in the system. The point status shall be available by menu, on graphics or through custom programs.
 - b) Temporary Overrides. The user shall be able to perform a temporary override wherever an override is allowed, automatically removing the override after a specified period of time.
 - c) Override Owners. The system shall convey to the user the owner of each override for all priorities that an override exists.
 - d) Provide a specific icon to show timed override or operator override, when a point, unit controller or application has been overridden manually.
 - e) Global Point Control. Provide a method for a user to view, override, and edit if applicable, the status of multiple object and properties in the system. The point status shall be available by menu, on graphics or through custom programs.
- 14. Engineering Units
 - a) Allow for selection of the desired engineering units (i.e. Inch pound or SI) in the system.
 - b) Unit selection shall be able to be customized by locality to select the desired units for each measurement.
- 15. Scheduling. A user shall be able to perform the following tasks utilizing the Enterprise operator web interface:
 - a) Create a new schedule, defining the default values, events and membership.
 - b) Create expectations to a schedule for any given day.

- c) Apply an exception that spans a single day or multiple days.
- d) View a schedule by day, week and month.
- e) Exception schedules and holidays shall be shown clearly on the calendar.
- f) Modify the schedule events, members and exceptions.
- g) Create schedules and exceptions for multiple buildings.
- h) Apply emergency schedule to multiple buildings
- i) Drag and drop scheduling editing
- j) Global schedule and exceptions across multiple buildings

16. Time of day scheduling

- a) Individual time schedules shall be provided for all areas and as listed below. The schedules for each area shall operate independently and shall be configured to meet the requirements of the Owner. The start time of each area shall be configured with optimum start times software functions, stop times shall follow a simple off time schedule.

Areas	Approx. Occupied Time
Office Areas	06:30 - 17:00
Classroom	07:00 - 15:00
Library	07:00 - 15:00
Toilet Room Exhaust Fans	06:00 - 20:00
Gymnasium	09:00 - 15:00
Auditorium	09:00 - 15:00
Kitchen	06:00 - 1500
Open Area	07:00 - 17:00

Note: General equipment associated with a particular area shall follow the area start/stop time schedule (i.e. – classroom general exhaust fans shall stop @ 15:00).

17. Data Logs

- a) Data Logs Definition
 - (1) The Enterprise operator web interface shall allow a user with the appropriate security permissions to define a Data Log for any data in the system.
 - (2) The Enterprise operator web interface shall allow a user to define any Data Log options as described in the Application and Control Software section.
 - (3) Data Log viewing capabilities shall include the ability to show a minimum of 5 points on a chart.
 - (4) Each data point data line shall be displayed as a unique color.
 - (5) Data points can be hidden on the display view by clicking on the point.
 - (6) The operator shall be able to specify the duration of historical data to view by scrolling, zooming, or selecting from a pull down list.
 - (7) The system shall provide a graphical trace display of the associated time stamp and value for any selected point along the x-axis.
 - (8) Operator will have the ability to show alarms and overrides on any data log view.

- b) Export Data Logs
 - (1) The Enterprise operator web interface shall allow a user to export Data Log data in CSV, xlsx or text format for use by other industry standard word processing and spreadsheet packages.
- C. Central Server – Components (Provide server as required)
 - 1. The central physical or virtual server shall consist of the following (minimum):
 - 2. System shall utilize a server class PC, tower or rack mounted.
 - 3. Two 3.0 GHz, Quad Core
 - 4. 8GB, DDR266 SDRAM memory
 - 5. Hard Drive 73 GB
 - 6. RAID 5 (recommended)
 - 7. Microsoft Windows Server 2012/2014
 - 8. Microsoft SQL Server 2008/2012
 - 9. No Exception Taken Framework V3.5, 4.0
 - 10. TCP/IP Interface
- D. The central server shall provide the following applications within the system.
 - 1. Trend Log Application
 - a) The system shall automatically harvest trend logs for defined key measurements for each controlled MECHANICAL device and MECHANICAL application.
 - b) The automatic trend logs shall monitor these parameters for a minimum of 30 days at 15 minute intervals. The automatic trend logs shall be user adjustable.
 - 2. Site Management
 - a) The system must allow for grouping of the many sites in an enterprise in a logical manner.
 - b) The system shall provide a search function to allow users to search for sites or groups of sites by name or partial names.
 - c) The system must provide the necessary means to add, remove, and manage site.
 - 3. Automatic System Database Save and Restore
 - a) The central server shall store on the hard disk backup tables of data including trends, alarms, custom settings and user profiles.
 - b) The data shall be backed up once a day.
 - c) This database shall be updated whenever a change is made in the system.
 - d) The storage of this data shall be automatic and not require operator intervention.
 - e) This capability is completed through SQL scheduled automated tasks for backup and only available in full SQL, and not SQL Express.
 - 4. Manual Database Save and Restore. A system operator with the proper password clearance shall be able to archive the database manually at any time.
 - 5. System Configuration. The central server shall serve web pages as the interface for configuring the operator-level functions of the system. A user with proper security shall be able to configure the system to allow for future changes or additions.

- E. Portable Operator's Terminal P.O.T (where indicated).: (Intended for portable field diagnostic tool.) Provide laptop computer with terminal emulation software to interface with DDC panels. Computer shall be Windows platform with latest stable windows operating system (Windows 8.1) integral pointing device. Furnish unit with all interface cards, cables, and software necessary to operate with DDC communications network, and to communicate directly with unit control panels. Furnish with (2) sets interface cables. Provide Windows 8.1 software. Schedule of laptop computer requirements:

Processing Chip	Pentium N3540, 2.5 GHz
RAM Memory	4 GB
Hard Drive	500 GB 5400 RPM
Two USB	USB 2.0 Ports and 3.0 Ports
Display	15" LED True Life HD
Video	HDMI Port
Sound	Maxx Audio
LAN Comm.	Ethernet Communications Board, 3COMM; or equal
Wireless Card	3-1 Memory Card Reader

- F. Furnish the following applications software for building and energy management. All software applications shall reside and run in the system controllers. Editing of applications shall occur at the building operator interface.
1. Scheduling. Provide the capability to schedule each object or group of objects in the system based off of the owner's request. Each of these schedules shall include the capability for start, stop, optimal start, optimal stop, and night economizer actions. Each schedule may consist of up to [10] events. When a group of objects are scheduled together, provide the capability to define advances and delays for each member. Each schedule shall consist of the following:
 - a) Weekly Schedule. Provide separate schedules for each day of the week.
 - b) Exception Schedules. Provide the ability for the operator to designate any day of the year as an exception schedule. This exception schedule shall override the standard schedule for that day. Exception schedules may be defined up to a year in advance. Once an exception schedule is executed it will be discarded and replaced by the standard schedule for that day of the week.
 - c) Holiday Schedules. Provide the capability for the operator to define up to 99 special or holiday schedules. These schedules may be placed on the scheduling calendar and will be repeated each year. The operator shall be able to define the length of each holiday period.
 - d) Optimal Start. The scheduling application outlined above shall support an optimal start algorithm. This shall calculate the thermal characteristics of a zone and start the equipment prior to occupancy to achieve the desired space temperature at the specified occupancy time. The algorithm shall calculate separate sets of heating and cooling rates for zones that have been unoccupied for less then and greater than 24 hours. Provide the ability to modify the start algorithm based on outdoor air temperature. Provide an early start limit in minutes to prevent the system from starting before an operator determined time limit.
 2. Trend Log Application
 - a) Trend log data shall be sampled and stored on the System Controller panel and shall capable of being archived to a BACnet Workstation for longer term storage.
 - b) Trend logs shall include interval, start-time, and stop-time.

- c) Trend log intervals shall be configurable as frequently as 1 minute and as infrequently as 1 year.
- 3. Trend Logs
 - a) The system controller shall create trend logs for defined key performance indicators for each controlled MECHANICAL device and MECHANICAL application.
 - b) The trend logs shall monitor these parameters for a minimum of 7 days at 15 minute intervals. The automatic trend logs shall be user adjustable.
- 4. Alarm/Event Log
 - a) Any object in the system shall be configurable to generate an alarm when transitioning in and out of a normal or fault state.
 - b) Any object in the system shall allow the alarm limits, warning limits, states, and reactions to be configured for each object in the system.
 - c) An alarm/event shall be capable of triggering any of the following actions:
 - (1) Route the alarm/event to one or more alarm log
 - (2) The alarm message shall include the name of the alarm location, the device that generated the alarm, and the alarm message itself.
 - (3) Route an e-mail message to an operator(s).
 - (4) Log a data point(s) for a period of time.
 - (5) Run a custom control program.
- 5. Point Control. User shall have the option to set the update interval, minimum on/off time, event notification, custom programming on change of events.
- 6. Timed Override. A standard application shall be utilized to enable/disable temperature control when a user selects on/cancel at the zone sensor, building operator interface, or the local operator display. The amount of time that the override takes precedence will be selectable from the building operator interface.
- 7. Anti-Short Cycling. All binary output points shall be protected from short cycling.
- 8. Alarm/Event Notification:
 - a) An operator shall be notified of new alarms/events as they occur while navigating through any part of the system via an alarm icon.
 - b) The operator will have the option of selecting an audible alarm notification for all alarm classes they subscribe to.
 - c) The system operator will have the option of setting specific times and days that that they will receive alarm notifications.
 - d) Provide software alarm points as listed below and as required by the Owner. Contractor shall meet with the Owner to include additional alarm point annunciation as requested by the Owner.

Point	Alarm Function
Hardware	Communication Failure Hardware Failure
Space Temperature	Out of Limits ($\pm 5^{\circ}$ from setpoint)
Duct Air Temperature	Out of Limits ($\pm 10^{\circ}$ from setpoint)
Water Flow Switch	Loss of Flow
Air Flow Switch	Loss of Flow
Water Temperature	Out of Limits ($\pm 10^{\circ}$ from setpoint)
Freeze Stat	Report Freeze Condition
Current Flow Switch	Loss of Current (Fan/Pump)

9. User Change Log. The operator shall be able to view all logged user changes in the system from any Enterprise operator web interface.
 - a) An operator shall be able to group user changes by: date, affected, date & affected, user, date & user, transaction type, date & transaction type, or sort only.
 - b) The operator will have the option of additional filtering capability of: date, transaction, type, user, affected, and details that can be used individually or in conjunction with other filters.

2.04 BUILDING CONTROLLERS

- A. There shall be one or more independent, standalone microprocessor based System Controllers to manage the global strategies described in Application and Control Software section.
 1. The System Controller shall have sufficient memory to support its operating system, database, and programming requirements.
 2. The controller shall provide a USB communications port for connection to a PC.
 3. The operating system of the Controller shall manage the input and output communications signals to allow distributed controllers to share real and virtual point information and allow central monitoring and alarms.
 4. All System Controllers shall have a real time clock.
 5. Data shall be shared between networked System Controllers.
 6. The System Controller shall continually check the status of its processor and memory circuits. If an abnormal operation is detected, the controller shall.
 - a) Assume a predetermined failure mode.
 - b) Generate an alarm notification.
 - c) Create a retrievable file of the state of all applicable memory locations at the time of the failure.
 - d) Automatically reset the System Controller to return to a normal operating mode.
 7. Environment. Controller hardware shall be suitable for the anticipated ambient conditions. Controller used in conditioned ambient shall be mounted in an enclosure, and shall be rated for operation at -40°C to 50°C [-40°F to 122°F].

8. Clock Synchronization:
 - a) All System Controllers shall be able to synchronize with a NTP server for automatic time synchronization.
 - b) All System Controllers shall be able to accept a BACnet time synchronization command for automatic time synchronization.
 - c) All System Controllers shall automatically adjust for daylight savings time if applicable.
9. Serviceability
 - a) Provide diagnostic LEDs for power, communications, and processor.
 - b) The System Controller shall have a display on the main board that indicates the current operating mode of the controller.
 - c) All wiring connections shall be made to field removable, modular terminal connectors.
 - d) The System controller shall utilize standard DIN mounting methods for installation and replacement.
10. Memory. The System Controller shall maintain all BIOS and programming information indefinitely without power to the System controller.
11. Immunity to power and noise. Controller shall be able to operate at 90% to 110% of nominal voltage rating and shall perform an orderly shut-down below 80% nominal voltage.
12. BACnet Test Labs (BTL) Listing. Each System Controller shall be listed as a Building Controller (B-BC) by the BACnet Test Labs with a minimum BACnet Protocol Revision of 14.

2.05 ADVANCED APPLICATION CONTROLLERS

- A. Advance Application Controllers shall be used to control all equipment or applications of medium and high complexity, including but not limited to Air Handlers, Boiler Plants and Chiller Plants.
- B. For Stand-Alone Operation of Advanced Application Controllers:
 1. Shall operate a schedule in a standalone application using a Real Time Clock with a 7 day power backup.
 - a) The Controller shall have a built in schedule (assessable with or without a display).
 - b) Support will be for at least 3 schedules with up to 10 events for each day of the week.
 - c) Each of the 3 schedules can be Analog, Binary or Multi-State.
 - d) The controller shall support a minimum of 25 exceptions each with up to 10 events.
- C. For ease of troubleshooting, the Controller shall support data trend logging.
 1. 25,000 samples minimum

2. Trends shall be capable of being collected at a minimum sample rate of once every second.
 3. Trends shall be capable of being scheduled or triggered.
- D. To meet the sequence of operation for each application, the Controller shall use library programs provided by the controller manufacturer that are either factory loaded or downloaded with service tool to the Controller.
- E. Environment. Controller hardware shall be suitable for the anticipated ambient conditions.
1. Storage conditions:
 - a) Temperature: -67°F to 203°F (-55°C to 95°C).
 - b) Humidity: Between 5% to 100% RH (non-condensing).
 2. Operating conditions:
 - a) Temperature: -40°F to 158°F (-40°C to 70°C)
 - b) Humidity: Between 5% to 100% RH (non-condensing).
 3. Controllers used indoors shall be mounted in a NEMA 1 enclosure at a minimum.
 4. Controllers used outdoors and/or in wet ambient shall be mounted within NEMA 4 type waterproof enclosures, and shall be rated for operation at -40° F to 158° F [-40° C to 70° C].
- F. Input/Output: The Controller shall have on board or through expansion module all I/O capable of performing all functionality needed for the application. Controls provided by the equipment manufacture must supply the required I/O for the equipment. In addition other controls must meet the following requirements.
1. Shall support flexibility in valve type, the controllers shall be capable of supporting the following valve control types: 0-10VDC, 0-5VDC, 4-20mA, 24VAC - 2 position.
 2. Shall support flexibility in sensor type, the Controller shall be capable of reading sensor input ranges of 0 to10V, 0 to 20mA, 50ms or longer pulses, 200 to 20Kohm and RTD input.
 3. Shall support flexibility in sensor type, all Analog Outputs shall have the additional capability of being programmed to operate as Universal Inputs or Pulse Width Modulation Outputs.
 4. Shall support flexibility in sensor type, the Controller and/or expansion modules shall support dry and wetted (24VAC) binary inputs.
 5. The controller shall support pulse accumulator for connecting devices like energy meters.
 6. In order to support a wide range of devices, the Controller's binary output shall be able to drive at least 10VA each.
 7. Any unused I/O that is not needed for the functionality of the equipment shall be available to be used by custom programs on the Controller and by any other controller on the network.
 8. The Controller shall provide 24VAC and 24VDC power terminals sensors and other devices required.
 9. The Controller shall provide a dedicated static pressure input.

- G. Input/Output Expandability – The Controller shall provide the following functionality in order to meet current and future application needs:
1. For the application flexibility, the Controller shall be capable of expanding to a total of at least 100 hardware I/O terminations.
 2. Expansion I/O can be mounted up to 650 ft. (200m) from control.
 3. Expansion I/O can be added in as small as 4 point increments.
 4. To keep BACnet network traffic to a minimum, expansion I/O must communicate via an internal controller communication bus.
- H. Serviceability – The Controller shall provide the following in order to improve serviceability of the Controller.
1. Diagnostic LEDs for power/normal operation/status, BACnet communications, sensor bus communications, and binary outputs. All wiring connections shall be clearly labeled and made to be field removable.
 2. Binary and analog inputs and outputs shall use removable connectors or be connected to terminal strip external to the control box.
 3. Software service tool connection through all of the following methods: direct cable connection to the Controller, connection through another controller on BACnet link and through the Controller's zone sensor.
 4. For safety purposes, the controller shall be capable of being powered by a portable computer's USB port for the purposes of configuration, programming and testing programs so that this work can be accomplished with the power off to the associated equipment.
 5. The Controller software tool service port shall utilize standard off-the-shelf USB printer cable.
 6. Capabilities to temporarily override the BACnet point values with built-in time expiration in the Controller.
 7. To aid in service replacement, the Controller shall easily attached to standard DIN rail mounting.
 8. For future expansion, the Controller shall be capable of adding sequence of operation programming utilizing service tools software with a graphical programming interface (editing or programming in line code is not permissible).
 9. To aid in service replacement, the Controller shall allow for setting its BACnet address via controller mounted rotary switches that correspond to the numerical value of the address. (DIP switch methodologies are not allowed). Setting of the address shall be accomplished without the need of a service tool or power applied to the controller.
 10. Controller data shall be maintained through a power failure.
- I. Software Retention: All Controller operating parameters, setpoints, BIOS, and sequence of operation code must be stored in non-volatile memory in order to maintain such information for months without power.

- J. Transformer for the Controller must be rated at minimum of 115% of ASC power consumption, and shall be fused or current limiting type. 24 VAC, +/- 15% nominal, 50-60 Hz, 24 VA plus binary output loads for a maximum of 12 VA for each binary output.
- K. Controller must meet the following Agency Compliance:
 - 1. UL916 PAZX, Open Energy Management Equipment
 - 2. UL94-5V, Flammability
 - 3. FCC Part 15, Subpart B, Class B Limit
 - 4. BACnet Testing Laboratory (BTL) Listed.
- L. A Local Operator Touch Sensitive Display shall be provided for Central Plant and Air Handler Controllers at building locations where specified in the sequence of operations or point list.

2.06 APPLICATION-SPECIFIC CONTROLLERS

- A. Application Specific Controllers (ASC) shall be microprocessor-based DDC controllers which, through hardware or firmware design, control specified equipment. They are not user programmable, but are customized for operation within the confines of the equipment they are designed to serve.
 - 1. Application Specific Controller are only allowed when both the following are met.
 - a) The equipment is compressor based or boiler based.
 - b) The controller is provided by the equipment manufacturer and warrantied as part of the equipment.
- B. Zone Controllers are controllers that operate equipment that control the space temperature of single zone. Examples are controllers for VAV, Fan coil, Blower Coils, Unit Ventilators, Heat Pumps, and Water Source Heat Pumps.
 - 1. Software
 - a) To meet the sequence of operation for each zone control, the controller shall use programs developed and tested by the controller manufacturer that are either factory loaded or downloaded with service tool to the controller.
 - b) Stand-Alone Operation: Each piece of equipment specified in section "A" shall be controlled by a single controller and provide stand-alone control in the event of communication failure. In case of communications failure stand-alone operation shall use default values or last values for remote sensors read over the network such as outdoor air temperature.
 - c) For controlling ancillary devices and for flexibility to change the sequence of operation in the future, the controller shall be capable running custom programs written in a graphical programming language.
 - 2. Environment: Controller hardware shall be suitable for the anticipated ambient conditions.
 - a) Storage: -55° to 203° F and 5 to 95% Rh, non-condensing.
 - b) Operating: -40° to 158° F and 5 to 95% Rh, non-condensing.
 - c) Controllers used indoors shall be mounted in a NEMA 1 enclosure at a minimum.

- d) Controllers used outdoors and/or in wet ambient shall be mounted within NEMA 4 type waterproof enclosures, and shall be rated for operation at -40° to 158° F.
3. Input/Output:
- a) For flexibility in selection and replacement of valves, the controllers shall be capable of supporting all of the following valve control types 0-10VDC, 0-5VDC, 4-20mA, 24VAC floating point, 24VAC - 2 position (Normally Open or Normally Closed).
 - b) For flexibility in selection and replacement of sensors, the controllers shall be capable of reading sensor input ranges of 0 to 10V, 0 to 20mA, pulse counts, and 200 to 20Kohm.
 - c) For flexibility in selection and replacement of binary devices, the controller shall support dry and wetted (24VAC) binary inputs.
 - d) For flexibility in selection and replacement devices, the controller's shall have binary output which are able to drive at least 12VA each.
 - e) For flexibility in selection and replacement of motors, the controller shall be capable of outputting 24VAC (binary output), DC voltage (0 to 10VDC minimum range) and PWM (in the 80 to 100 Hz range).
 - f) For future needs, any I/O that is unused by functionality of equipment control shall be available to be used by custom program on the controller and by another controller on the network.
 - g) For future expansion and flexibility, the controller shall have either on board or through expansion, 20 hardware input/output points. Expansion points must communicate with the controller via an internal communications bus. Expansion points must be capable of being mounted up to 650ft. (200 m) from the controller. Expansion points that require the BACnet network for communication with the controller are not allowed.
4. Serviceability – The controller shall provide the following in order to improve serviceability of the controller.
- a) Diagnostic LEDs shall indicate correct operation or failures/faults for all of the following: power, sensors, BACnet communications, and I/O communications bus.
 - b) All binary output shall have LED's indicating the output state.
 - c) All wiring connectors shall removable without the use of a tool.
 - d) Software service tool connection through all of the following methods: direct cable connection to the controller, connection through another controller on BACnet link and through the controller's zone sensor.
 - e) For safety purposes, the controller shall be capable of being powered by a portable computer for the purposes of configuration, programming, and testing programs so that this work can be accomplished with the power off to the equipment.
 - f) Capabilities to temporarily override of BACnet point values with built-in time expiration in the controller.
 - g) BACnet MAC Address shall be set using decimal (0-9) based rotary switches.
 - h) Configuration change shall not be made in a programming environment, but rather by a configuration page utilizing dropdown list, check boxes, and numeric boxes.
 - i) BACnet trending objects resident on controller.
 - (1) Minimum of 20,000 trending points total on controller

- (2) Shall be capable of trending all BACnet points used by controller
 - (3) Shall be capable of 1 second sample rates on all points
5. Software Retention: All Zone Controller operating parameters, setpoints, BIOS, and sequence of operation code must be stored in non-volatile memory in order to maintain such information for months without power.
 6. Transformer for the controller must be rated at minimum of 115% of ASC power consumption, and shall be fused or current limiting type. 24 VAC, +/- 15% nominal, 50-60 Hz, 24 VA plus binary output loads, for a maximum of 12 VA for each binary output.
 7. Agency Approval: The controller shall have meet the Agency Compliance:
 - a) UL916 PAZX, Open Energy Management Equipment
 - b) UL94-5V, Flammability
 - c) FCC Part 15, Subpart B, Class B Limit

2.07 INPUT / OUTPUT INTERFACE

- A. Hardwired inputs and outputs may tie into the system through building, custom application, or ASCs.
- B. All input points and output points shall be protected such that shorting of the point to itself, to another point, or to ground will cause no damage to the controller. All input and output points shall be protected from voltage up to 24V of any duration, such that contact with this voltage will cause no damage to the controller.
- C. Binary inputs shall allow the monitoring of on/off signals from remote devices. The binary inputs shall provide a wetting current of at least 12 mA to be compatible with commonly available control devices and shall be protected against the effects of contact bounce and noise. Binary inputs shall sense "dry contact" closure without external power (other than that provided by the controller) being applied.
- D. Pulse accumulation input objects. This type of object shall conform to all the requirements of binary input objects and also accept up to 10 pulses per second for pulse accumulation.
- E. Analog inputs shall allow the monitoring of low voltage (0 to 10 VDC), current (4 to 20 mA), or resistance signals (thermistor, RTD). Analog inputs shall be compatible with and field configurable to commonly available sensing devices.
- F. Binary outputs shall provide for on/off operation or a pulsed low-voltage signal for pulse width modulation control. Binary outputs on building and custom application controllers shall have status lights. Outputs shall be selectable for either normally open or normally closed operation.
- G. Analog outputs shall provide a modulating signal for the control of end devices. Outputs shall provide either a 0 to 10VDC or a 4 to 20 mA signal as required to provide proper control of the output device. Analog outputs shall not exhibit a drift of greater than 0.4% of range per year.
- H. Tri-State Outputs. Provide tri-state outputs (two coordinated binary outputs) for control of three-point floating type electronic actuators without feedback. Use of three-point floating devices shall be limited to zone control and terminal unit control applications (VAV terminal units, duct-mounted heating coils, zone dampers, radiation, etc.). Control algorithms shall run the zone actuator to one end of its stroke once every 24 hours for verification of operator tracking.
- I. System Object Capacity. The system size shall be expandable to at least twice the number of input/output objects required for this project. Additional controllers (along with associated devices and

wiring) shall be all that is necessary to achieve this capacity requirement. The operator interfaces installed for this project shall not require any hardware additions or software revisions in order to expand the system.

2.08 POWER SUPPLIES

- A. Control transformers shall be UL listed. Furnish Class 2 current-limiting type or furnish overcurrent protection in both primary and secondary circuits for Class 2 service in accordance with NEC requirements. Limit connected loads to 80% of rated capacity.
 - 1. DC power supply output shall match output current and voltage requirements. Unit shall be full-wave rectifier type with output ripple of 5.0 mV maximum peak-to-peak. Regulation shall be 1.0% line and load combined, with 100-microsecond response time for 50% load changes. Unit shall have built-in overvoltage and overcurrent protection and shall be able to withstand a 150% current overload for at least three seconds without trip-out or failure.
 - a. Line voltage units shall be UL recognized and CSA approved.

2.09 AUXILIARY CONTROL DEVICES

- A. Motorized dampers, unless otherwise specified elsewhere, shall be as follows:
 - 1. **(D-1)**: Opposed blade damper.
 - 2. **(D-2)**: Parallel blade damper.
 - 3. Damper frames shall be 16 gauge galvanized sheet metal or 1/8" extruded aluminum with reinforced corner bracing.
 - 4. Damper blades shall not exceed 8" in width or 48" in length. Blades are to be suitable for medium velocity performance (2,000 fpm). Blades shall be not less than 16 gauge.
 - 5. Damper shaft bearings shall be as recommended by manufacturer for application.
 - 6. All blade edges and top and bottom of the frame shall be provided with compressible seals. Side seals shall be compressible stainless steel. The blade seals shall provide for a maximum leakage rate of 10 CFM per square foot at 2.5" w.c. differential pressure.
 - 7. All leakage testing and pressure ratings will be based on AMCA Publication 500.
 - 8. Individual damper sections shall not be larger than 48" x 60". Provide a minimum of one damper actuator per section.
 - 9. Control dampers shall be parallel or opposed blade types as scheduled on drawings.
 - 10. Acceptable Manufacturer shall be Ruskin, Greenheck, or equal.
- B. Electric damper/valve actuators **(ME-1, ME-2, ME-3)**
 - 1. ME-1: Modulating range.
 - 2. ME-2: Two Position.
 - 3. ME-3: Modulating range, for unit ventilators.

4. The actuator shall have electronic overload or digital rotation sensing circuitry to prevent damage to the actuator throughout the rotation of the actuator.
5. Where shown, for power-failure/safety applications, an internal mechanical, spring return mechanism shall be built into the actuator housing.
6. Proportional actuators shall accept a 0-10 VDC or 0-20 ma control signal and provide a 2-10 VDC or 4-20 ma operating range.
7. Actuators shall be Underwriters Laboratories Standard 873 listed.
8. Acceptable Manufacturer shall be Belimo or equal.

C. Control Valves

1. Control valves shall be two-way or three-way type for two-position or modulating service as scheduled or shown.
2. Size control valves according to chart below: (Maximum DP of 3 psi):

VALVE SIZE CHART		
Max GPM	VALVE SIZE	CV
7.5	1/2"	4.4
13	3/4"	7.5
24	1"	14
35	1-1/4"	20
48	1-1/2"	28
69	2"	40
113	2-1/2"	65
156	3"	156
294	4"	294

3. Close-off (differential) Pressure Rating: Valve actuator and trim shall be furnished to provide the following minimum close-off pressure ratings:
 - a) Water Valves:
 - (1) Two-way: 150% of total system (pump) head.
 - (2) Three-way: 300% of pressure differential between ports A and B at design flow or 100% of total system (pump) head.
 - b) Steam Valves: 150% of operating (inlet) pressure.
4. Water Valves
 - a) Body and trim style and materials shall be in accordance with manufacturer's recommendations for design conditions and service shown, with equal percentage ports for modulating service.
 - b) Sizing Criteria.
 - (1) **(CVI)** Two-position service.
 - (2) Two-way modulating service: Pressure drop shall be equal to twice the pressure drop through heat exchanger (load), 50% of the pressure difference between supply and return mains, or 3 psi, whichever is greater.

- (3) **(CVM, CVZM)** Three-way modulating service: Pressure drop equal to twice the pressure drop through the coil exchanger (load), 3 psi maximum.
- (4) Valves (1/2 in.) through (2 in.) shall be bronze body or cast brass ANSI Class 250, spring-return, PTFE packing, quick opening for two-position service. Two-way valves to have replaceable composition disc or stainless steel ball, 23°F - 250°F.
- (5) Valves (2 1/2 in.) and larger shall be cast iron ANSI Class 125 with guided plug and PTFE packing, globe valve.
- (6) Never provide a controls valve that is less than half the size of the supply line serving that system.

c) Terminal Unit Zone valves shall be sized to meet the control application and they shall be spring return so in the event of a power failure, they will go to full open.

5. Acceptable Manufacturer shall be Belimo; or equal

D. Binary Temperature Devices (**THL-1**)

- 1. Low-voltage space thermostat shall be 24 V, bimetal-operated, mercury-switch type, with either adjustable or fixed anticipation heater, concealed setpoint adjustment, 13°C to 30°C (55°F to 85°F) setpoint range, 1°C (2°F) maximum differential, and vented ABS plastic cover. Acceptable Manufacturer shall be Honeywell; or equal.
- 2. Line-voltage space thermostat shall be bimetal-actuated, open contact type, or bellows-actuated, enclosed, snap-switch type or equivalent solid-state type, with heat anticipator, UL listed for electrical rating, concealed setpoint adjustment, 13°C to 30°C (55°F to 85°F) setpoint range, 1°C (2°F) maximum differential, and vented ABS plastic cover. Acceptable Manufacturer shall be Honeywell; or equal.

E. Temperature Sensors (**TSB, TSR, TSD, TSDA, TS/HS**)

- 1. TSB: Flat plate thermistor room sensor. ACI R2; or equal.
- 2. TSR: Room sensor with LCD display and setpoint adjustability. ZS Pro-M, Automated Logic; or equal.
- 3. TSD/TSDA: duct mounted sensor.
- 4. TS/HS: Combination temperature and humidity sensor. A/RH1; Automation Components, Inc.
- 5. Combination Temperature and Humidity sensor.
- 6. Temperature sensors shall be RTD or thermistor.
 - a) Wireless space sensor component certifications shall include:
 - (1) UL 916 - Energy Management Equipment.
 - (2) UL 94 - The Standard for Flammability of Plastic Materials for Parts in Devices and Appliances.
 - (3) UL 873 - Temperature regulating and indicating equipment.
 - b) The wireless space sensor battery life shall provide at least 15 years life under normal operating conditions and must be readily available size AA, 1.5V.

7. Duct sensors shall be single point or averaging as shown. Averaging sensors shall be a minimum of 1.5 m (5 ft) in length per 1 m² (10 ft²) of duct cross section.
 8. Immersion sensors shall be provided with a separable stainless steel well. Pressure rating of well is to be consistent with the system pressure in which it is to be installed. The well must withstand the flow velocities in the pipe.
 9. Space sensors shall be equipped with setpoint adjustment, override, display, and/or communication port as shown on plans.
 10. Provide matched temperature sensors for differential temperature measurement.
- F. Humidity Sensors (**HSTS-wall mount / HSP-duct mount**)
1. Space Humidity Sensors shall have a sensing range of 20% to 80% with accuracy of +/- 2% RH.
 2. Duct Sensors and Outdoor air humidity sensors shall have a sensing range of 20% to 95% RH with an accuracy of +/- 2% RH.
 3. Humidity sensor's drift shall not exceed 1% of full scale per year.
 4. Acceptable Manufacturer shall be Omega; or equal.
- G. End Switch (**ES-1**)
1. Proof of closure of damper. Kele; or equal.
- H. Pressure Sensors (**DPT-1**)
1. Air pressure of differential pressure measurements in the range of 0 to 10" water column shall be accurate to +/- 1% of range. Acceptable Manufacturer shall be Setra; or equal.
 2. Liquid pressure or differential liquid pressure measurements shall be accurate to +/- 0.25% of range. Unit shall be provided with isolation and bypass manifold for startup and maintenance operations. Acceptable Manufacturer shall be Setra; or equal.
- I. Low Limit Thermostats (**LC-1**)
1. Safety low limit thermostats shall be vapor pressure type with an element 6m [20 ft] minimum length. Element shall respond to the lowest temperature sensed by any one foot section. Acceptable Manufacturer shall be Honeywell; or equal.
 2. Low limit shall be manual reset only.
- J. Carbon Dioxide Sensors (**CDS-1**)
1. Carbon Dioxide sensors shall measure CO₂ in PPM in a range of 50 ppm with drift not to exceed 20 ppm. Sensors shall be duct or space mounted as indicated in the sequence of operation.
 2. Acceptable Manufacturer shall be Dwyer; or equal.
- K. Flow Switches (**FS-1**)

1. Flow-proving switches shall be either paddle or differential pressure type.
2. Paddle type switches (water service only) shall be UL listed, SPDT snap-acting with pilot duty rating (125VA minimum) and shall have adjustable sensitivity with NEMA 1 enclosure unless otherwise specified. Manufacturer shall be Setra; or equal.
3. Differential pressure type switches (air or water service) shall be UL listed, SPDT snap-acting, pilot duty rated (125 VA minimum), NEMA 1 enclosure, with scale range and differential suitable for intended application or as specified. Acceptable Manufacturer shall be Setra; or equal.

L. Air Flow Probes (**AF-1**)

1. Provide an array of airflow traverse probes where indicated, capable of continuously monitoring the fan or duct capacities (CFM) they serve. Each airflow traverse probe shall contain multiple total and static pressure sensors located along the exterior surface of the cylindrical probe and internally connected to their respective averaging manifolds. The flow sensors shall not protrude beyond the surface of the probe(s), and shall be the offset type for static pressure and the chamfered impact type for total pressure measurement. The airflow sensing probe's measurement accuracy shall not be affected by directional flow having pitch and/or yaw angles up to 30°. Each airflow traverse probe shall be of extruded aluminum construction and furnished with mounting plate(s), gasket and signal fittings suitable for MECHANICAL duct installation.
2. The airflow traverse probe shall not induce a pressure drop in excess of 0.03" w.c. at 2000 FPM, nor measurably contribute to sound levels within the duct. Total and static pressure sensors shall be located at the centers of equal areas (for rectangular duct) or at equal concentric area centers (for circular ducts) along the probe length. The airflow traverse probe shall be capable of producing steady, non-pulsating signals of total and static pressure without need for flow corrections or factors, with an accuracy of 2-3% of actual flow, over a velocity range of 400 to 4000 FPM.
3. Provide the minimum number of probes indicated: Duct height 8 – 12", 1 probe; 13 – 30", 2 probes; 31 – 54", 3 probes; 55 – 84", 4 probes; 85 – 120", 5 probes; 121 – 180", 6 probes.
4. The airflow traverse probe shall be the VOLU-probe as manufactured by Air Monitor Corporation, or equivalent.

M. Hydronic Flow Meters (**FM-3**)

1. Insertion-Type Turbine Meter
 - a) Insertion type, complete with hot-tap isolation valves to enable sensor removal without water supply system shutdown.
 - b) Liquide flow measurement devices shall be accurate to +/- 1% over a turn down ratio of 10:1.
 - c) Each sensor shall be individually calibrated and tagged accordingly against the manufacturer's primary standards.
 - d) All wetted metal parts shall be constructed of 316 stainless steel.

- e) Analog outputs shall consist of non-interactive zero and span adjustments, a DC linearity of 0.1% of span, voltage output of 0–10 Vdc, and current output of 4–20 mA.
- f) Acceptable Manufacturer shall be Onicon; or equal.

N. Relays (**CR-1**)

- 1. Control relays shall be UL listed plug-in type with dust cover and LED “energized” indicator. Contact rating, configuration, and coil voltage shall be suitable for application.
- 2. Time delay relays shall be UL listed solidstate plug-in type with adjustable time delay. Delay shall be adjustable $\pm 200\%$ (minimum) from setpoint shown on plans. Contact rating, configuration, and coil voltage shall be suitable for application. Provide NEMA 1 enclosure when not installed in local control panel.
- 3. Acceptable Manufacturer shall be Functional Device Inc.; or equal.

O. Transformers and Power Supplies

- 1. Control transformers (**XT-1**) shall be UL listed, Class 2 current-limiting type, or shall be furnished with over-current protection in both primary and secondary circuits for Class 2 service.
- 2. Unit output shall match the required output current and voltage requirements. Current output shall allow for a 50% safety factor. Output ripple shall be 3.0 mV maximum Peak-to-Peak. Regulation shall be 0.10% line and load combined, with 50 microsecond response time for 50% load changes. Unit shall have built-in over-voltage protection.
- 3. Unit shall be UL recognized.
- 4. Acceptable Manufacturer shall be Functional Device Inc.; or equal.

P. Current Switches (**CFS-1**)

- 1. Current-operated switches shall be self-powered, solid state with adjustable trip current. The switches shall be selected to match the current of the application and output requirements of the DDC system.
- 2. Acceptable Manufacturer shall be Functional Device Inc.; or equal.

Q. Immersion Temperature Sensor (**ITS, ITS-1**)

- 1. Furnish with brass thermowell. Well insertion length to center of pipe. Glycol system require stainless steel well. ACI; or equal.

R. Motion Detector (**MDS-1**)

- 1. Ultra-sonic type omni directional transmitter, dual receivers, sensitivity gain control, 600 sq. ft. coverage, 24 Volt DC, Universal Energy Control Inc.; or approved equal.

S. Static Pressure Sensor (**SPS-1, SPNL-1**)

1. Model 264, pressure transmitter 4-20mA, 0-5VDC, 2.5VDC bidirectional output, 24VDC power by this Contractor, range 0-1.0" wg. or as applicable to individual systems needs. Setra; or approved equal.

T. Current transmitters

1. AC current transmitters shall be the self-powered, combination split-core current transformer type with built-in rectifier and high-gain servo amplifier with 4 to 20 mA two-wire output. Unit ranges shall be 10 A, 20 A, 50 A, 100 A, 150 A, and 200 A full scale, with internal zero and span adjustment and $\pm 1\%$ full-scale accuracy at 500 ohm maximum burden.
2. Transmitter shall meet or exceed ANSI/ISA S50.1 requirements and shall be UL/CSA recognized.
3. Unit shall be split-core type for clamp-on installation on existing wiring.
4. Acceptable Manufacturer shall be Functional Device Inc. or equal.

U. Power Monitors

1. Selectable rate pulse output for kWh reading, 4–20 mA output for kW reading, N.O. alarm contact, and ability to operate with 5.0 amp current inputs or 0–0.33 volt inputs.
2. 1.0% full-scale true RMS power accuracy, +0.5 Hz, voltage input range 120–600V, and auto range select.
3. Under voltage/phase monitor circuitry.
4. NEMA 1 enclosure.
5. Current transformers having a 0.5% FS accuracy, 600 VAC isolation voltage with 0 - 0.33 V output. If 0–5 A current transformers are provided, a three-phase disconnect/ shorting switch assembly is required.
6. Acceptable Manufacturer shall be Allen-Bradley; or equal.

V. Push Button (**PB-1**)

1. Flush mount, stainless steel plate, mushroom head, contact block with red nameplate, white lettering to identify fan and purpose.

W. Thermal Energy Meters

1. Matched RTD or thermistor temperature sensors with a differential temperature accuracy of $\pm 0.15^\circ\text{F}$.
2. Flow meter that is accurate within $\pm 1\%$ at calibrated typical flow rate and does not exceed $\pm 2\%$ of actual reading over an extended 50:1 turndown range.
3. Unit accuracy of $\pm 1\%$
4. NEMA 1 enclosure.
5. UL listed.

6. Isolated 4–20 ma signals for energy rate and supply and return temperatures and flow.
 7. Acceptable Manufacturer shall be Onicon; or equal.
- X. Carbon Monoxide Sensor (**CDS-1**)
1. Wall mounted Carbon Monoxide Sensor (CO) shall monitor CO over a range of 0-300 PPM.
 2. The device shall have an accuracy of +/- 3% and operate within the range of 32-110 deg F and 0-95% RH.
 3. Acceptable Manufacturer shall be Honeywell; or equal.
- Y. Local Control Panels (**TCP, TCP-1**)
1. All indoor control cabinets shall be fully enclosed NEMA 1 Type construction with hinged door, and removable sub-panels or electrical sub-assemblies.
 2. Interconnections between internal and face-mounted devices shall be pre-wired with color-coded stranded conductors neatly installed in plastic troughs and/or tie-wrapped. Terminals for field connections shall be UL listed for 600-volt service, individually identified per control/interlock drawings, with adequate clearance for field wiring. Control terminations for field connection shall be individually identified per control drawings.
 3. Provide on/off power switch with over-current protection for control power sources to each local panel.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. The Contract Documents shall be thoroughly examined for coordination of control devices, their installation, wiring, and commissioning. Coordinate and review mechanical equipment specifications, locations, and identify any discrepancies, conflicts, or omissions that shall be reported to the Architect/Engineer for resolution before rough-in work is started.
- B. The BAS manufacturer shall inspect the jobsite in order to verify that control equipment can be installed as required, and any discrepancies, conflicts, or omissions shall be reported to the Architect/Engineer for resolution before rough-in work is started.

3.02 PROTECTION

- A. The BAS installation contractor shall protect all work and material from damage by their work or personnel, and shall be liable for all damage thus caused.
- B. The BAS manufacturer shall be responsible for their work and equipment until final inspection, testing, and acceptance. The BAS installing contractor shall protect their work against theft or damage, and shall carefully store material and equipment received on site that is not immediately installed. The Contractor shall close all open ends of work with temporary covers or plugs during storage and construction to prevent entry of foreign objects.

3.03 COORDINATION

A. Site

1. Where the mechanical work will be installed in close proximity to, or will interfere with, work of other trades, the contractor shall assist in working out space conditions to make a satisfactory adjustment. If the contractor installs his/her work before coordinating with other trades, so as to cause any interference with work of other trades, the contractor shall make the necessary changes in his/her work to correct the condition without extra charge.
2. Coordinate and schedule work with all other work in the same area, or with work that is dependent upon other work, to facilitate mutual progress.

B. Submittals. Refer to the "Submittals," section of this specification for requirements.

C. Test and Balance

1. The contractor shall furnish a single set of all tools necessary to interface to the control system for test and balance purposes.
2. The contractor shall provide training in the use of these tools. This training will be planned for a duration of 4 hours.
3. The tools used during the test and balance process shall be returned to the contractor at the completion of the testing and balancing.

D. Life Safety

1. Duct smoke detectors required for air handler shutdown shall be supplied under Division 26 contract. The contractor shall interlock smoke detectors to air handlers for shutdown as described in the Sequences of Operation for this project.

E. Coordination with Controls Specified in Other Sections or Divisions. Other sections and/or divisions of this specification include controls and control devices that are to be part of or interfaced to the control system specified in this section. These controls shall be integrated into the system and coordinated by the contractor as follows:

1. All communication media and equipment shall be provided as specified in the "Communication" section of this specification.
2. Each supplier of a controls product is responsible for the configuration, programming, start-up, and testing of that product to meet the sequences of operation described in this section.
3. The Contractor shall coordinate and resolve any incompatibility issues that arise between the control products provided under this section and those provided under other sections or divisions of this specification.

F. Fire Alarm: Provide interface card to allow communications between temperature control network and fire alarm system. Coordinate exact requirements with Electrical Contractor. Provide all hardware and software necessary for full seamless interface. Show fire alarm failure on graphics.

3.04 GENERAL WORKMANSHIP

- A. Install equipment, piping, wiring/conduit, parallel to building lines (i.e. horizontal, vertical, and parallel to walls) wherever possible.
- B. Provide sufficient slack and flexible connections to allow for vibration of piping and equipment.
- C. Install all equipment in readily accessible locations as defined by National Electric Code (NEC). Control panels shall be attached to structural walls or properly supported in a free-standing configuration, unless mounted in equipment enclosure specifically designed for that purpose. Panels shall be mounted to allow for unobstructed access for service.
- D. Verify integrity of all control wiring to ensure continuity and freedom from shorts and grounds prior to commencing the startup and commissioning procedures.
- E. All control device installation and wiring shall comply with Contract Documents, acceptable industry specifications, and industry standards for performance, reliability, and compatibility. Installation and wiring shall be executed in strict adherence to local codes and standard practices referenced in Contract Documents.

3.05 FIELD QUALITY CONTROL

- A. All work, materials, and equipment shall comply with the rules and regulations of applicable local, state, and federal codes and ordinances as identified in Contract Documents.
- B. BAS manufacturer shall continually monitor the field installation for building code compliance and quality of workmanship. All visible piping and or wiring runs shall be installed parallel to building lines and properly supported.
- C. BAS installing Contractor(s) shall arrange for field inspections by local and/or state authorities having jurisdiction over the work.

3.06 WIRING

- A. All control and interlock wiring shall comply with the National, Local Electrical Codes, and Division 26 of these Contract Document specifications.
- B. All NEC Class 1 (line voltage) wiring shall be UL Listed in approved raceway according to NEC requirements.
- C. All wiring in plenum spaces shall be enclosed in conduit. Plenum rated cable can be used in accessible ceilings.
- D. Where Class 2 wires are in concealed and accessible locations; including ceiling return air plenums, approved cables outside of electrical raceway can be used provided that the following conditions are met:
 - 1. Circuits meet NEC Class 2 (current-limited) requirements. (Low-voltage power circuits shall be sub-fused when required to meet Class 2 current-limit.)
 - 2. All cables shall be UL listed for application (i.e., cables used in ceiling plenums shall be UL listed specifically for that purpose).
 - 3. Line Voltage Control Wiring:

- a) For control relays or other low amperage circuits #14 AWG THHN.
 - b) For direct line voltage control of equipment minimum conductor size #12 AWG THHN.
 - c) Electronic Sensor Wiring: 18 AWG, stranded (16x30) copper conductors, twisted pair, 100% overall aluminum polyester shield, 20 AWG CU drain wire. Polyethylene insulation, PVC jacket, 300V, 60°C. Furnish Belden; or equal.
 - d) Computer Communications Cable: 18 AWG, stranded (16x30) copper conductors, (2) twisted pair, 100% individual aluminum polyester shields each shield with 20 AWG CU drain wire. PVC insulated, PVC jacket, 300V. Furnish Belden; or equal.
Note: Actual # of conductors may be increased as required for actual communication requirement.
4. Provide minimum (1) spare shielded twisted pair conductors in each communications wiring run. Wiring runs between operator work stations (if any) provide (2) spare shielded twisted pair conductors.
- E. Do not install Class 2 wiring in conduits containing Class 1 wiring. Boxes and panels containing high voltage may not be used for low voltage wiring except for the purpose of interfacing the two via control relays and transformers.
- F. Where Class 2 wiring is run exposed, wiring shall be conduit
- G. Maximum allowable voltage for control wiring shall be 120Vac. If only higher voltages are available for use, the BAS manufacturer shall provide step-down transformers to achieve the desired control voltages.
- H. All control wiring shall be installed as continuous lengths, where possible. Any required splices shall be made only within an approved junction box or other approved protective device.
- I. Install plenum wiring in sleeves where it passes through walls and floors. Maintain fire rating at all penetrations in accordance with Contract Documents and National and/or Local Codes.
- J. Conduit and wire sizing shall be determined by the BAS manufacturer in order to maintain manufacturer's recommendation and meet National and Local Codes.
- K. Conduit Routing and termination
- 1. Conduits shall be installed so as to be concealed in all finished spaces at the conclusion of the project unless otherwise noted. Conduits may be exposed in mechanical and electrical rooms and unfinished storage, maintenance and production areas.
 - 2. Where it is impractical to conceal wiring or conduit in finished construction, cables shall be run in wiremold.
 - 3. Make neat runs parallel or perpendicular to structural elements (walls, ceilings, floors) of building with minimum number of couplings and bends. Install so that required conductors may be drawn without injury or excessive strain.

4. Provide double locknuts and insulation bushings on the end of each conduit entering an enclosure. If smaller holes are used in knockouts provide listed devices which overlap largest knockouts as required to strengthen the termination.
5. Cap or plug open ends of conduits during construction.
6. Conduits shall be continuous from equipment controls to cabinets, junction or pull boxes and shall enter and be secured to all boxes in such a manner that each system shall be electrically continuous.
7. Change in Direction of Conduit:
 - a) Concealed locations - use standard radius bend.
 - b) Exposed locations or concealed locations where conduit will be accessible; use standard radius bends or conduit body.
8. Install conduits to allow proper drainage. Do not form pockets.
9. Securely attach all conduits to building structure utilizing approved methods and fastening devices for support.
10. Clear obstructions in raceways or replace raceways at no additional contract cost. Demonstrate to Architect that spare conduits are free of obstruction at substantial completion and leave a drag line (1/8" polypropylene monofilament utility rope) for future use.
- L. Follow manufacturer's installation recommendations for all communication and network bus cabling. Network or communication cabling shall be run separately from all control power wiring.
- M. Adhere to the Division 26 requirements for installation of electrical raceways.
- N. BAS manufacturer shall terminate all control and/or interlock wiring and shall maintain updated (as-built) wiring diagrams with terminations identified at the job site.
- O. Flexible metal conduits and liquid-tight flexible metal conduits shall not exceed 3' in length and shall be supported at each end. Flexible metal conduit less than 1/2" electrical trade size shall not be used. In areas exposed to moisture, including chiller and boiler rooms, liquid-tight, flexible metal conduits shall be used.
- P. Penetrations:
 1. Provide fire stopping for all penetrations used by dedicated BMS conduits and raceways. All other project fire stopping to be by other trade.
 2. All openings in the fire proofed or fire stopped components shall be closed by using approved fire resistive sealant.
 3. All wiring passing through penetrations, including walls, shall be in conduit or enclosed raceway.
 4. Penetrations of floor slabs shall be by core drilling. All penetrations shall be plumb, true and square.
 5. No penetrations in structural elements shall be made before receipt of written approval from Engineer and/or Architect.

Q. BMS Raceway:

1. All wiring shall be installed in conduit or raceway except as noted elsewhere in this specification. Minimum control wiring conduit size 3/4".
2. Where it is not possible to conceal raceways in finished locations, surface raceway (wiremold) may be used as approved by the Engineer.
3. All conduits and raceways shall be installed level, plumb, at right angles to the building lines and shall follow the contours of the surface to which they are attached.
4. Flexible metal conduit shall be used for vibration isolation and shall be limited to 3' in length when terminating to vibrating equipment. Flexible metal conduit may be used within partition walls. Flexible metal conduit shall be UL listed.

3.07 COMMUNICATION WIRING

- A. All cabling shall be installed in a neat and workmanlike manner. Follow manufacturer's installation recommendations for all communication cabling.
- B. Do not install communication wiring in raceway and enclosures containing Class 1 or other Class 2 wiring.
- C. Maximum pulling, tension, and bend radius for cable installation, as specified by the cable manufacturer shall not be exceeded during installation.
- D. Contractor shall verify the integrity of the entire network following cable installation. Use appropriate test measures for each particular cable.
- E. When a cable enters or exits a building, a lightning arrestor must be installed between the line and ground.
- F. All runs of communication wiring shall be unspliced length when the length is commercially available.
- G. All communication wiring shall be labeled to indicate origin and destination.

3.08 FIBER OPTIC CABLE

- A. All cabling shall be installed in a neat and workmanlike manner. Minimum cable and unjacketed fiber bend radii as specified by cable manufacturer shall be maintained.
- B. Maximum pulling tensions as specified by the cable manufacturer shall not be exceeded during installation. Post installation residual cable tension shall be within cable manufacturer's specifications.
- C. Fiber optic cabinets, hardware, and cable entering the cabinet shall be installed in accordance with manufacturers' instructions. Minimum cable and unjacketed fiber bend radii as specified by cable manufacturer shall be maintained.

3.09 INSTALLATION OF SENSORS

- A. Sensors required for mechanical equipment operation shall be factory installed and wired as specified in mechanical equipment specifications. BAS manufacturer shall be responsible for coordinating these

control devices and ensuring the sequence of operations will be met. Installation and wiring shall be in accordance with the BAS manufacturer's recommendations.

- B. Sensors that require field mounting shall meet the BAS manufacturer's recommendations and be coordinated with the mechanical equipment they will be associated.
- C. Mount sensors rigidly and adequately for the environment the sensor will operate.
- D. Room temperature sensors shall be installed on concealed junction boxes properly supported by the block wall framing. For installation in dry wall ceilings, the low voltage sensor wiring can be installed exposed and must meet applicable National and Local Electrical Codes.
- E. All wires attached to wall mounted sensors shall be sealed off to prevent air from transmitting in the associated conduit and affecting the room sensor readings.
- F. Install duct static pressure tap with tube end facing directly down-stream of air flow.
- G. Install space static pressure sensor with static sensing probe applicable for space installation where applicable.
- H. Sensors used in mixing plenums, and hot and cold decks shall be of the averaging type. Averaging sensors shall be installed in a serpentine manner horizontally across duct. Each bend shall be supported with a capillary clip.
- I. All pipe mounted temperature sensors shall be installed in matched thermowells. Install all liquid temperature sensors with heat conducting fluid in thermal wells for adequate thermal conductance.
- J. Wiring for space sensors shall be concealed in building drywall. EMT conduit is acceptable within mechanical equipment and service rooms.
- K. Install outdoor air temperature sensors on north wall complete with sun shield at manufacturer's recommended location and coordinated with Engineer.

3.10 IDENTIFICATION OF HARDWARE AND WIRING

- A. All field wiring and cabling, including that within factory mounted, and wired control panels and devices for mechanical equipment, shall be labeled at each end within 2" of termination with a cable identifier and other descriptive information for troubleshooting, maintenance, and service purposes. BAS manufacturer to coordinate this labeling requirement with mechanical equipment manufacturer as it relates to controls.
- B. Permanently label or code each point of field terminal strips to show the instrument or item served and correlate them to the BAS design drawings.
- C. Identify control panels with plastic nameplates.

3.11 GROUNDING AND BONDING

- A. Equipment Grounding Conductors: All metallic non-current carrying parts of electrical equipment shall be grounded with equipment grounding conductors whether or not shown on the drawings. Equipment grounding conductors shall be green insulated copper conductors unless otherwise indicated.
1. Install green, equipment grounding conductor with all feeder and branch circuit conductors.
 2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.
 3. Enclosures: Ground all enclosures of electrical and electronic wiring and distribution equipment in accordance with requirements of the NEC Article 250.
 4. Equipment Enclosure Grounding: Bare wire, wrapped around connecting screws or mounting bolts and screws is not acceptable as a grounding connection. All ground lugs shall be of a noncorrosive material suitable for use as a grounding connection, and must be compatible with the type of metal being grounded. Ground lugs shall be mounted on clean, bare metal surfaces that are free of paint, rust, etc. Wire brush clean each surface to remove paint or oxidation prior to bolting jumper connectors in place. In general use tinned copper connectors for connections of dissimilar metals. Use of bimetal connectors shall only be allowed in special circumstances and only with the prior written approval.

3.12 CONNECTIONS

- A. General: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
1. Use electroplated or hot-tin-coated materials to assure high conductivity and to make contact points closer in order of galvanic series.
 2. Make connections with clean, bare metal at points of contact.
 3. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
- B. Terminate insulated equipment grounding conductors for feeders with pressure-type grounding lugs. Where metallic raceways terminate at non-metallic or non-conductive housings, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to the ground bus in the housing. Bond electrically non-continuous conduits at both entrances and exits with grounding bushings and bare grounding conductors.
- C. Raceway Grounding: Surface metal raceways, wireways, or cable trays or cable rack systems shall be installed in a manner that ensures electrical continuity. Short insulated green copper bonding jumpers shall be installed between adjacent raceway sections, on both sides of each joint, to ensure proper bonding. Unless otherwise indicated, the minimum size for these bonding jumpers shall be No. 6 AWG. Jumpers shall be provided with compression connectors at each end of cable. Surface metal raceways, wireways, cable trays or cable rack systems shall be field drilled to provide bolting point for securing bonding jumper. Wire brush clean each surface to remove paint or oxidation prior to bolting jumper connectors in place. Bolts and hardware shall be as per details or as approved for grounding purposes. All metallic raceway penetrations into a facility structure shall be bonded to the earth electrode system.

- D. Other Grounding Systems: Any additional grounding systems used for electronic equipment shall be connected to the facility main ground plate, structural steel or exterior earth electrode system as shown on drawings.
- E. Tighten grounding and bonding connectors and terminals, including screws and bolts, in accordance with torque tightening values specified in UL 486A.

3.13 CONTROL SYSTEM CHECKOUT AND TESTING

A. Acceptance Check Sheet:

1. The contractor shall prepare check commissioning sheets that include all points for all functions of each system as indicated on the temperature controls submittal documents.
2. Submit the check sheets to the engineer for approval within the temperature controls submittal documents.
3. Engineer will use the approved check sheets as the basis for acceptance of the BAS.
4. The contractor is perform complete commissioning reports for this project. Prior to final payment, contractor must submit signed commissioning checklist, approved by both the owner and engineer. The contractor must also prepare commissioning reports for each piece of equipment that is being controlled.

B. Start-up testing. All testing in this section shall be performed by the contractor and shall make up part of the necessary verification of an operating control system. This testing shall be completed before the owner's representative is notified of the system demonstration.

1. The contractor shall furnish all labor and test apparatus required to calibrate and prepare for service all of the instruments, controls, and accessory equipment furnished under this specification.
2. Verify that all control wiring is properly connected and free of all shorts and ground faults. Verify that terminations are tight.
3. Enable the control systems and verify calibration of all input devices individually. Perform calibration procedures according to manufacturer's recommendations.
4. Verify all binary output devices (relays, solenoid valves, two-position actuators and control valves, magnetic starter, etc.) operate properly and normal positions are correct.
5. Verify all analog output devices (I/Ps, actuators, etc) are functional, that start and span are correct, and that direction and normal positions are correct. The contractor shall check all control valves and automatic dampers to ensure proper action and closure. The contractor shall make any necessary adjustments to valve stem and damper blade travel.
6. Verify the system operation adheres to the sequences of operation. Simulate and observe all modes of operation by overriding and varying inputs and schedules. Tune all DDC loops and optimal start/stop routines.
7. Alarms and Interlocks
 - a) Check each alarm separately by including an appropriate signal at a value that will trip the alarm.

- b) Interlocks shall be tripped using field contacts to check the logic, as well as to ensure that the fail-safe condition for all actuators is in the proper direction,
 - c) Interlock actions shall be tested by simulating alarm conditions to check the initiating value of the variable and interlock action.
- C. Start-up testing. All testing in this section shall be performed by the contractor and shall make up part of the necessary verification of an operating control system. This testing shall be completed before the owner's representative is notified of the system demonstration.

3.14 CONTROL SYSTEM DEMONSTRATION AND ACCEPTANCE

- A. Acceptance: The BAS will not be accepted as meeting the requirements of Completion until all tests described in this specification have been performed to the satisfaction of both the Engineer and Owner. Any tests that cannot be performed due to circumstances beyond the control of the Contractor may be exempt from the Completion requirements if stated as such in writing by the Owner's representative. Such tests shall then be performed as part of the warranty.

3.15 TRAINING

- A. Provide minimum of 2 classroom training sessions, and 4 hours for each session, throughout the contract period. The training will be provided for personnel designated by the Owner.
- B. Provide course outline and materials prior to schedule training session. The instructor(s) shall provide one copy of training material per student.
- C. The instructor(s) shall be factory-trained and experienced in teaching this technical material.

END OF SECTION 23 0993

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including the General and Supplementary Conditions and Division 1 Specifications Section, apply to the work of this section.

1.02 SUBMITTALS

- A. Product data.

1.03 REMOVALS

- A. If any glycol is removed from the building's systems and is to be disposed of, the Contractor is responsible to remove the glycol from the site and have it properly disposed of with respect to EPA and all local guidelines. The contractor shall carry the cost of removal within his bid. Putting the product down a drain will not be acceptable.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Contractor is responsible for supplying the proper amount of the product to the heating and chilled water glycol systems, contractor to reference contract drawings for piping sizes and lengths to determine volume. Contractor is responsible for filling system to 40% concentration. A written report is to be completed as specified in Part 3 – Execution.
- B. All anti-freeze on this project is to be 100% virgin anti-freeze. Any anti-freeze that is recycled or partially recycled formula shall be rejected without review. The submittal must state that anti-freeze is 100% virgin. If anti-freeze has been installed and found to have recycled component it shall be removed and replaced with new 100% virgin at contractor's expense.

2.02 PROPYLENE GLYCOL, DOWFROST (PG)

- A. Dow Chemical Co. inhibited glycol based heat transfer fluid, 95.5% glycols and 4.5% inhibitors and water by weight. Capable of protection from freezing to -23°F @ 42% and -12°F @ 30% and boiling to 250°F. Fluid shall contain special corrosion inhibitors that passivate the surface of metals and buffer any acids that form from normal oxidation. Fluid shall have a low acute oral toxicity.

2.03 ANTIFREEZE TESTER

- A. Model #YA845, Snap-On-Tools Corp.; or equal. Contains six temperature compensating discs to show degree of protection thru a magnified tube. Shall have a scale range of 25°F to overprotection. Also includes flexible rubber hose.

2.04 INJECTION TANKS (IT-1)

- A. Chemical Feed system for glycol solution. Each system to include one 50 gallon polyethylene tank with hinged cover and one feed pump with 1/2 HP motor mounted below tank. Motor to be 115V/1Ph. Pump suction of PVC tubing to include ball valve and strainer. Pump discharge of schedule 80 PVC pipe includes ball valve and check valve. Additional accessories to include: PVC float switch, pressure switch, relief valve, pressure gauge on discharge and NEMA 12, 115V control panel. Controls to include a 24 volt control circuit, H-O-A for pump, low tank level indicator and pump "on" indicator.

PART 3 - EXECUTION

3.01 GENERAL

- A. Fill system 100% with water. Hydrostatically test the system to check for any leaks.
- B. Remove all air from the system as per filling instructions. See Section 232113 - Piping Systems & Accessories.
- C. Partially drain system to accommodate the appropriate quantity of glycol.
- D. Disposal of anti-freeze: all fluid removed from fluid cooler which contains anti-freeze solution shall be pumped into temporary tankage and disposed of offsite in an approved manner. Do not drain fluids containing anti-freeze on the ground or directly into building floor drains
- E. Add the appropriate amount of glycol fluid to the system and circulate for 24 hours to insure complete mixing.
- F. Test concentration of solution using tester specified and add any necessary amount of glycol to reach the desired level.
- G. Provide written report to Architect stating volume of antifreeze solution added, concentration level of antifreeze and expected freeze point of solution.

END OF SECTION 23 2510

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including the General and Supplementary Conditions and Division 1 Specification Sections, apply to the work of this section.

1.02 SUBMITTALS

- A. Schedule of all components.
- B. Product data sheets on all equipment.
- C. Submit shop drawings on all equipment. Include all performance and dimensional data.

1.03 GENERAL REQUIREMENTS

- A. All control dampers shall have published performance data taken from test made in accordance with AMCA Standard 500 and in compliance with the AMCA certified ratings program for air performance and air leakage performance.
- B. All fire dampers shall be rated for 1-1/2 hrs (unless specifically noted otherwise) under UL Standard 555 and shall meet NFPA 90A construction requirements.
- C. Backdraft dampers shall have performance data published under the guidelines of AMCA and conform to all safety standards as set forth by NFPA 90A.

PART 2 - PRODUCTS

2.01 VOLUME DAMPERS

- A. Provide where indicated on drawings or required to control air flow, for air balancing, size as required, manually operated.
- B. For Rectangular Ducts up to 12" Max Dimension: Single blade volume damper for use by air balancing contractor. Damper may be fabricated by sheetmetal contractor. Damper blade shall be fabricated from stiff material and be free from operating noise. Ensure sufficient clearance between damper blade and duct wall to prevent noise. Provide external position indication and locking quadrant.
- C. For Rectangular Ducts Over 12": Furnish and install where indicated on drawings, size as required, manually operated, opposed blade damper, 16 ga. galvanized steel construction, concealed linkage, with manual locking quadrant. Model #VCD-20, Greenheck Fan Corporation; or equal.
- D. For Round Ducts: When volume damper is not an integral part of branch connection, furnish and install where indicated, size as required, manually operated, round air balancing damper, galvanized steel construction with manual locking quadrant. Model VCDR-53, Greenheck Fan Corporation.
- E. BD-1: Backdraft damper, nonmetallic type with blades constructed of neoprene coated fiberglass. Extruded aluminum channel. Model #BD51, Pottorff Mfg.; or an approved equal. Don't have a vinyl blade damper.

- F. BD-2: Counter balanced backdraft damper, constructed of 75 aluminum blades with neoprene blade seal and steel axles will ride on ball bearing. Model #EM-30, Greenheck Fan Corporation.
- G. OBVD-1: Opposed Blade Volume Damper, aluminum construction, parallel blade, Oilite Bronze bearings, Stainless steel jamb seals and vinyl blade seals, stainless steel linkage. Model #VCD-43, Greenheck Fan Corporation.

2.02 REMOTE CONTROL DAMPER REGULATORS

- A. RC-1: Concealed damper regulator, ceiling installation, embedded in the finished ceiling so unit is flushed with finished surface. Cover plate shall be 2-5/8". Finish shall be cadmium. Ceiling remote controller shall be Young Regulator Co., #301-HRS-3/8" with coupling; or equal. Furnish OBD control damper, Model #820A-C for operation from ceiling regulator, as manufactured by Young Regulator Company.
- B. RC-2: Round Duct: Furnish remote control circular damper, #850, as manufactured by Young Regulator Co.; or an approved equal. Furnish corner pulleys, union connectors, compression fittings and brass tubing, quantity as required. Furnish remote operator, #700-SM.
 - 1. Rectangular Duct: Furnish remote control OBD, extruded aluminum construction, Model #830A, as manufactured by Young Regulator Company; or an approved equal. Furnish with corner pulleys, compression fittings, union connectors, brass tubing and cable all as required for complete and proper installation. Furnish operator Model #700-SM, for surface mounting, Type "C" indicator dial, as manufactured by Young Regulator Company; or an approved equal.

2.03 FIRE DAMPERS

- A. FRD-A: Fire dampers used in transfer air sleeves between adjacent rooms above ceilings, UL listed 1-1/2 hour rating. Nailor Industries Model #0110 or equal.
- B. FRD-B: Fire dampers shall be manufactured, tested and labeled in accordance with UL 555 Safety Standard for Fire Dampers - Sixth Edition, June 1999, and shall have 1-1/2 hour fire resistance rating. Each fire damper shall bear a UL label verifying fire resistance rating in addition to intended mounting position. Fire dampers shall be suitably constructed for vertical or horizontal installation as required for each specific location. Each fire damper shall be complete with a 165°F (74°C) UL Listed fusible link. Fire dampers shall each include a steel sleeve of appropriate length/gauge and retaining angles, supplied by damper manufacturer to ensure proper installation in accordance with damper manufacturer's instructions. Damper to have blades out of air stream. Contractor shall provide and install an access door at each fire damper, of appropriate size to allow for inspection, testing and fusible link replacement. Information submitted for approval shall include confirmation of UL qualifications, pressure drop data and manufacturer's installation instructions. Fire dampers shall be Nailor Industries Models 0120 (Type B), or equal. Use Model 0130V or 0130H for round ducts.
- C. FRD-S: Provide fire/smoke dampers where indicated on drawings. UL 555S classified Class II leakage rating at 250 degrees and UL 555 listed 1-1/2 hour labeled. Nailor Model # 1270ERL with min. 16" long 20 gauge sleeve and 120 volt electric actuator, with actuator out of airstream, and 165°F heat responsive device. Contractor shall provide and install an access door at each fire damper, of appropriate size to allow for inspection and testing. Electrical contractor shall furnish smoke detector to heating contractor – heating contractor to install within 5'-0" of damper. Install detector per manufacturer's recommendations and requirements.

2.04 DUCT ACCESS DOORS

- A. Furnish and install where indicated on plans and/or required for access to life safety dampers, control probes, etc.; galvanized door with manual lock(s), double wall, 1" internal fiberglass insulation, galvanized steel frame, foam gasket seal, minimum 24 gauge construction. Label each access door at fire dampers with "Fire Damper" in letters no less than 1/2" high.
1. Hinged Type: Model #H-10, Buckley Air Products
 2. Double Latch Type: Model #C-10, Buckley Air Products

2.05 ARCHITECTURAL ACCESS DOORS

- A. Ceiling/Wall Access Door: door and frame for use in existing ceiling or walls. Door and frame fabricated from galvanized steel, thickness as scheduled, with rounded edges and concealed pivoting rod hinge. Frame shall be one piece construction with no miters or welds exposed on face. Door shall include screw driver type latch mechanism.
- B. For Existing Ceilings: Provide concealed 1-1/2"x 1-1/2" support angles to be used as a sub-structure to support door frame above existing ceiling.
- C. For Fire Rated Doors: Doors shall be UL Listed for fire rated service as scheduled. Door shall include heavy duty spring closer.

Tag	AD	ADF
Model #	BNTC 24x24	BIT 24x24
Manufacturer	Babcock-Davis	
Fire Rating (hours)	None	1.5
Fire Rating Label	None	B
Steel Thickness	16 gauge	16 gauge
Size (inches)	24x24	24x24
Weight (lbs)	16	24.5
Latches (Qty)	3	1
Notes	(1)(2)	(1)(2)

Notes:

- (1) Finish factory prime coat, contractor shall field paint white to match ceiling where located.
- (2) Contractor shall verify actual size prior to ordering if required to fit actual ceiling tile arrangement, size may be adjusted to 22x22. However, no gaps are to be allowed from door frame flange and adjacent existing ceiling tiles around perimeter.

2.06 CODE REQUIREMENTS

- A. All work shall be in accordance with all applicable codes including NFPA 90A, 90B, and SMACNA requirements.

PART 3 - EXECUTION

3.01 GENERAL

- A. Install all equipment in strict accordance with manufacturer's instructions.

3.02 DAMPERS

- A. Contractor to furnish all required hardware to complete installation of air split damper and regulator.
- B. Provide access doors for dampers not accessible from grilles.
- C. Dampers shall be installed so as not to cause stress or strain on the frames. Fasteners shall not interfere with proper operation of blades or linkages.
- D. Lubricate and thoroughly clean all moving parts according to the manufacturer's recommendations before initial operation.
- E. Seal all seams.
- F. Make all necessary adjustments to linkages to insure dampers open fully and close tightly over full stroke of actuator.
- G. Replace any damaged parts including blades, seals, linkages, etc.
- H. Install automatic vent damper in strict accordance with manufacturer's instructions and NFPA 54.

END OF SECTION 23 3300

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections apply to work of this section.

1.02 SUBMITTALS

- A. See Section 233330 for submittal requirements.

1.03 WORK INCLUDED

- A. Contractor shall provide all hangers and supports for all ductwork and air system equipment and accessories.
- B. Contractor shall field verify and coordinate all ductwork hangers and supports, dimensions, clearances, and ductwork elevations with new and existing building structure.

1.04 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 233330 - Low Velocity Ductwork
- B. Section 230713 - Duct Insulation

1.05 QUALITY ASSURANCE

- A. SMACNA Manual: Methods of supporting ductwork shall be in accordance with the SMACNA Manual, Section 1 - Low Velocity Systems", unless otherwise shown on the drawings or specified herein.
- B. SMACNA - Sheetmetal and Air Conditioning Contractors National Association, Inc.
- C. Electrically operated and power actuated tools for installing welded studs and power driven fasteners shall be listed by a nationally recognized test agency.

PART 2 - PRODUCTS

2.01 DUCT HANGERS

- A. All Hangers Shall Be Rod Type Hangers: Mild carbon steel, unless otherwise specified; fully threaded or threaded each end, with (2) removable nuts each end for positioning and locking rod in place. Unless galvanized or cadmium plated, provide a shop coat of red lead or zinc chromate primer paint.
- B. Hangers for ducts shall be as specified in the SMACNA Manual, with the following exceptions:
 - 1. Lower hanger attachments for rectangular duct with any dimension 18" and above shall be trapeze hangers, supported by threaded rods (3/8" dia. min.).
 - 2. Trapeze hangers shall be minimum 1-1/2" x 1-1/2" x 1/4" angle or larger size as required by larger or heavier ductwork. Ductmate trapeze hanger size AS and AT is acceptable.

3. Lower hanger attachments for rectangular duct with maximum dimension less than 18" may be flat strap attached directly to duct. Fasteners penetrating ducts must be completely sealed.
4. Wire used as supports or as banding shall not be acceptable.
5. Fasteners used on hanger system shall not penetrate supported ductwork. (Exception: Flat strap hangers, see above.)
6. Threaded support rods shall utilize sufficient support, jamb, and lock nuts to allow adjustment of duct heights.

2.02 MISCELLANEOUS FASTENERS AND UPPER HANGER ATTACHMENTS

- A. Machine Bolts and Nuts: Galvanized or cadmium plated steel.
- B. Steel "C" Clamp with Locknut: Elcen Co.; No. 29L, with 25B steel retaining clips.
- C. Structural Aluminum Shapes and Aluminum Plates.
- D. Structural Steel Shapes and Steel Plates: ASTM A-36, shop primed.
- E. Self Drilling Expanding Fasteners: Phillips type.

2.03 BRANCH FITTINGS, JOINTS & TURNING VANES

- A. Provide supports necessary for lengths over 16" or heights over 8".

PART 3 - EXECUTION

3.01 UPPER HANGER ATTACHMENTS

- A. General Notes: Upper hanger attachments for ductwork shall be secured to overhead structural steel or steel bar joists wherever possible, unless otherwise specified.
- B. In addition, when required by ductwork support spacing schedules, provide intermediate structural steel members, framed to span the structural steel or steel bar joists. The minimum size of structural steel members, for use as intermediate steel framing, shall be 2-1/2" x 2-1/2" x 1/4" steel angles. Intermediate steel members shall be shop prime coated prior to installation. Intermediate steel will be sized for span and load to show no deflection.
- C. Secure upper hanger attachments to bar joists at the panel points of joists.
- D. Do not drill holes in main structural steel members.
- E. Exercise extreme care in the field drilling of holes in precast or pre-stressed concrete work, so as to avoid damage to reinforcing. Power driven types of fastening devices shall have be utilized in the attachment of hangers to precast or pre-stressed concrete work.

- F. Upper hanger attachments shall be as specified in the Manual, with the following exceptions:
1. Do not use flat bar, bent rod, power actuated drive pins or expansion nails as upper hanger attachments in concrete construction.
- G. Attachment to Structural Steel: Secure to steel beams with beam clamps, welded studs, power actuated fasteners, or "C" clamps with lock nuts and minimum 1/8"x1" wide safety bars.
- H. Do not use power actuated fasteners except by written permission from the Engineer's Representative.
- I. Do not attach welded studs or powder actuated fasteners to steel less than 3/16" in thickness.
- J. Do not use power drive on beam clamps.
- K. Attachment to New Poured Concrete Construction: Support hangers from concrete insets. Properly locate and install concrete inserts in concrete form work as required, in ample time so as not to delay the construction work. Bolt band iron hangers to inserts with 3/8" bolts. Screw rods into proper size inserts and secure with lock nuts and washers.
- L. Attachment to Cellular Steel or Fluted Metal Decks: Do not support ductwork from cellular steel or fluted metal roof decks. Attach hangers to structural steel members wherever possible, and where required intermediate structural steel supporting members shall be provided, framed to span the structural steel.
- M. For attachment to overhead cellular steel or fluted metal decking, other than roof decks, hangers may be attached by means of welded studs with double nuts. The maximum load on any one stud shall be 250 lbs. **UNDER NO CIRCUMSTANCES SHALL UPPER ATTACHMENTS PENETRATE STEEL DECKING, OR ROOF DECK.**
- N. Riser Supports: Support vertical rectangular ducts by means of two steel angles or channels, anchor bolted to floor slab or adjacent structural member at every floor through which the riser passes. Steel angles or channels shall contact a transverse joint and be secured to the joints by means of 1/8" bolts, or by welding.
- O. Steel angle or channel support sizes shall be as follows:

Max. Side Dimension	Support Angle	Support Channel	Bear on Concrete or Structural Support
36"	1"x1"x1/8"	1"x1/2"x1/8"	2"
48"	1-1/2"x1-1/2"x1/8"	1-1/2"x3/4"x1/8"	3"
60"	2"x2"x1/8"	2"x1"x1/8"	3"
Over 60"	2-1/2"x2-1/2"x3/16"	2"x1"x3/16"	4"

3.02 DUCT HANGER SPACING

- A. The duct hanging method must be in accordance with this specification and is subject to Engineer's approval.
- B. Duct hanger spacing shall be in strict accordance with SMACNA and as follows:
1. Rectangular Duct Hangers Min. Sizes:

<u>Max. Half of Duct Perimeter</u>	<u>Rod Pair at 10' Spacing</u>	<u>Rod Pair at 8' Spacing</u>	<u>Rod Pair at 6' Spacing</u>	<u>Rod Pair at 4' Spacing</u>
Up to 72	1/4"	1/4"	1/4"	1/4"
73 to 96	3/8"	1/4"	1/4"	1/4"
97 to 120	3/8"	3/8"	1/4"	1/4"
121 to 168	1/2"	3/8"	3/8"	3/8"
169 to 192	1/2"	1/2"	3/8"	3/8"
Above	SEE SMACNA FOR SPECIAL CONDITIONS			

2. Round Duct Hanger Strap Sizes:

<u>Duct Diameter</u>	<u>Strap Hangers</u>	<u>Max. Spacing</u>
Up to 26"	One 1" x 22 Ga.	12 Ft.
27" - 36"	One 1" x 18 Ga.	12 Ft.
37" - 50"	One 1" x 16 Ga.	12 Ft.
51" - 60"	Two 1" x 18 Ga.	12 Ft.

See SMACNA, Table 5-3 for allowable loading for trapeze angles.

END OF SECTION 23 3310

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this section.

1.02 SUBMITTAL

- A. Layouts of duct systems shown on contract drawings are diagrammatic. Actual duct layout and fabrication shop drawings are required to be submitted for approval. Coordinate these shop drawings with other trades and existing conditions, as required for proper installation, prior to submittal.
- B. Please note that ductwork CAD files will not be given to the contractor. Contractor is expected to field verify and draw all ductwork.
- C. General duct layout, 3/8" = 1'-0" scale, of all duct systems, including dimensions and elevations.
- D. Ductwork shop drawings shall be fabrication drawings, showing actual intended location of ductwork and clearances. Ductwork elevations and architect's ceiling heights shall be noted on drawings.
- E. All areas where ductwork is below the architect's ceiling height shall be noted and clouded. **FAILURE TO NOTE BOTH BOTTOM OF DUCT ELEVATIONS AND ARCHITECT'S CEILING HEIGHTS WILL BE CAUSE FOR REJECTION.**
- F. Duct shop drawings shall show actual existing and/or new structural steel arrangements, and shall be coordinated to properly fit in intended spaces.
- G. Sheetmetal contractor shall verify that ductwork layouts are coordinated with all other construction trades which might cause a conflict. This contractor is required to provide copies of duct shop drawings to all applicable contractors for their use in coordination efforts.
- H. Immediately notify Engineer if a duct layout conflict is discovered.
- I. Submittal packages which do not include all items listed in this section will be considered incomplete and will be returned to the contractor without review.
- J. If a significant number of shop drawings are required, individual drawings may be submitted for review. Duct construction booklet must accompany initial submittal or it will be considered incomplete and returned without review.
- K. Fabrication of installation of ductwork shall not be permitted unless duct shop drawings and construction booklet are approved by Engineer.
- L. Contractor will be required to remove ductwork installed without duct submittals conforming to requirements of this section and approved by the Engineer.

1.03 DUCT CONSTRUCTION BOOKLET

- A. Duct construction booklet shall be submitted with initial duct layout drawing submittal.

B. The following is a basic list of materials, devices, methods, etc. that shall be described in the ductwork construction booklet submittal:

1. Manufacturer's data sheets for all purchased duct accessory components (damper hardware, duct liner, access doors, etc.)
2. Gauges of ductwork, material, method of construction, types of reinforcing and joints, etc.
3. Transverse and Longitudinal Joints
4. Duct Fitting Construction
5. Duct Sealing & Sealants
6. Duct Hangers, Type, Spacing, Upper, Lower
7. Special Supply Air Duct Construction Details (i.e. 14 gauge)
8. Branch Duct Connections Details
9. Acoustic Lining
10. Flexible Ductwork
11. Flexible Connection (to AHU's etc.)
12. Access Doors
13. Duct Accessories
14. Volume Dampers
15. Locking Quadrants
16. Remote Control Damper Regulators
17. Turning Vanes
18. Penetration Trim Frames
19. Fire Damper Installation Details
20. Fire Proofing Penetrations, Chase Safing
21. Specialty Duct Construction and Installation Methods
22. Other Specialty Equipment Connections

1.04 RELATED SUBMITTALS

A. The following shop drawings are required under other specification sections and must be submitted as separate packages (in addition to ductwork submittals detailed in this section).

1. Exhaust Fans
2. Louvers
3. Roof Hoods
4. Diffusers, Registers, Grilles
5. Ductwork Accessories:
 - a) Special volume control dampers
 - b) Fire and/or smoke dampers
 - c) Remote control damper actuators

1.05 WORK REQUIRED

- A. Contractor shall furnish materials and labor and shall fabricate and erect all sheetmetal ductwork including connections to units, all dampers, registers, diffusers and accessories as shown on the drawings, described herein and/or as required to make the air handling installations complete.
- B. Complete supply and return air ductwork serving all units.
- C. All exhaust air ductwork.
- D. Relief air ductwork.
- E. Ductwork and connection into existing air systems where applicable in existing building.
- F. Installation of all intakes and discharges including exhaust fans, louvers, roof hoods.
- G. Specialty ductwork and specialty equipment for applicable kitchen, fume exhaust, safety hoods, and other specialty systems where indicated.
- H. Modification of existing air system equipment to meet new air system requirements (i.e. - fan drives, belts, sheaves, fan motors, etc.).
- I. Complete balancing of all air systems.
- J. Contractor shall field verify and coordinate all ductwork, dimensions, clearances, and ductwork elevations with existing building structure.

1.06 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 230005 - MECHANICAL Work General
- B. Section 230593 - Testing, Adjusting & Balancing
- C. Section 230713 - Ductwork Insulation
- D. Section 233300 - Ductwork Accessories
- E. Section 233310 - Ductwork Hangers & Supports

1.07 QUALITY ASSURANCE

- A. SMACNA Manual: Gauges of materials, fabrication and installation of ductwork shall be in accordance with the SMACNA Manual, Section 1 - "Low Velocity Systems", unless otherwise shown on the drawings or specified herein.

- B. SMACNA - Sheetmetal and Air Conditioning Contractors National Association, Inc.
- C. New York State Energy Code.
- D. 2016 New York State Building Code.
- E. Electrically operated and power actuated tools for installing welded studs and power driven fasteners shall be listed by a nationally recognized test agency.

1.08 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect materials of this Section before, during and after installation and to protect installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.
- C. Delivery and storage: Deliver all materials to the jobsite in their original unopened containers with all labels intact and legible at time of use. Store in strict accordance with the manufacturer's recommendations.
- D. Ductwork that is shop fabricated shall be delivered to the site in quantities acceptable to the storage area that the General Contractor has available.

PART 2 - PRODUCTS

2.01 GENERAL

- A. For the purpose of establishing equality, certain manufacturers have been specified herein. In no way shall this be construed as limiting competition. Products of other manufacturer's may be proposed in accordance with the provisions of the Contract.
- B. Fabrication: All ducts, unless otherwise allowed, shall be true to dimensions indicated upon plans, straight and smooth on inside, with neatly finished joints. Securely anchor to building construction in acceptable manner, free from vibration under all conditions of operation, and properly brace and reinforce with aluminum angle or other structural members. Slip joints shall be in direction of flow. Elbows shall have centerline radius equal to 1-1/2 times width of duct.
- C. **NOTE: ALL DUCTWORK SERVING A VAV SYSTEM SHALL BE RATED FOR 3 IN. W.G. STATIC (POSITIVE OR NEGATIVE) AND SHALL CONFORM TO SMACNA. ALL OTHER DUCTWORK SHALL BE RATED FOR 2 IN. W.G. STATIC (POSITIVE OR NEGATIVE).**
- D. All ductwork with a 4 to 1 ratio, and higher shall have a Condu-lock internal reinforcing at midpoint between joints, both horizontally and vertically.
- E. All ductwork 10 ft downstream of a VAV to be internally lined, whether shown or not.

2.02 SHEETMETAL

- A. Galvanized Steel: ASTM A653/A653M lock forming quality – zinc-coated (galvanized): ASTM A653/A653M commercial coating class – 0.9 oz. per sq. ft.

- B. 2" W.G. Low Pressure Rectangular Duct Construction:
1. Note: These gauges are 1 gauge heavier than required by SMACNA.

<u>Longest Side</u>	<u>Gauge</u>	<u>SMACNA Rigid Class (1)</u>	<u>Stiffeners Spacing</u>
0-12"	24	A	5'
13-30"	22	B	5'
31-54"	20	B	5'
55-84"	18	E	5'

- C. 2" W.G. Low Pressure Round Duct Construction:

<u>Diameter</u>	<u>Gauge</u>
0-12"	26
13-24"	24
25-36"	22

- D. Aluminum Ductwork: Use 1 gauge heavier than required by SMACNA Standards.

2.03 LONGITUDINAL JOINTS FOR RECTANGULAR DUCT

- A. Seams shall be formed and assembled with proper dimensions for tight and secure fit. Notching shall be minimal consistent with transverse joint requirements.
- B. Standard longitudinal seam shall be Pittsburgh Lock. Standing seams are not acceptable.

2.04 TRANSVERSE JOINTS FOR RECTANGULAR DUCT

- A. Joint type shall be selected on the basis of $\pm 2"$ wg. Pressure class, materials, support intervals, and other provisions for proper assembly of ductwork.
- B. All transverse joints with any dimension greater than 16" shall be constructed with the Duct Mate system; or an approved equal. All transverse joints 16" and less shall be slip and drive.
- C. Contractor shall submit for approval the intended joint type with the duct construction detail book submittal.
- D. Turning Vanes and Vane Runners: Weld runners to duct and weld vanes to runners, all as shown on the drawings. All turning vanes shall be air foil type.

2.05 DUCTWORK FITTINGS

- A. All elbows on main supply ducts shall be radiused type fittings.
- B. Where square elbows are allowed, turning vanes shall be used. Square fittings without turning vanes are not permitted.

2.06 BRANCH CONNECTIONS

- A. Furnish and install where indicated on drawings, size as required, the following:
 1. For rectangular branch ducts: 45 degree cinch collar, each branch duct to include a volume damper.

2. For round duct branches: High efficiency take-off type fitting with integral volume damper.
3. Branch duct connections regardless of size or type will be fully sealed by an approved method.

2.07 ROUND DUCT CONSTRUCTION

- A. Round duct seams shall be spiral lockseam type. Snap lock or lap seams are not acceptable. Duct and fittings shall be single wall Uni-Seal Duct, United McGill Corp.; or equal, unless noted otherwise.

2.08 FLAT OVAL

- A. Duct shall be of a spiral lock seam construction with a mechanically formed seam locking indentation evenly spaced along the spiral seam. All spiral duct 8" diameter and larger shall incorporate multiple corrugations between spiral seams. Duct shall be galvanized steel that conforms to ASTM standards A653 and A924 and be in accordance with SMACNA 2005 Duct Construction Standards and shall conform to SMACNA's MECHANICAL Duct Construction Standards for +10" water gauge pressure. Connection methods shall be slip-fit with all joints being sealed by the installer during the installation process. The type of sealant used as well as the method and level of application should be in accordance with the sealant manufacturer's published installation instructions and as specified hereinafter. All fittings that are either spot-welded or button punched construction are internally sealed. All transitions and divided flow fittings which convert from flat-oval to round 60" diameter or less. Provide 1" lining where indicated on drawing.

2.09 DUCT SEALING REQUIREMENTS

- A. All ductwork, fittings, connections to equipment, damper connections, branch duct connections, and other duct system joints shall be sealed in accordance with the duct system sealing schedule.
- B. The term sealed requires the use of liquids, mastics, combination mastics and open weave fabric, gaskets, or other sealing compounds made exclusively for duct work applications. Oil base caulking and glazing compounds shall not be used.
- C. Tapes shall not be applied to metal surfaces or to dry sealant.
- D. Liquid: As recommended by the manufacturer of the ductwork.
- E. Mastic: 3M Co. #ED-800 or 900.
- F. Gaskets: Soft neoprene or reinforced inert plastic of the self conforming type.
- G. Special Note: All sealants must be applied in ambient temperatures exceeding manufacturer's recommendations to insure proper setup.
- H. Seal all penetrations with Manville Pyro-Fiber safing; or equal. Provide safing clips and joint sealant.

2.10 DUCT SYSTEM SEALING SCHEDULE

- A. Supply, Return & Exhaust Ductwork: Completely seal all transverse joints and longitudinal seams.
- B. Connection to Equipment: Use flanged connections to equipment, provide gasket to seal between flanges. Bent sheetmetal is not acceptable as a flange. Use steel angle or heavy gauge flat bar as a back up surface.

2.11 DUCT LINER

- A. Furnish and install where indicated on drawings, acoustic duct liner.
- B. Duct liner shall: made from flame attenuated glass fibers bonded with a thermosetting resin, air stream side to be coated with a non abrasive black surface. Furnish 2" thick, permacoat Linacoustic manufactured by Johns Manville; or equal. Duct liner rated for use at 250°F, 5000 fpm, with a k-factor of 0.25 and acoustical performance NRC of 0.70.
- C. Ductwork having internal lining is not to be externally insulated, unless otherwise noted.
- D. Any lined duct that has had water on the liner, shall be deemed unusable and will be required to be immediately removed from the site. The contractor shall provide an new section at no cost to the owner.
- E. Note: Duct sizes shown are net inside duct dimensions, not including internal liner. Failure to comply with this requirement will be grounds for rejection.

2.12 FLEXIBLE DUCTWORK

- A. Furnish and install where indicated on drawings, bi-directional reinforced metallized vapor barrier with triple ply stand-up seam; acoustically rated black CPE liner permanently bonded to a coated spring steel wire helix and supporting a thick blanket of fiberglass insulation. UL listed, Class 1 air duct. Flexible Tubing Division, Thermaflex, Type MKE; or equal. For connections to rectangular duct, use Bellmouth fittings with integral volume damper. Flex duct is not to be connected directly to rectangular main ducts. Duct centerline radius to duct diameter ratio not to exceed 1.5. Flex duct to have minimum R-value of 6.0.
- B. Maximum length of flexible ductwork not to exceed 8'-0".

2.13 EQUIPMENT CONNECTIONS

- A. All equipment shall be connected to ductwork with flexible duct collars.
- B. Flexible connection shall be heavy glass fabric, coated with "Durolon", weighing approximately 24 oz. per sq. yard, as manufactured by Duro Dyne Corp.
 - 1. For ducts 30" and below use 3" free length
 - 2. For ducts above 30" use 5" free length.

2.14 TRIM FRAMES

- A. Whenever ductwork passes through masonry, furnish and install mitered angle trim frames around ductwork to conceal rough masonry opening.

2.15 EXTERIOR DUCTWORK

- A. If there is any exterior ductwork to be installed on the project, there shall be a mandatory meeting with the MC, the sheetmetal subcontractor, insulation subcontractor, the owner's representative and the engineering field representative prior to any duct being fabricated.
- B. The MC shall produce a detail of how they will install the ductwork with respect to attachment to the

duct supports, detail of how the duct shall penetrate a wall or roof and installation of insulation and external weather wrap.

- C. All exterior ductwork shall be pressure tested prior to insulation being installed \ to a minimum of 2 in wg. A report shall be given to the owner's representative and the engineer stating that the duct had been tested, any leaks have been sealed and the duct retested to ensure no leakage.
- D. All exterior ductwork over 18" shall be a minimum of 18 gauge, with a ductmate connection every 5 ft. All ductwork over 24" shall have condu-lock-internal reinforcing at every joint and at midpoint between joints. Exterior supports shall be a minimum of every 8 ft.
- E. All exterior ductwork transverse connections shall be ductmate connection. TDF will not be acceptable on the exterior of the building. All longitudinal seams will be sealed.
- F. There shall be no breaks in the external wrap on the ductwork. If there are any openings that need to be made (balancing, equipment, etc) the MC is fully responsible for sealing the opening immediately. If rain goes on the ductwork prior to the wrap being sealed, the MC shall be fully responsible to remove all wrap and insulation to the owner's representative and engineering field representative's satisfaction that there is no water on the insulation and provide new insulation and new external wrap per specifications.

PART 3 - EXECUTION

3.01 APPLICATION

- A. Properly seam, brace, stiffen, support and render ducts mechanically air tight. Where SMACNA plates and/or the specifications indicate duct stiffeners or reinforcing angles, they shall be continuous around all four sides and interlock at corners.
- B. Adjust ducts to suit local conditions, and if necessary to accomplish this, dimensions may be changed, as approved, but maintain cross sectional area. Install ductwork so as to provide maximum headroom, unless otherwise noted on the drawings.
- C. In addition to having all shop joints in ductwork fabricated in accordance with the Manual, all field joints shall be sealed air tight in accordance with the duct seal schedule.
- D. Where turning vanes, balancing damper or any other kind of products are installed, ductwork must be reinforced at all four sides and interlocked at corners.

3.02 FLEXIBLE DUCTWORK CONNECTIONS

- A. Flexible connections shall be made with tie straps as made by Panduit; or equal. Straps shall be used to clamp both inner and outer liner to diffuser and branch ductwork. (2) straps are required at each end of flexible ductwork.

3.03 CONNECTIONS TO MISCELLANEOUS DUCT EQUIPMENT

- A. All duct connections to duct coils, etc. must be made with smooth transitions in accordance with SMACNA. Duct dimensions specified upstream and downstream (net free area) must be maintained. Sizing ductwork to match miscellaneous equipment is not acceptable, unless design conditions are met.

END OF SECTION 23 3330

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including the General and Supplementary Conditions and Division 1 Specification Sections apply to the work of this section.

1.02 SUBMITTALS

- A. See Section 233330 for submittal requirements.
- B. In addition to plan layouts, provide vertical sections describing all vertical grease duct runs.
- C. Shop drawings shall indicate allowance for fire proof insulation.
- D. Construction booklet shall include all special construction methods for grease duct.
- E. Detail all grease duct special access doors and openings.

1.03 WORK INCLUDED

- A. Definition: For the purposes of this specification, ductwork serving cooking hood exhaust shall also be known as grease duct.
- B. Furnish materials, labor to fabricate and erect sheetmetal ductwork and all accessories specified in this section.
 - 1. Complete cooking hood exhaust air ductwork system.
 - 2. Connection to kitchen hood & exhaust fan.
 - 3. Access door assemblies. Access doors shall be located at each floor penetration and at each change of direction.

1.04 RELATED WORK

- A. Work in this section shall be in accordance with applicable provisions in section 233330 - Low Velocity Ductwork.
 - 1. Section 233310 - Ductwork Hangers and Supports
 - 2. Section 233813 - Kitchen Exhaust Hoods
 - 3. Section 230713 - Ductwork Insulation

1.05 CODE REQUIREMENTS

- A. All work shall be in accordance with all applicable codes including NFPA 90A, 90B, and SMACNA requirements.
- B. All ductwork covered under this section shall be in strict accordance with NFPA 96 (standard for "Installation of equipment for removal of smoke and grease laden vapors from commercial cooking equipment").

PART 2 - PRODUCTS

2.01 DUCTS SERVING TYPE I HOODS (GREASE AND SMOKE)

- A. Kitchen hood ducts shall be black carbon steel minimum thickness No. 16 MSG (0.054").

- B. All seams, joints and penetrations shall have a liquid tight continuous external weld.
- C. No internal projections or obstructions of any kind will be allowed in grease ductwork.
- D. Use of bolted or flanged type connections are not permitted. The outer surface of the grease ducts shall be smooth with no flanges or other projections (exception: external weld bead).
- E. Use of fasteners which penetrate the duct wall or project into the duct are not permitted.
- F. Duct systems shall be continuous and liquid tight with no penetrations except access doors.
- G. All fittings shall be radiused type ELLS; no mitered elbows, turning vanes, or joints are permitted.
- H. Connections to equipment shall be by an approved method and shall be liquid tight.
- I. Ductwork accessories shall be listed for this application.
- J. All grease ducts shall be hung with trapeze hangers.
- K. Contractor Option: Supply listed prefabricated grease ductwork. A pre-engineered UL listed for grease duct system is acceptable as a substitution.
- L. Access Doors:
 - 1. Factory-fabricated, -listed, and -labeled, double-wall access doors tested according to UL 1978 and rated for 500 deg F continuously, or 2000 deg F for 30 minutes; with positive or negative duct pressure and complying with NFPA 211.
 - 2. Construction: 0.0625 inch ASTM A666, Type 304 stainless-steel inner shell and aluminized-steel outer cover with two handles.
 - 3. Fasteners: Stainless-steel bolts and wing nuts.
 - 4. Access Door Dimensions: 18 x 12 inches or as shown on drawings and required to fit duct.
 - 5. Door Label: Mark door with uppercase lettering as follows: "ACCESS PANEL. DO NOT OBSTRUCT."

2.02 DUCTS SERVING TYPE II HOODS (HEAT AND STEAM)

- A. Ducts shall be Type 304, stainless-steel sheet, No. 2D finish
- B. All longitudinal seams shall be welded.
- C. All transverse joints shall either be welded or flanged with watertight EPDM gaskets.
- D. All ductwork shall be hung with trapeze hangers.
- E. No internal projections, obstructions, or fasteners of any kind will be allowed ductwork.
- F. Duct systems shall be continuous and liquid tight with no penetrations except access doors.
- G. All fittings shall be radiused type ELLS; no mitered elbows, turning vanes or joints are permitted.
- H. Connections to equipment shall be by an approved method and shall be liquid tight.

PART 3 - EXECUTION

3.01 DUCTS SERVING TYPE I HOODS (GREASE AND SMOKE)

- A. Install all ducts without dips and traps that may hold grease, and sloped a minimum of 2 percent to drain grease back to the hood.
- B. All joints shall be welded and shall be telescoping, bell, or flange joint as per NFPA 96.
- C. Ductwork shall be sized to maintain a minimum air velocity of not less than 1500 FPM (unless shown on drawings sized for higher velocity).
- D. Dampers and auxiliary equipment shall not be installed in grease ducts unless listed for use in this application.
- E. Access doors shall be provided at each change in direction and at each floor penetration.
- F. For access doors, weld 3/8" studs to 3" deep extension frame, studs shall be spaced 4" O/C. Fully welded door shall be formed to fit into extension frame to allow a flush inner surface. Provide 1500°F high temperature gasket for each door. Weld flat stock handle to project through insulation on each plate. Ensure fasteners do not penetrate interior of duct space.
- G. Access doors shall not be located on the bottom side of ductwork, unless specifically allowed by the Engineer. Openings for access doors shall be cut into the side of ducts approximately 2" minimum above bottom surface to prevent possible leakage.
- H. Testing: Prior to the use or concealment of any portion of grease ductwork, a leakage test shall be performed by passing a light over the entire section of ductwork to be tested per section 506.3.2.5 of the Mechanical Code.

3.02 DUCTS SERVING TYPE II HOODS (HEAT AND STEAM)

- A. Install dishwasher exhaust ducts and other exhaust ducts from wet, high-humidity locations without dips and traps that may hold water. Slope ducts a minimum of 2 percent back to dishwasher or toward drain.
- B. Provide a drain pocket at each low point and at the base of each riser with a 1-inch trapped copper drain from each drain pocket to open site floor drain.
- C. Minimize number of transverse seams.
- D. Do not locate longitudinal seams on bottom of duct.

END OF SECTION 23 3351

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary conditions and Division 1 Specification Sections, apply to work in this section.

1.02 SUBMITTALS

- A. Schedule of exhaust fans and all accessories.
- B. Sound power ratings.
- C. Product data sheets for all equipment.
- D. Dimensioned shop drawings.
- E. Special Note: Fans sizes may be selected for future capacities. Fan size substitutions which do not meet intended future capacities will not be accepted.
- F. Provide submittal indicating maximum, minimum and design RPM for fan size.

1.03 GENERAL REQUIREMENTS

- A. Provide supply, and exhaust fans to fit intended use and location as indicated on plans and/or specified.
- B. Capacity, size and arrangement, static pressure, brake horsepower, component parts and accessories as scheduled and/or as necessary to obtain required results and allow for proper maintenance. Motor efficiency shall comply with EISA standards.
- C. Ratings based on tests made in strict accordance with current AMCA sound and performance standards including standard #210.
- D. Each size fan to be supplied shall be tested in the manufacturer's laboratory under simulated installation **CONDITIONS**. Ratings based on test, not on interpolated or extrapolated calculation.
- E. Submit certified performance tests by AMCA for all centrifugal fans 5,000 CFM and larger.
- F. Guaranteed full capacity delivery through duct systems finally installed and under conditions listed.
- G. Guaranteed sound-power level ratings not exceeding those of design equipment.
- H. All equipment statically and dynamically balanced to acceptable tolerances with all weights permanently fastened.
- I. When dampers are supplied, furnish all necessary relays and devices to permit operation.

PART 2 - PRODUCTS

2.01 CENTRIFUGAL FANS DESCRIPTION

- A. Centrifugal fan belt driven (unless otherwise noted). Fabricated from formed and curved material with continuously welded seams. Provide removable covers or access doors to allow access to internal parts. Drive frame structure constructed of heavy gauge galvanized steel.
- B. Drive assembly and wheel shall be removable without disassembly of fan housing. Fan shaft shall be painted to avoid corrosion. Furnish accessory hinging kit to facilitate access to fan internal components and ductwork.

2.02 MOTORS

- A. All motors shall be general purpose squirrel-cage induction type, NEMA Design 8, Class 8 insulation, continuous duty, 40°C ambient, single or multiple speed as scheduled, designed for 60 hertz operation.
- B. All three phase motors shall be NEMA Premium Efficiency design. Motor efficiency shall be indicated on the motor nameplate by the manufacturer per IEEE Standard 112 Method 8 in accordance with following tables:

Open Drip Proof (ODP)

Horsepower	1200 RPM	1800 RPM	3600RPM
1	82.5%	85.5%	77.0%
1.5	86.5%	86.5%	84.0%
2	87.5%	86.5%	85.5%
3	88.5%	89.5%	85.5%
5	89.5%	89.5%	86.5%
7.5	90.2%	91.0%	88.5%
10	91.7%	91.7%	89.5%
15	91.7%	93.0%	90.2%
20	92.4%	93.0%	91.0%
25	93.0%	93.6%	91.7%
30	93.6%	94.1%	91.7%

Totally Enclosed Fan-Cooled (TEFC)

Horsepower	1200 RPM	1800 RPM	3600 RPM
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1.5	87.5%	86.5%	84.0%
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5	89.5%	89.5%	86.5%
7.5	91.0%	91.7%	98.5%
10	91.0%	91.7%	90.2%
15	91.7%	92.4%	91.0%
20	91.7%	93.0%	91.0%
25	93.0%	93.6%	91.7%
30	93.0%	93.6%	91.7%

- C. Single speed motors shall operate at 1750 RPM unless otherwise indicated.

D. For All Motors with Motor Starters:

1. Provide premium efficiency motor.
2. Fractional HP motors shall be equipped with internal automatic reset thermal overload switch.
3. Provide factory mounted and wired safety disconnect switch; locate in motor compartment. When disconnect will not fit in motor compartment furnish weatherproof NEMA 3R safety switch for external mounting.

E. Motors for Units With Variable Frequency Drives:

1. Motor shall be rated for inverter duty.
2. Provide motor of continuous duty, 1.15 SF, NEMA Class F insulation
3. For fractional horse motors with variable frequency applications provide permanently split capacitor or shaded pole type motor.
4. See Specification Section 238505 - Variable Frequency Drive Systems for further details.

F. ECM Motors

1. Motor to be an electronic commutation (EC) motor specifically designed for fan applications. AC induction type motors are not acceptable.
2. Motors shall be permanently lubricated with heavy-duty ball bearings to match the fan load and prewired to the specific voltage and phase.
3. Internal motor circuitry shall convert AC power supplied to the fan to DC power to operate the motor.
4. Motor shall be speed controllable down to 20% of full speed (80% turndown).
5. Provide fan with the following fan speed control device (unless otherwise noted):
 - a) Constant Speed Operation: Fan speed potentiometer, factory mounted and wired, for fan operation at a constant volume. Potentiometer shall be utilized for balancing.
 - b) Variable Speed Operation: When scheduled with multiple airflows, a fan speed controller capable of accepting a 0-10 VDC signal from BMS, and any required transformer for powering controller to allow for variable speed operation throughout the range indicated. Contractor shall be responsible for any field wiring of components if they do not come factory mounted and wired.
6. Motor shall be a minimum of 85% efficient at all speeds.

2.03 FAN DRIVE ASSEMBLIES

- A. Fan manufacturer shall furnish motors, V-belts and drives complete and ready to operate. Drives shall include the following:
1. Drives rated at 150% of motor horsepower.

2. Motors 5 HP and larger: Minimum of two belts.
 3. Use only matched belt sets for multiple drives.
 4. Cast iron or cast steel pulleys.
 5. Provide test holes in belt guards for speed checks.
 6. Provide shaft guards where shafts extend beyond belt guards.
 7. Adjustable type motor pulley with 15% speed adjustment above and below rated speed.
 8. Drive ratio not over 4:1 except as otherwise approved.
- B. For Variable Frequency Applications:
1. Do not use belt drives
 2. All variable frequency applications shall utilize direct drive fans.

2.04 FAN BEARINGS

- A. Fan manufacturer shall furnish all fans with self-aligning, grease lubricated, ball or spherical roller bearings selected in accordance with rating method of Anti-Friction Bearing Manufacturers' Association, so "rating life" is not less than 50,000 "life hours" continuous operation at maximum speed and pressure for each AMCA fan class. If requested by Engineers, submit bearing selection calculations for approval.

2.05 VIBRATION ISOLATION

- A. Fan manufacturer to furnish vibration isolation equipment for each piece of equipment supplied.

2.06 KITCHEN FANS

- A. Equipment shall meet latest edition of NFPA Article 96 (Requirements for commercial cooking equipment).
- B. Kitchen fans shall be similar to standard exhaust fans with the following additional requirements:
1. Fan(s) shall be upblast vertical discharge type.
 2. Motor and drives isolated from air stream with insulated barrier.
 3. Oversized air tube for motor cooling located away from fan discharge.
 4. Grease trough with drain connection to baffled grease trap container.
 5. Vented curb extension to meet 40" minimum discharge height above roof surface.
 6. Weatherproof NEMA 3R disconnect switch mount on curb extension (wiring connections in liquid tight flexible conduit by EC).
 7. Hinging kit to allow fan to be opened to facilitate access to ductwork.
 8. Fans must be UL/cUL 762 listed.

2.07 ROOF CURBS

- A. Furnish prefabricated welded galvanized steel roof curb for all roof fans. Roof curb with rigid fiberglass insulation and wood nailer held in place by metal wrap-around. Standard height to be 12"

above finished roof unless otherwise noted. Roof curbs will be fully assembled and placed onto the roof by the MC for installation by GC.

- B. Bottoms of curbs to sit level on roof. Contractor is to verify any roof pitches prior to submittal. Provide pressure treated wood blocking to raise roof curb base to top of finished roof surface.
- C. Roof curb to include metal liner to protect insulation (NO EXCEPTIONS!).
- D. Cant strips formed into curb body. Provide raised cant for use with insulated roof decks. For fans located on rubber roof membranes raised cant is not to be supplied with curb.
- E. For units with dampers furnished by fan manufacturer provide damper shelf mounted inside of curb. Alert duct sub-contractor to this condition for proper damper and duct installation.

2.08 UTILITY SET

A. Description:

- 1. Factory-fabricated, -assembled, -tested, and -finished, centrifugal fan utility vent sets, consisting of housing, wheel, fan shaft, bearings, motor, drive assembly, and support structure. Fan shall be belt or direct driven per equipment schedule.

B. Housings:

- 1. Housing Material: Reinforced steel., treated with a high performance powder coating, unless otherwise noted.
- 2. Formed panels to make curved-scroll housings with shaped cutoff.
- 3. Panel Bracing: Steel angle- or channel-iron member supports for mounting and supporting fan scroll, wheel, motor, and accessories.
- 4. Discharge Arrangement: Fan scroll housing field rotatable to any multiple discharge positions. Provide fan with discharge positioned in proper direction to minimize connected duct turns.

C. Wheels:

- 1. Wheel Configuration: SWSI, with hub keyed to shaft, statically and dynamically balanced.
- 2. Wheel and Blade Materials: Steel unless otherwise noted to attain a spark resistant construction rating per equipment schedule.

D. Shafts:

- 1. Turned, ground, and polished steel; keyed to wheel hub. First critical speed at least 1.4 times maximum class speed.

E. Required Accessories:

- 1. Companion Flanges: Rolled flanges for duct connections of same material as housing.

2. When motorized dampers are not indicated, provide backdraft dampers of gravity actuated type with counterweight and interlocking aluminum blades, with felt edges in steel frame installed on fan discharge.
 3. Belt Guard: OSHA-compliant, completely enclosed shaft and drive components.
 4. Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
 5. Equipment Rails with housed vibration isolators – isolators shall be appropriate for mounting type and location.
- F. Additional required accessories when roof mounted:
1. Drain Connections: NPS 3/4 threaded coupling drain connection installed at lowest point of housing.
 2. Weather Hoods: Weather resistant with stamped vents over motor and drive compartment.
 3. Roof Equipment Support Rails: This contractor shall furnish prefabricated 18 gauge welded galvanized steel rail with integral base plate. Size to be 12" larger than unit that it supports or a minimum of 8" overhang each end over joist (whichever dimension is larger). This contractor shall verify actual length dimensions required. This Contractor shall provide pressure treated top rail/wood blocking and metal cap flashing of sufficient width and length to cover insulation. Insulation, flashing, roof membrane, cap flashing and sealants shall be installed on rail by General Contractor. Rail to be Model ER-2B; RPS Corporation.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install equipment in strict accordance with manufacturer's instructions and so as to be compatible with intent of the respective system performance requirements.
- B. Field services shall be provided by a factory trained representative to fully set-up and adjust the new units, after the installations have been completed and before the units are placed in service. Written start-up report to be furnished. Factory alignment, mechanical seals, lubrication, three phase motor rotation, and all necessary commissioning tests shall be completed and checked before units are placed in service.
- C. Install vibration isolators in strict accordance with manufacturer's instructions.
- D. Provide all necessary supporting ironwork for equipment requiring same.
- E. Provide guards for all exposed belts, shafts or fan wheels.
- F. Change pulley sizes as many times as necessary, as part of contract, to make systems deliver specified quantities of air.
- G. Roof curb must be roofed and flashed to the top of wooden nailer to assure weather tightness.
- H. Bolt fan housing to curb.

- I. Install vibration isolation per manufacturer's requirements. Bolt, provide hold down tabs over bottom isolator plate, or lag to equipment rail, floor, support steel, or other mounting location to ensure a stable, secure installation of equipment.

END OF SECTION 23 3416

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.02 SUBMITTALS

- A. Schedule indicating drawing no., room location, quantity, size, throw, direction of throw, accessories, finish, material type, color chart, etc.
- B. Product data sheet for each unit indicating throw, noise criteria ratings, directional data (four-way, etc.) material, accessories, mounting details, etc.
- C. Noise criteria shall conform with specified equipment performance data.
- D. If requested by Engineer, provide sample of diffuser, register, grille, etc.

1.03 GENERAL REQUIREMENTS

- A. Duct drawings are diagrammatic and do not provide exact locations for diffusers, registers and grilles. Contractor shall reference reflected ceiling plans or instructions by Architect for a more exact location of diffusers, etc., with respect to ceiling grid, light fixture and sprinkler etc.
- B. Each manufacturer shall check noise level ratings for their equipment to insure that the sizes selected will not produce noise to exceed 30 db, "A" scale, measured at occupant level; notify Engineer of any problems in this regard and change equipment size accordingly.

1.04 REQUIREMENTS FOR DIFFUSERS, REGISTERS AND GRILLES

- A. All units and accessories shall be installed "sight-proof" where possible.
- B. Borders and frames shall be of same material and color as specified for grille face.
- C. Total quantity of air equally divided, or as required and/or shown, where diffusers blow in more than one direction. Provide blank off plate (finished to match unit) to match blow pattern shown on drawings.
- D. Each supply register and diffuser shall be guaranteed to deliver indicated capacity and proper throw with draftless diffusion, and within acceptable noise level.
- E. Limit terminal velocity at walls of room, below 25 fpm, measured 4' above floor.
- F. Contractor shall provide proper duct connection to all diffusers, registers and grilles. Ductwork connections shall be as required by unit manufacturer. Connections required by Contractor include but are not limited to square/round adapter, transitions, flanges, neck rings, etc.
- G. Because of intricate system designs and special performances required, all devices may not be of same make.
- H. Suitable for recessed mounted unless otherwise indicated.

- I. Diffusers and registers that are scheduled with integral opposed blade volume damper at neck must match unit construction and must be able to be adjusted through face, without removing unit.
- J. Diffusers, registers and grilles do not require volume control dampers unless specifically indicated.
- K. All exposed fasteners must be tamper proof.
- L. Security Grille Face: Where indicated, provide heavy duty security type, tamper proof, secure grille face. Grille shall be 12 ga. thick cold rolled steel 1/2" sq. perforated grille. Fasteners shall be located 6" C/C around perimeter. Unit shall have white prime finish suitable for field painting. Provide A.J. Manufacturing Co.; or equal.

PART 2 - PRODUCTS

2.01 GENERAL

- A. See drawings for schedule.

2.02 TRANSFER GRILLE ASSEMBLY

- A. TG-1: Furnish and install where indicated on drawings, TG-1 assembly consisting of: (2) grilles, (1) fire damper and (1) duct sleeve. Each grille shall include plaster frame. Fire damper shall be 1-1/2hr, Air Balance Model #119AF; or equal. Locate as shown. Paint all visible interior surfaces flat black. Do not paint fire damper.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. All equipment specified under this section shall be installed where called for on plans and in compliance with the contract documents.
- B. Install equipment in strict accordance with manufacturer's instructions and so as to be compatible with intent of the respective system performance requirements.
- C. Diffusers in lay-in type ceiling tiles shall be located at center of tile, squared with tile edges.

END OF SECTION 23 3713

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions and Division 1 Specification Sections, apply to the work of this section.

1.02 SUBMITTALS

- A. Submit shop drawings on all equipment specified. Operation and maintenance manuals.

PART 2 - PRODUCTS

2.01 GENERAL PROVISIONS

- A. Furnish and install a complete kitchen exhaust hood and system components as manufactured by Econovent Systems, Inc. The exhaust system is to be the compensating type, using un-tempered filtered outside air introduced into the hood front.
- B. Exhaust double wall canopy shall be constructed of 16 ga. polished No. 304 stainless steel with No.4 finish; both the exterior shell and interior liner. Exterior shell shall be liquid tight, continuously welded, with all visible welds ground smooth and blended, conforming to the latest edition of NFPA Bulletin No. 96. Exhaust canopy shall bear the NSF No. 1113 label, BOCA label per research report 78-46, and UL label listing fusible link fire damper at the exhaust collar.
- C. The supply air chamber shall have a fully insulated interior with 1", 3 lb. density aluminum skin vapor barrier insulation. Insulation shall be fastened to the chamber walls with a cured mastic tape. Below each supply air inlet opening, a perforated metal air diffuser plate shall be installed to ensure an even air distribution.
- D. The exhaust canopy shall include UL listed 115V vaporproof incandescent lights. All lights shall be factory mounted and wired in conduit to a power junction box, for field connection to the power supply. Light bulbs are not included.
- E. Exhaust canopy shall include 2" deep UL listed aluminum panel extractors or mesh grease filters. Filter removal tool shall be included.
- F. The kitchen exhaust fans shall be as manufactured by Jenn-Air, upblast configuration for use in kitchen grease exhaust systems. Fan(s) must include all aluminum construction and internal service disconnect switch.
- G. Supply air fans shall be Econovent Systems. All air must pass thru metal mesh air filters mounted before the centrifugal fan wheel. Fan(s) must include internal service disconnect switch.
- H. All roof curbs are to be provided by the fan supplier and shall conform to local codes. Curb construction shall be aluminum with a 2"x2" wood nailer around the full perimeter of the curb inside diameter. All exhaust canopies include an opposed blade balancing damper for field installation at each canopy's supply air damper.

- I. A control panel is provided by the kitchen exhaust system supplier to interface with and control the exhaust system operation. This panel shall include fan motor starters and fuses, light interlocks, and pilot lights to indicate supply fan or exhaust fan operation.
- J. All supply air and exhaust air openings are to be on the centerline of the canopy and these openings must be factory cut with duct collar.
- K. Fire Suppression System: All hoods shall be served by a single fire suppression system located on the KEH-1 hood as shown on drawings. The system shall automatically: protect the exhaust ducts, hood, and cooking appliances and shut off the main fuel supply to the appliances by means of a mechanically activated gas line shut off valve. The valve shall have resilient seating with an aluminum body and stainless steel internal parts. In addition, the valve shall have an external indicator of the closed or open position. The system shall be furnished with manual pull stations where shown on drawings. The system enclosure shall be an integral part of the exhaust hood and shall match the hood finish. The enclosure shall also provide enough room to house the electrical control panel serving the hood. The enclosure access door shall be custom made to accommodate the ceiling recess of 4". The system shall be Ansul #R-102; or equal.
- L. Skirting: Provide closure panel (height as scheduled) to run vertically from top of hood to ceiling height. Panels shall be removable for service.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. This installing contractor shall guarantee all materials and workmanship for one (1) full year from the date of system acceptance by Owner.
- B. All exhaust ductwork from the exhaust canopy to the exhaust fan shall be 16 ga. welded black iron, liquid tight, and shall conform to the latest NFPA Bulletin 96, and to all local codes regarding elbows, traps, access doors and insulation. All ductwork from the un-tempered supply air fan to the exhaust canopy shall conform to current SMACNA standards and the latest edition of NFPA Bulletin 96. The exterior of this ductwork shall be fully insulated and wrapped, per local codes.
- C. Provide 16 gauge enclosure from top of canopy to finished ceiling to match hood finish. Install in removable sections to enable access for dampers and maintenance.
- D. Check, Test & Balance: Kitchen exhaust system shall be inspected, tested and balanced by an Econovent Systems, Inc. factory representative to ensure proper and satisfactory operation. Econovent Systems, Inc. must provide a written and detailed report of this check, test and start-up service to the specifying engineer and owner.
- E. The fire protection system shall be installed by a factory authorized contractor.
- F. This contractor shall provide training for the Owner's personnel in the operation of the system, and service for a period of (1) year.

END OF SECTION 23 3813

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.02 SUBMITTALS

- A. Submit shop drawings of units with all accessories as specified in this section. Shop drawings shall include schedule of units including ratings of fan and coils. Sound power levels shall be submitted. Submit (3) copies of installation, operation and maintenance manuals.
- B. Submittals shall be marked to show specified information.

1.03 GENERAL REQUIREMENTS

- A. Provide outdoor, roof curb mounted, packaged air conditioning units to fit intended use and location as indicated on Plans and/or specified:
- B. Capacity, size and arrangement, static pressure, brake horsepower, component parts and accessories as scheduled and/or as necessary to obtain required results and allow for proper maintenance. Ratings based on Standard Test Code for Centrifugal Fans, adopted jointly AMCA and ASHRAE. Each size fan to be supplied shall be tested in the manufacturer's laboratory under simulated installation conditions. Ratings based on test, not on interpolated or extrapolated calculation. Guaranteed full capacity delivery through duct systems finally installed and under conditions listed. Guaranteed sound-power level ratings not exceeding those of design equipment. All equipment statically and dynamically balanced to acceptable tolerances with all weights permanently fastened. Fan bearings shall be rated for 200,000 hour life continuous operation at maximum speed and pressure in accordance with ANSI Code B3.15.
- C. Equipment shall include motors, belt drives, belts, and required accessories; horsepower as scheduled. Motor efficiency shall comply with EISA standards.
- D. Equipment manufacturer shall furnish vibration isolators for each piece of unit as required; spring type or unit fully internally isolated with thrust restraint springs, flexible connections and deflection springs.

PART 2 - PRODUCTS

2.01 PRODUCT DESCRIPTION

- A. Roof Curb:
 - 1. Where scheduled furnish prefabricated, 12 ga. galvanized roof curb height above insulation 12": to be supplied by unit manufacturer.

B. Unit Casing:

1. Unit shall to be furnished with insulated discharge plenum.
2. Unit shall be completely insulated with 2" thick neoprene coated glass fiber secured to side, top and end panels with adhesive and mechanical fasteners. Lifting brackets with lifting holes shall be provided on the unit base to accept cable or chain hooks.
3. Filters shall be 2" thick, removable throwaway filters.
4. Where roof curb scheduled; unit frame and base shall be 14 ga. galvanized steel. Unit to have formed recess that seats on roof curb gasket to provide watertight seal.
5. Where roof curb not required provide weatherproof sheet metal bottom pan with full thickness insulation.

C. Supply Fan:

1. Supply fan shall be centrifugal, forward curve, statically and dynamically balanced for quiet operation. Fan motor shall be heavy duty, open drip proof with re-lubricative ball bearings.
2. Furnish fan assembly with vibration isolated floating frame.

D. Gas Heat Section:

1. Unit shall include indirect fired separated combustion heating furnace with heat exchange (material as scheduled) including induced draft blower, electric pressure switch to lock out gas valve. Furnish gas ignition system with electronic ignition, modulating (see schedule) gas valve and safety system.

E. Heating Coil Sections:

1. Steam coils non freeze type (IDT) shall have aluminum fins helically wound to 518" OD copper tubes. Steam shall be distributed into each tube by an inner distributing perforated tube. Tube shall be brazed to steel headers with NPT connections. Working pressure 175 psig at 400°F.
2. Hot water heating coils shall be aluminum plate fins with belled collars bonded to 1/2" minimum OD copper tubes by mechanical expansion. Galvanized steel casings and steel headers with threaded connections. WP 300 psig, at 200°F. Coils shall be drainable, no turbulence promoting devices, headers shall have drain and vent connections.

F. Compressor:

1. Shall be heavy duty, scroll type, semi-hermetic type with reversible, positive displacement oil pump, and overload protection. Each compressor shall have a complete refrigeration circuit including, sightglass, filter drier, manual shutoff valve and relief valve. Compressor shall be mounted on vibration isolation blocks.

G. Cooling System:

1. Cooling Coil shall be seamless copper tubing, mechanically bonded to corrugated aluminum fins. Coils shall be factory leak tested. Furnish with factory mounted expansion valves. Cooling coils shall be circuited for combination row/face split.
2. Drain Pan with a mastic coating shall be provided with the cooling coil and extend beyond the leaving side of the coil and underneath the cooling coil connections. The drain pan shall be connected to a threaded drain connection extended through the unit base. Units shall be provided with a secondary mastic coated drain pan connected to the primary drain pan.
3. Furnished cooling system complete with refrigeration controls. Where scheduled furnish optional unloading steps complete with suction switches and step controller. The refrigeration controls shall include expansion valve, safety hi/low pressure switches and anti cycling timer.

H. Relief Type:

1. Gravity relief system (where scheduled) shall include exhaust air damper 0-100% rated SA located in the return air section to relieve air out the back of the unit. Exhaust dampers shall be sealed with urethane gasketing on the contact edge. Exhaust louvers and bird screen shall be provided.
2. Powered relief (where scheduled) shall include powered relief exhaust air fan, sized for 100% relief, with a relief air damper. Fan shall be controlled with an integral VFD factory wired speed controller.

I. Heat Recovery System:

1. Heat wheel (where scheduled) unit shall include an ARI rated heat wheel system, factory mounted and wired .
2. Wheel shall be a total energy (sensible) type unit with a cleanable, lightweight polymer material with a bonded desiccant coating. Unit shall be equipped with upstream disposable 4" pleated OA filters.
3. Wheel drive motor and controls shall be factory mounted and wired.

J. Electrical Power Requirements:

1. Weatherproof safety disconnect switch with external lever shall be provided by unit manufacturer.
2. Unit shall be equipped with a single point connection. All internal motors sub feeds shall have individual overcurrent protection housed in an electrical enclosure which shall include terminal blocks for all field connections.
3. All motors shall include integral motor starter or variable frequency drive as indicated and shall be factory mounted and wired.

K. Controls: Controls by Temperature Control Contractor. See Specification Sections 230993 and 230994 for details.

2.02 MOTORS

- A. All motors shall be general purpose squirrel-cage induction type, NEMA Design 8, Class 8 insulation, continuous duty, 40°C ambient, single or multiple speed as scheduled.
- B. All three phase motors shall be NEMA Premium Efficiency design. Motor efficiency shall be indicated on the motor nameplate by the manufacturer per IEEE Standard 112 Method 8 in accordance with following tables:

Open Drip Proof (ODP)

Horsepower	1200 RPM	1800 RPM	3600RPM
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3	89.5%	89.5%	85.5%
5	89.5%	89.5%	86.5%
7.5	91.0%	91.7%	98.5%
10	91.0%	91.7%	90.2%
15	91.7%	92.4%	91.0%
20	91.7%	93.0%	91.0%
25	93.0%	93.6%	91.7%
30	93.0%	93.6%	91.7%

- C. Single speed motors shall operate at 1750 RPM unless otherwise indicated.
- D. Motors controlled by Variable Frequency Drive (VFD) units shall be rated for inverter duty (NEMA MG1, Part 31).

PART 3 -EXECUTION

3.01 GENERAL

- A. Install in strict accordance with manufacturer's instructions.
- B. Duct connection to units shall have flexible connections.
- C. Furnish (1) spare set of filters for each unit.
- D. This Contractor is responsible to furnish and install condensate trap and drain external to unit; drain shall discharge to roof.

E. Roof curbs to be fully assembled and placed onto roof by HC, for installation GC.

END OF SECTION 23 7500

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including all General Conditions, Supplementary Conditions, Division 1 specification sections as well as Information to Bidders requirements that are included in the project documents, apply to the work of this Contract.

1.02 ALLOWANCES, ALTERNATES, AND UNIT PRICES

- A. Refer to Division 1 specifications for allowances, alternates and unit prices required as part of this Contract.

1.03 INTENT

- A. The intent of the drawings and these specifications is to provide all systems complete and operative. Whether indicated on the drawings and/or included in the specification or not, provide all materials, equipment and labor usually furnished with such systems.

1.04 DEFINITIONS

As Called for	Materials, equipment including the execution specified/shown in the contract documents.
Code Requirements	Minimum requirements.
Concealed	Work installed in pipe and duct shafts, chases or recesses, inside walls, above ceilings, in slabs or below grade.
Design Make	Indicates minimum requirements for equipment.
ERL	Existing to be relocated. (see definition of relocate).
EXR	Existing to remain. Make connections to maintain circuit.
Exposed	Work not identified as concealed.
Acceptance	Owner acceptance of the project from Contractor upon certification by Owner's Representative.
Furnished by Others	Receive delivery at job site or where called for and install.
Inspection	Visual observations by Owner's site Representative.
Install	Mount or set equipment, device or fixture and make electric connections.
Labeled	Refers to classification by a standards agency.
Make Provide	Refer to the article, BASIS OF DESIGN. Furnish and install complete.

Relocate	Disassemble, disconnect, store and transport equipment to new locations, then clean, test, and install ready for use.
Replace	Remove and provide new item.
Review	A general contractual conformance check of specified products.
Roughing	Pipe, duct, conduit, equipment layout and installation.
Satisfactory	As specified in contract documents.
Site Representative	Construction Manager or Owner's Inspector at the work site.

Refer to General Conditions of the Contract for additional definitions.

1.05 WORK INCLUDED

- A. In general, the electrical work includes, but is not necessarily limited to the following:
 - 1. Provide Removal Work and all temporary electric and communications connections to maintain services during construction.
 - 2. Provide Grounding of services, raceway systems, disconnects and devices, etc.
 - 3. Provide Interior lighting, wiring, conduits and switching.
 - 4. Provide Power and convenience outlet branch circuits, devices, etc.
 - 5. Provide Exit and emergency lighting.
 - 6. Provide power circuits and select controls to mechanical equipment.
 - 7. Provide modifications to existing Simplex Fire Alarm System.
 - 8. Provide Interior Horizontal Communications raceways and cable.
 - 9. Provide modifications to existing IP cameras at direction of owner's security contractor.
- B. Refer to Division 1 front end specifications for additional scope requirements and phasing.

1.06 BASIS OF DESIGN

- A. The contract documents are prepared on basis of one manufacturer as "design equipment," even though other manufacturers' names are listed as acceptable makes. If Contractor elects to use one of the listed makes other than "design equipment," submit detailed drawings, indicating proposed installation of equipment. Show maintenance clearances, service removal space required, and other pertinent revisions to the design arrangement. Make required changes in the work of other trades, at no increase in any contract. Provide larger electrical feeders, circuit breakers, equipment, additional control devices and other miscellaneous equipment required for proper operation and assume responsibility for proper location of roughing and connections by other trades. Remove and replace door frames, access doors, walls ceilings or floors required to install other than design make equipment. If revised arrangement submittal is rejected, revise and resubmit specified "design equipment" item which conforms to contract documents.

1.07 QUALITY ASSURANCE

- A. Manufactures of equipment shall be firms regularly engaged in the production of factory fabricated systems and equipment whose products have been in satisfactory use in similar service for not less than (3) years.
- B. Suppliers of equipment must have factory trained and authorized personnel for the service of all equipment provided

1.08 LICENSING

- A. The contractor shall hold a license, issued, or recognized by the Authority Having Jurisdiction, to perform electrical work.

1.09 INSPECTIONS

- A. Provide rough in and final inspection by an electrical inspector certified by the AIAEI (the American International Association of Electrical Inspectors).

1.10 REMOVAL, DISPOSAL AND HAZARDOUS MATERIALS

- A. All removed electrical equipment shall be removed from the site and properly disposed of.
- B. All hazardous materials must be disposed of in compliance with ENCON and all other regulatory agencies.
- C. The Owner may wish to keep certain equipment, therefore, check with Owner before removals to determine what may be salvageable.

1.11 TEMPORARY SERVICES

- A. Contractor shall provide a complete temporary light and power service in accordance with requirements of specification section 260016 - Temporary Electric Power.
- B. Refer to Division 1 sections for additional requirements.

1.12 CONTINUITY OF UTILITY SERVICES

- A. It is of paramount importance that each utility service operates continuously and without interruption. Whenever this contractor plans to make changes or alterations to any existing utility service, such plans shall result in no or minimum service interruption or inconvenience to Owner. This contractor shall plan and schedule any change or alteration to an existing utility service with Architect and Owner. Such planning, timing, and/or scheduling shall be approved by both these parties.

1.13 CODES AND STANDARDS

- A. National Electrical Code: All work covered under these Contract Documents shall conform to the latest issue of the National Electrical Code.
- B. Standards: All equipment shall meet all the requirements of ANSI, NEMA, IES, and IEEE standards.
- C. Listing: All equipment and devices for which Underwriters' Laboratory has a listing service, shall be UL listed and bear the UL listing label.
- D. All materials and installation methods shall comply with the following:
 - 1. 2020 New York State Building Code, including all applicable amendments supplements to the following:
 - a. 2020 International Building Code
 - b. 2020 International Existing Building Code
 - c. 2020 International Fire Code
 - d. 2020 International Plumbing Code
 - e. 2020 International Mechanical Code
 - f. 2020 International Fuel Gas Code
 - g. 2020 International Energy Conservation Code
 - 2. National Fire Protection Association (NFPA).
 - 3. New York State Department of Labor Rules and Regulations.
 - 4. The Americans with Disabilities Act.
 - 5. New York State Department of Health.
 - 6. Local Municipality/City Codes and Ordinances and the Authority Having Jurisdiction.
 - 7. Local Fire Department.
 - 8. Insurance Carrier.
 - 9. National Electrical Contractors Association (NECA)
 - 10. Occupational Safety and Health Administration. (OSHA).

1.14 SUBMITTALS & SUBMISSION REQUIREMENTS

- A. All submittals shall be in accordance with Division 1 requirements, the following requirements listed below, and also as indicated in each specification section. All submittals not complying with the listing above will be returned to the contractor without being reviewed. Rejection by Architect or Engineer of any items submitted shall require resubmittal of acceptable items.
1. Within (30) days after receiving signed contract or notice to proceed, submit to Architect for review complete descriptive dimensional data and ratings for equipment and materials proposed to be furnished and installed. Submit (8) copies of data unless otherwise specified by the architect.
 2. All materials submitted shall clearly state the job name and specification section(s) that it applies to.
 3. Any package containing more than one piece of equipment or material shall also contain a schedule clearly listing all items in submittal. Schedule page (s) shall also indicate project name and building name.
 4. All submittals must be clearly marked using nomenclature used in this specification for proper item identification, schedule of usages, model numbers, construction materials, performance, data, etc.
 5. Projects involving multiple buildings must have the submittals separated by building. Submittals in which buildings are combined will not be accepted. (Exception: When specifically approved by engineer, basic materials may be submitted once.)
 6. The Contractor shall insure that dimensions of equipment to be used conform to the space allocated for the equipment on the drawings.
 7. Submittals traced or copied from contract drawings are not acceptable and will be returned without review.
 8. In the event material and/or equipment is installed prior to obtaining approval of shop drawings, and in the sole opinion of the Owner's Agent, this material and/or equipment does not meet the specifications, the Contractor shall be liable for the removal and the replacement at no additional cost to the contract.
- B. Samples: When requested by Engineer, provide samples of both specified equipment and proposed substitutions for review by the Owner's Agent. Such equipment shall be delivered to a location designated, or erected at the job site as directed. When neither is physically possible, arrange for the Owner's Agent to visit an acceptable site where the proposed equipment can be inspected.
- C. Substitutions:
1. Submittals for equipment or materials other than as specified shall be accepted for review by the Owner's agent.
 2. Approval of substitute equipment shall be based on functional, physical and aesthetic compatibility to the equipment specified as determined by the Owner's agent and approved by the engineer.

3. Where substitute equipment is approved, the contractor shall be responsible for, and bear the cost of any necessary changes by his trade or other trades to make the system complete and operable.
4. Contractor is fully responsible for providing coordination between all trades affected by equipment substitution.
5. When requested, contractor shall submit layout drawings indicating new dimensions and arrangements of substituted equipment. Layout drawings shall indicate all revisions necessary for all services affected by substitution.

1.15 FIELD INSPECTION

- A. As there are various conditions at the site which do not show on the accompanying drawings, or which are at variance with the conditions indicated on the drawings, it is important that each bidder visit the site and acquaint himself with existing conditions, and take these conditions into consideration when preparing his proposal. Each bidder shall obtain information or make any measurement desired. Lack of knowledge relative to existing conditions will not be allowed as a basis for extra compensation.
- B. This contractor and his subcontractors shall inspect existing equipment to remain prior to any of his new work in order to determine that all equipment is in good operating condition. If equipment is found to be lacking components, is inoperable, damaged, etc., contractor shall provide immediate written notice to the Owner. The Owner or his representative shall determine if any additional work is necessary and the method by which any work shall be performed.

1.16 PERMITS, CERTIFICATES AND FEES

- A. This Contractor shall obtain and pay for permits, certificates, fees etc. listed below. Costs for permits, fees etc. shall be included in the base bid amount.
 1. All required applications and permits to begin work.
 2. Certificate of inspection including Third-Party Agency.
 3. Fees and charges shall be obtained directly from the respective authority having jurisdiction.

1.17 GUARANTEE

- A. Contractor shall guarantee all work furnished through this contract including work performed by subcontractors, for a period of (1) year (unless otherwise noted), from the date of final acceptance. Contractor agrees to repair or replace any defective work or materials at no additional cost to the Owner. Contractor shall also pay for any damage to other work resulting from repairs to defects. Contractor shall furnish written guarantees to the Owner's agent in accordance with the general conditions.

1.18 TESTING AND INSPECTION

- A. Inspections required for any ordinances, regulations, instructions, laws, rules, standards and practices that require any work to be inspected or tested shall be performed. Contractor shall give Owner, Architect and Engineer timely notice of readiness of work for inspection or testing and the date fixed for said inspection or testing.
- B. Third-Party Agency must inspect completed installation and present Owner with Certificate of Inspection showing approval.

- C. Required local or municipal inspection. Process and present Owner with certificate indicating approval of such governing bodies.
- D. Contractor shall submit a written report to Architect, copy to Engineer, on results of each inspection or test on system or equipment supplied. Report shall contain all pertinent information, recommendations, approvals, additional work required, etc.
- E. Contractor is responsible to check rotation on all three phase equipment prior to turning on equipment for temporary or permanent use.
- F. Panelboard, Circuit Breaker, Transformer and Fuse Tests:
 - 1. Energize all possible lighting and equipment loads for a period of not less than eight hours.
 - 2. Check all fuses and circuit breakers for faulty tripping and excessive heat.
 - 3. Tabulate phase current on all feeders.
 - 4. Tabulate voltages at each panelboard (phase to phase and phase to neutral).
 - 5. Reconnect branch circuits that vary over 5% between high and low current.
 - 6. Reconnect transformer taps as required to adjust for high or low voltages.
 - 7. All tabulation sheets shall be presented to the Architect for approval, make any corrections determined by the Architect.

1.19 RECORD DOCUMENTS

- A. When required by general conditions or other Division 1 Section this Contractor shall prepare and turn over to Owner's agent record as-built documents. As-built drawings will include actual equipment location layout, service connections, etc.
- B. In all projects, contractor shall provide record drawings of all underground equipment and service runs. As-built drawings for underground work will include dimensions to actual locations finish grade elevations, and actual invert to underground structures equipment and service runs.

1.20 PENETRATIONS THRU FIRE RATED CONSTRUCTION

- A. All penetrations for new work or left from removed work by this contract through rated construction shall be sealed fire safe by a UL listed approved method.
- B. All electrical penetrations through walls, floors, etc. shall be conduit sleeved.
- C. All conduit penetrations through fire rated partitions, walls, floors, etc. shall be installed as follows; penetration shall be oversized 1/2" to 3/4" maximum. This Contractor shall pack with fireproofing insulation, type FS cerablanket. Outside of penetrations shall be caulked and sealed with flame stop V, as manufactured by Flame Stop, Inc.; or an approved equal. Flame stop sealant shall be troweled smooth for finishing as required.

- D. Electric panels installed in one- or two-hour fire rated walls shall be wrapped in an approved endothermic mat rated to maintain the assembly.

1.21 CONFINED SPACES

- A. All work in pipe tunnels, mechanical pits, well manholes, etc. shall be performed by skilled tradesman and laborers with current certification for working in confined space. Contractor shall bear all costs to provide all safety equipment, ventilation, etc. as required by State and Federal Regulations and shall obtain all necessary permits for such work.
- B. Contractor shall submit copy of current certifications and photo I.D. of all tradesman and laborers who will be working in confined spaces on this project.

1.22 INTENT OF DRAWINGS

- A. The drawings are diagrammatic, unless detailed dimensioned drawings are included. Drawings show approximate locations of equipment, fixtures, panelboards, and wiring devices. Exact locations are subject to the approval of the Owner's Representative. The general run of electrical feeders, branch circuits, and conduits, indicated on the drawings, is not intended to be the exact routing. Circuit designations, in the form of "Home Runs" on branches, indicate the designation of the branch circuit, and the panelboard or interconnection box from which the branch circuit is served.
- B. Drawings show general design and arrangement. Verify exact location and elevations at the job location. Do not scale plans and diagrams.
- C. Drawings do not show all offsets, fittings, interferences, and elevation changes. Adjust installation of conduit, equipment location, etc. to accommodate work with the obstacles and interferences. Where a major and important rearrangement is necessary, report same to Architect for review. Obtain written approval for all major changes.
- D. Prior to roughing in any back boxes for power or communications devices, thoroughly examine the architectural elevations, enlarged plans and details. Also exam vendor drawings and manufacturer instructions for equipment furnished by others or as part of this contract. Install back boxes in locations and at heights as indicated on these documents. If the locations are not detailed, issue an RFI to the construction manager to obtain them. Boxes that are roughed in without detailed location and heights will re-located at no additional cost to the contract by the electrical contractor.
- E. Cooperate with all Contracts and Owners and determine the exact route of all raceway and location of all equipment.

1.23 COORDINATION DRAWINGS

- A. Before construction work commences, Contractors for all trades shall submit Coordination Drawings at not less than 1/4" = 1'-0" scale. Coordination Drawings are required throughout all areas for all trades. These drawings shall identify and show resolutions of trade conflicts. Mechanical Equipment Rooms shall be drawn early in the Coordination Drawing process, simultaneous with all other congested areas. Prepare Coordination Drawings As Follows:

1. HVAC Contractor will prepare the base plan Coordination Drawings showing all ductwork and all pertinent piping and equipment. These drawings may be CAD drawings of the required ductwork Shop Drawings. The drawings shall be coordinated with cable tray, lighting fixtures, sprinklers, air diffusers, other ceiling mounted items, ceiling heights, structural work, maintenance clearances, electric code clearance, reflected ceiling plans, and other contract requirements. Reposition proposed locations of work after coordination drawing review by the Construction Manager and the Architect. Provide adjustments to exact size, location and offsets of ducts, pipes, conduit, etc., to achieve reasonable appearance objectives. Provide these adjustments as part of Base Bid Contracts. Minor revisions need not be redrawn.
 2. HVAC Contractor will provide prints and Cad drawings and submit the base plan to all major trades' Contractors.
 3. Electrical, Plumbing and Fire Protection Contractors will draft location of piping and equipment on the base plan, indicating areas of conflict and suggested resolutions.
- B. Contractors who proceed without approved coordination drawings will be responsible at no additional cost to move, reroute or replace their work that is in conflict.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. All materials, unless otherwise specified, shall be new and be the standard products of the manufacturer. Used equipment or damaged material will be rejected.
- B. The listing of a manufacturer as "acceptable" does not indicate acceptance of a standard or catalogued item of equipment. All equipment and systems conform to the Specifications.

2.02 ACCESS DOORS

- A. Steel Access Doors and Frames: Fabricate units of continuous welded steel construction, unless otherwise indicated. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to existing ceiling support system. Furnish with manufacturer's factory applied prime paint and top coat of white enamel.
 1. Frames: Fabricate from 16-gage steel. Frames shall be compatible with the existing ceiling suspension system.
 2. Flush Panel Doors: Fabricate from not less than 14-gage sheet steel, with concealed spring hinges or concealed continuous piano hinge set to open 175 degrees.
- B. Locking Devices: Furnish flush, screwdriver-operated cam locks of number required to hold door in flush, smooth plane when closed. Provide a minimum of (2) cam locks for any units over 324 sq. inches.
- C. Acceptable Manufacturers: Karp Associates, Inc.; Meadow Craft, Inc.; Milcor, Div.; Inryco, Inc.

2.03 U.L. LISTING

- A. Equipment shall bear the Underwriter's Laboratories (UL), or other approved agency listing label. This listing requirement applies to the entire assembly. Any modifications to equipment to suit the intent of the specifications shall be performed in accordance with the National Electric Code and listed by U.L.

2.04 FIRE STOPPING FOR POWER AND COMMUNICATION OUTLETS

- A. Provide fire rated moldable putty around all power and communication outlet boxes in resident rooms. The putty shall meet the following:
 - 1. Firestop tested up to 4 hours in accordance with ASTM E 814 and (UL 1479)
 - 2. Wall opening protective tested up to 2 hours in accordance with UL 263
 - 3. Pliable and conformable to mold easily into required shape
 - 4. Re-enterable/repairable
 - 5. Halogen-free and solvent-free
- B. Design Make: 3M™ Fire Barrier Moldable Putty Pads MPP+ 6.

2.05 FIRE STOPPING FOR OPENINGS IN RATED WALLS

- A. Provide Fire-stopping for Openings through Fire and Smoke Rated Walls and Floor Assemblies shall be listed or classified by an approved independent testing laboratory for "Through-Penetration Fire-Stop Systems." The system shall meet the requirements of "Fire Tests of Through-Penetration Fire-Stops" designated ASTM E814.
- B. Acceptable Manufacturers:
 - 1. Dow Corning Fire-Stop System Foams and Sealants.
 - 2. Nelson Electric Fire-Stop System Putty, CLK and WRP.
 - 3. Thomas & Betts - S-100 FS500/600.
 - 4. Carborundum Fyre Putty.
 - 5. Hilti Firestop Systems.
 - 6. 3M Interam Endothermic Mats

PART 3 - EXECUTION

3.01 ROUGHING

- A. Obtain approved roughing diagrams and exact locations of equipment for items furnished under other Divisions of the specifications. Do not rough in without approved drawing.
- B. Due to small scale of Drawings, it is not possible to indicate all offsets, fittings, changes in elevation, etc. Verify final locations for rough-ins with field measurements and with the equipment being connected. Verify exact location and elevations at work site prior to any rough in work. DO NOT SCALE PLANS. If field conditions, details, changes in equipment or shop drawing information require a significant change to the original documents, contact the owners' representative for approval before proceeding.
- C. All equipment locations shall be coordinated with other trades to eliminate interference with required clearances for equipment maintenance and inspections.

- D. Do not rough in outlets back-to-back in adjoining walls offset as required by field conditions and provide fire rated putty around boxes.
- E. Coordinate work with other trades and determine exact routing of all duct, pipe, conduit, etc., before fabrication and installation. Coordinate with Architectural Drawings. Verify with Owner's Representative exact location of all equipment in finished areas, such as thermostat, fixture and switch mounting heights, and equipment mounting heights.
- F. Coordinate all work with the architectural reflected ceiling plans and/or existing Architecture. Mechanical and electrical drawings show design arrangement only for diffusers, grilles, registers, air terminals, lighting fixtures, sprinklers, speakers and other items. Do not rough-in contract work without reflected ceiling location plans.
- G. Before roughing for equipment furnished by Owner or in other contracts, obtain from Architect and other Contractors, approved roughing drawings giving exact location for each piece of equipment. Do not "rough in" services without final layout drawings approved for construction. Cooperate with other trades to insure proper location and size of connections to insure proper functioning of all systems and equipment. Obtain written authorization from the Owners representative or other contractor for any "rough ins" that, due to project schedule, are required before approved coordination drawings are available. Any work installed without written authorization or approved coordination drawings, causing a conflict will be relocated by the electrical contractor at no expense to the Owner.
- H. For equipment and connections provided in this contract, prepare roughing drawings as follows:
 - 1. Existing equipment being relocated: Measure the existing equipment and prepare drawings for installation in new location.
 - 2. New equipment: Obtain equipment roughing drawings and dimensions, then prepare rough-in drawings.
 - 3. Where more than one trade is involved in an area, space or chase, all shall cooperate and install their own work to utilize the space equally between them in proportion to their individual requirements. In general, ductwork shall be given preference except where grading of piping becomes a problem, followed by piping then electrical wiring. If, after installation of any equipment, piping, ducts, conduit, and boxes, it is determined that ample maintenance and passage space has not been provided, rearrange work and/or furnish other equipment as required for ample maintenance space. Any changes in the size or location of the material or equipment supplied, which may be necessary in order to meet field conditions or in order to avoid conflicts between trades, shall be brought to the immediate attention of the Owner's Representative and approval received before such alterations are made.
 - 4. Provide easy, safe, and code mandated clearances at controllers, motor starters, valve access, and other equipment requiring maintenance and operation. Contractor shall relocate existing work in the way of new construction. VISIT SITE BEFORE BIDDING TO DETERMINE SCOPE OF WORK. Provide new materials, including new piping and insulation for relocated work.

3.02 CUTTING AND PATCHING

- A. Provide cutting and patching required by and for the installation of the electrical work.
- B. Patching of fire rated floors, walls, partitions, etc. shall be made using new materials equal to the fire rating of the existing.
- C. Should changes, omissions or errors in electrical work require cutting, patching or making alterations in any portion of new construction, such work will be performed by a qualified tradesman.
- D. Cutting and patching of roof surfaces and structures shall only be performed by a qualified contractor, as approved by the Architect. The contractor shall bear the cost of above mentioned cutting and patching. This contractor shall insure that existing roof warranties remain in force.
- E. This contractor shall furnish lintels, sized to accommodate structure above opening, where cutting and patching is to be performed on load bearing walls. Contractor shall obtain written approval for all lintels prior to installation.
- F. Cutting shall be done in a manner which will not adversely affect the strength of the building. Holes and openings shall be neatly cut so as to provide a finished appearance and shall be patched around the edge where required for a finished appearance. Provide temporary bracing, shoring, etc. as required.
- G. Patching shall be structurally sound and match the existing materials and finish of adjacent materials. Patching is required in finished areas, wherever existing work is removed, at the sides of openings, etc. Patching shall include repairs, painting, etc.
- H. At the completion of the work, all evidence of alteration will be as inconspicuous as possible.

3.03 OPENINGS, SLEEVES, AND CHASES

- A. Certain chases, openings, and shafts will be provided as shown as part of General Construction Plans and Specifications.
- B. Provide all other openings and sleeves for conduit etc. through floors, walls, partitions, ceilings, roofs, etc. for Division 26-E work.
- C. Assume responsibility for correct and final location and size of such openings; furnish templates if required. Correct improperly located and sized or omitted chases and openings as required. Plug all abandoned sleeves left as part of this Contract.

3.04 SEALING AND FIRESTOPPING

- A. Installation of Fire-stopping for Openings Through Fire and Smoke Rated Walls and Floor Assemblies shall be as follows:
 - 1. Provide fire-stop system seals at all locations where piping, tubing, conduit, electrical busways/cables/wires, ductwork and similar utilities pass through or penetrate fire rated wall or floor assembly. Provide fire-stop seal between sleeve and wall for dry wall construction.
 - 2. The minimum required fire resistance ratings of the wall or floor assembly shall be maintained by the fire-stop system. The installation shall provide an air and watertight seal.

3. The methods used shall incorporate qualities that permit the easy removal or addition of electrical conduits or cables without drilling or use of special tools. The product shall adhere to itself to allow repairs to be made with the same material and permit the vibration, expansion and/or contraction of any items passing through the penetration without cracking, crumbling and resulting reduction in fire rating.
 4. Provide rigid steel sleeves where non-armored cables pass through fire rated walls and barriers.
 5. Where boxes are installed flush in a rated wall provide an approved endothermic wrap around the entire enclosure. Seal conduit penetrations with approved fire putty.
- B. Installation of Fire-stopping around junction boxes between resident rooms and in rated walls in other areas of the building.
1. Provide fire rated putty around all boxes in all boxes in rated walls other than in resident walls.
 2. Mold the putty to the box and the connector for a complete seal of all openings and knock outs in the box.
 3. The surface of the electrical box, or opening and any penetrating items must be cleaned (i.e. free of dust, grease, oil, loose materials, rust or other substances)
 4. Ensure that the surface of the substrates are not wet and are frost-free.
- C. All penetrations from abandoned or removal electrical work shall be sealed fire safe by this contract.

3.05 SUPPORTS

- A. Provide required supports for work of this Contract, including beams, angles, channel, hangers, rods, columns, plates, bases, braces, etc. to properly support all work.
- B. Provide steel angles, channels and other materials necessary for the proper support and erection of motor starters, distribution panelboards, large disconnect switches, pendant-mounted lighting fixtures, etc.
- C. Panelboards, cabinets, large pull boxes, cable support boxes and starters shall be secured to ceiling and floor slab and not supported from conduits. Small panelboards, etc., as approved by Owner's Representative, may be supported on walls. Racks for support of conduit and heavy electrical equipment shall be secured to building construction by substantial structural supports.
- D. Provide concrete bases for all floor mounted equipment. Provide 3,000 lb. concrete, chamfer edges, trowel finish, securely bond to floor by roughening slab and coating with cement grout. Bases 2" high; shape and size to accommodate equipment. Set anchor bolts in sleeves before pouring and after anchoring and leveling, fill equipment bases with grout.
- E. See Specification Section 260190 – Supporting Devices for additional requirements

3.06 CONCEALMENT

- A. Unless otherwise specifically indicated, all work shall be concealed above ceiling space, in wall space, below slabs in crawl spaces, and elsewhere throughout the building.

- B. In areas with no ceilings, install only after Architect reviews and comments on arrangement and appearance.

3.07 TEMPORARY LIGHT AND POWER

- A. Provide temporary electric system as called for in specification section 260016.

3.08 ROOF AND ROOF DECK CUTTING AND FLASHING

- A. All penetrations through roofing and decking shall be accomplished by the roofing manufacturer's Certified Roofing Contractor in order to maintain roof system warranty.

3.09 EQUIPMENT INSTALLATION

- A. All installations shall comply with the following requirements:
 - 1. Provide code required disconnects for all electrical equipment that is furnished or connected by the electrical contractor.
 - 2. Coordinate electrical systems, equipment, and materials installation with other building components. Be responsible for any changes in openings and locations necessitated by the equipment installed.
 - 3. The architect shall control the placement of all wall and ceiling mounted electrical equipment and devices in all rooms except for mechanical and electrical equipment rooms. When drawing details are not available, consult with the Architects representative for actual location.
 - 4. Verify all dimensions with field measurements.
 - 5. Arrange for all chases, slots and openings in other building components that are not indicated on drawings, to allow for electrical installations.
 - 6. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.
 - 7. Coordinate ordering and installation of all equipment with long lead times or having a major impact on work by other trades so as not to delay the job or impact the construction schedule. Pay close attention to equipment that must be installed prior to building enclosure.
 - 8. Where mounting heights are not detailed or dimensioned, install systems, materials and equipment to provide the maximum headroom possible.
 - 9. Install systems, materials and equipment to conform with approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer the conflict to the Architect.
 - 10. Store Materials on dry base, at least 6" above-ground or floor. Store so as not to interfere with other work or obstruct access to buildings or facilities. Provide waterproof/windproof covering. Remove and provide special storage for items subject to moisture damage. Protect against theft or damage from any cause. Replace items stolen or damaged, at no cost to Owner.

11. Set all equipment to accurate line and grade, level all equipment and align all equipment components.
 12. All tolerances in alignment and leveling, and the quality of workmanship for each stage of work shall be as required by the manufacturer and subject to approval by the owner's representative.
 13. All finished equipment surfaces damaged during construction shall be brought to "as new" condition by touch up or repainting. Any rust shall be removed and primed prior to repainting.
 14. Workmanship shall be as called for in the "Standard of Installation" published by the National Electrical Contractors Association (NECA).
 15. Provide all scaffolding, rigging, hoisting and services necessary for erection and delivery of equipment and apparatus furnished into the premises. These items shall be removed from premises when no longer required.
 16. No electrical equipment shall be hidden or covered up prior to inspection by the owners' representative. All work that is determined to be unsatisfactory shall be corrected immediately.
 17. All electrical work shall be installed level and plumb, parallel and perpendicular to other building systems and components.
 18. Conceal all contract work above ceilings and in walls, below slabs, and elsewhere throughout building. If concealment is impossible or impractical, notify Owner's Representative before starting that part of the work and install only after his approval. In areas with no ceilings, install only after Owner's Representative reviews and comments on arrangement and appearance.
 19. Install access panel or door where units are concealed behind finished surfaces.
- B. Provide complete power connections to all electrical equipment. Provide control connections to equipment where indicated on the drawings. Provide disconnect ahead of each piece of equipment. Ground all equipment in accordance with the latest version of the National Electrical Code.
- C. Provide all power wiring, electric equipment, control wiring, switches, lights, receptacles, and connections as required for proper equipment operation of Owner-Furnished Equipment and Equipment furnished by other contracts,
- D. Refer to Manufacturer's drawings/specifications for requirements of special equipment. Verify connection requirements before bidding and confirm prior to roughing.
- E. This contractor shall coordinate scheduling and installation of work with other contractors, sub-contractors and other trades. The contractor is also required to coordinate all work with owner supplied materials, direct contracts, and normal building operations, if any.
- F. All finished work shall be neat and workmanlike. All work of a special nature shall be performed by skilled and qualified workmen who can present credentials showing experience in said trade. New systems shall be delivered to Owner complete in perfect working order, tested and balanced in full accordance with plans and specifications. Existing systems shall function in same manner as before this work was performed. Any malfunctions which arise in existing systems as a result of demolition or alteration of parts of such systems shall be corrected.

- G. Layout of equipment, accessories and electrical systems in plan is generally diagrammatic unless specifically dimensioned or detailed. Check project drawings and existing site conditions before installing work for interferences as governed by structural or other conditions. Owner reserves the right to make reasonable changes in location of equipment, accessories or electrical systems prior to "roughing-in" without involving additional expense. Exact dimensions shown upon plans will be subject to verification and confirmation of exact conditions at site at time of construction. "Plus or minus" dimensions are shown upon drawing as a guide only. Exact surrounding conditions are governed by final equipment selection and/or other like details.
- H. Furnish all new equipment and materials as described herein. Any material, operation, method or device mentioned, listed or noted within this specification, if not specifically mentioned as furnished or installed by others, shall be furnished and installed by this contractor.

3.11 REMOVAL OF BALLAST IN EXISTING LIGHT FIXTURE

- A. Assume ballasts contain PCB materials unless labeled otherwise, or test samples to show materials are not PCB; submit test report. Remove all ballasts from existing light fixtures indicated on contract documents. Dispose of all ballasts which do not have non-PCB labels in PCB containers, and pay all costs to have containers taken to EPA-approved incinerators and disposed of per all EPA regulations. Follow all EPA regulations for transporting containers and materials. If ballast has leaked in existing fixture, remove material deposited in fixture, and dispose of those materials as listed above. Provide Certificate of Disposal and all associated paperwork to Owner's Representative.

3.12 FIRE ALARM DETECTOR COVERS

- A. Electrical Contractor is responsible to provide dust covers on all detectors whether new or existing in any area of construction. This shall be done in any area of construction even if there is no electrical work being done in this area. Coordinate with all trades.

3.13 ROOF PENETRATIONS

- A. Electrical Contractor is to refer to Division 7 for warranty requirements on existing roofs prior to any roof penetrations made.

3.14 PAINTING

- A. This Contract Includes the following:
 - 1. Painting for all cut and patch work performed as part of Division 26 and 27 work
 - 2. Painting required for touch-up of surfaces damaged due to the installation of electrical work.
 - 3. Painting as required to repair finish of equipment furnished.
 - 4. Painting of all surface mounted raceways in finished areas.

3.15 CLEANING

- A. After all tests are made and installations completed satisfactorily:
- B. Thoroughly clean entire installation, both exposed surfaces and interiors.
- C. Remove all debris caused by work.
- D. Remove tools, surplus, materials, when work is finally accepted.

3.16 CONTINUITY OF SERVICES

- A. The building will be in use during construction operations. Maintain existing systems in operation within all rooms of building at all times. Refer to "General Conditions of the Contract for Construction" for temporary facilities for additional contract requirements. Schedules for various phases of contract work shall be coordinated with all other trades and with Owner's Representative. Provide, as part of contract, temporary mechanical and electrical connections and relocation as required to accomplish the above. Obtain approval in writing as to date, time, and location for shut-down of existing mechanical/electrical facilities or services.

3.17 OPERATION AND MAINTENANCE MANUALS

- A. Provide Operation and Maintenance Manuals. For projects containing multiple buildings, (3) three manuals shall be submitted separately for each building. Include the following:
 - 1. Equipment wiring diagrams.
 - 2. Manufacturer's instructions.
 - 3. Include typewritten instructions, describing equipment, starting/operating procedures, emergency operating instructions.
 - 4. Recommended maintenance procedures.
 - 5. Include name, address, and telephone number of supplier manufacturer.
 - 6. Representative and service agency for all major equipment items.
 - 7. Panel schedules in hard copy and word or excel format.
 - 8. Bind above items in a three-ring binder with name of project on the cover.
 - 9. Provide USB drive with all data in word, pdf, or excel format.
- B. Refer to specific specification electrical specification sections for additional requirements.
- C. Deliver to Owner's Representative before request for acceptance.

3.18 ASBESTOS RECOGNITION AND PRECAUTIONS

- A. The contractor shall be responsible for coordination of all required removal work, coring, cutting and patching with the owner's asbestos management plan. Prior to performing such work identify areas containing asbestos. Notify the Owner so that they may make arrangements for abatement and/or containment prior to work proceeding. The contractor shall be responsible for cleaning all areas where asbestos is released due to the failure to coordinate with the asbestos management plan. Refer to Division 1 sections for further requirements.
- B. The disturbance or dislocation of asbestos-containing materials causes asbestos fibers to be released into the building's atmosphere, thereby creating a health hazard to workmen and building occupants. Consistent with Industrial Code Rule 56 and the content of recognized asbestos-control work, the Contractor shall apprise all of his workers, supervisory personnel, subcontractors, Owner and Consultants who will be at the job site of the seriousness of the hazard and of proper safeguards and work procedures which must be followed, as described in New York State Department of Labor Industrial Code Rule 56.

END OF SECTION 26 0010

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

1.02 SECTION INCLUDES

- A. Interior demolition, removal and abandonment of interior electrical systems including fire alarm.
- B. Cleaning and repair of existing equipment to remain.
- C. Construction managers Front end and Phasing documents for the description of work.
- D. 260016 - Temporary Electric Power
- E. 283111 - Addressable Fire Detection and Alarm
- F. Division 01 and 02 Specification sections.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching work: As specified in individual sections.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to beginning work inspect and test all existing electrical systems that will be affected by the work in this contract. Provide a report with photographs to the Owner indicating any problems or defects found. If no problems or system defects are submitted, the contractor shall be responsible for correcting problems found at the completion of the project that are determined to be caused by the work of this contract.
- B. Inspect the entire work area for defects in the existing construction such as scratches, holes etc. Submit a complete list and photographs of existing damage, to the owner prior to beginning work. If existing damage is not documented the contractor shall repair all damage to like new condition, that is determined to have been caused by the work in this contract.
- C. Verify circuiting arrangements are as shown on Drawings.
- D. Verify that abandoned wiring and equipment serve only abandoned facilities.
- E. Demolition Drawings are based on casual field observation and existing record documents. Report discrepancies to Architect/Engineer before disturbing existing installation.
- F. Beginning of demolition means installer accepts existing conditions.

3.02 PREPARATION

- A. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.

- B. Coordinate utility service outages with the owner and Utility Company.
- C. Provide temporary wiring and connections to maintain existing systems in service during construction.
- D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Obtain permission from Owner and Architect/Engineer at least (72) hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area. Refer to section 260010 and Division 1 for additional requirements.
- E. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Notify Owner, Architect/Engineer, and local fire service at least (72) hours before partially or completely disabling system. Minimize outage duration. Refer to 283100 and Division 1 for additional requirements.

3.03 DEMOLITION EXISTING ELECTRICAL WORK

- A. Demolish existing electrical work under provisions of Division 01, Division 02 and this section.
- B. Remove existing installations to accommodate requirements for new construction.
- C. Remove abandoned wiring to source of supply.
- D. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- E. Disconnect abandoned outlets and remove devices. Provide blank cover for abandoned boxes which are not removed.
- F. Disconnect and remove abandoned panelboards and distribution equipment.
- G. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- H. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
- I. Repair adjacent construction and finishes damaged during demolition work.
- J. Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.
- K. Where branch circuit home run is called to be reused label circuit in junction box and remove all branch and switch leg wiring.
- L. Where removal of branch circuit wiring effects devices or fixtures upstream or downstream, make permanent connections to maintain circuits. Existing circuits to must remain active. All required connections to maintain existing circuits must be made after normal hours and coordinated with the owner.

3.04 EXISTING BACK BOXES

- A. Where it is practical, and they will not interfere with new work from any other trade, existing back boxes and raceway may be reused. Obtain the approval from the construction manager prior to reusing backboxes or raceways.

3.05 RESUPPORT OF DEVICES CONDUIT AND WIRING AFTER CEILING REMOVAL

- A. Where existing ceilings are removed re-support all conduit 8 ft on center and all open cabling 4 foot on center.
- B. Utilize open top cable hangers for supporting cables.
- C. Where existing equipment, fixtures or devices are scheduled for reuse in new ceilings, remove and store in safe dry space. Make temporary connections to maintain through wiring where devices are removed.

3.06 RELOCATION OF EXISTING ELECTRICAL WORK

- A. Where drawings indicate, equipment is to be relocated the contractor shall do all of the following:
 - 1. Disconnect and remove the device or piece of equipment.
 - 2. Clean, box and store the device or piece of equipment.
 - 3. Make temporary connections to maintain the system that is effected by the relocation
 - 4. Reinstall the device or piece of equipment where indicated on new work plans.

END OF SECTION 26 0015

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract including the General and Supplementary conditions and Division 1 Specification Sections apply to the work of this Section.

1.02 SUBMITTALS

NOT REQUIRED.

1.03 GENERAL REQUIREMENTS

- A. Electrical Contractor shall furnish, install and maintain temporary electric system for lighting and power as described herein.
- B. All temporary electric system work shall comply with all applicable OSHA Standards.
- C. All temporary electric system work shall comply with all applicable N.E.C. Standards and local regulations.
- D. Power shall be supplied from the source listed in Part 3.
- E. Temporary service shall be installed on the jobsite where appropriate for the level of construction and as directed by Architect.
- F. Temporary service and all devices and wiring shall be removed from the site when permanent facilities are available.
- G. Temporary services including wire and cabling shall not interfere or impede movement of construction vehicles.
- H. Contractor shall provide all maintenance necessary for continuous operation for temporary electric system throughout the duration of system operation.

PART 2 - PRODUCTS

2.01 PRODUCTS

- A. Refer to Sections 260190, 260533, 260519

PART 3 - EXECUTION

3.01 TEMPORARY SUB-FEED FROM EXISTING BUILDING TO WORK AREAS

- A. Provide temporary power from existing building panels to each construction area. Refer to phasing plans for requirements.
- B. Route temporary power through existing ceilings to work site.

- C. Verify power sources with construction manager. Utilize distribution panels near the work site. Each phase of work will be serviced from different existing distribution panels.
- D. Provide a 480-single phase – 120/240V single phase 45 KVA transformer to be used for temporary power from existing 480V distribution panels
- E. Provide a 175A main circuit breaker load center to service the temporary power called for.

3.02 TEMPORARY LIGHTING IN WORK AREAS

- A. Provide temporary branch circuits with weatherproof medium base lamp holders equipped with guards for lighting of 10 foot-candles in work area. Provide replacement lamps where required for the duration of system operation.
- B. Provide temporary lighting in all work areas.
- C. Provide temporary lighting for corridors, walk areas, stairs, etc. for safe entrance and egress.
- D. Existing fixtures scheduled for demolition may be used for temporary lighting in renovation areas. Temporarily resort these fixtures as required.
- E. Provide temporary lighting as required for security purposes for building exterior and applicable site locations, and building interior locations.
- F. Provide lighting in specific areas as directed by Architect.

3.03 TEMPORARY CONVENIENCE POWER IN WORK AREAS

- A. Provide temporary convenience power distribution for the use of tradesman hand tools and other devices as requested by construction trades.
- B. Branch circuits with GFCI type receptacle outlets for single phase 120 volt, 20-amp power.
- C. Convenience power distribution shall cover all work areas of building within a 100' extension cord reach. Each contractor using power shall provide their own ground fault device protection.

3.04 TEMPORARY EQUIPMENT POWER

- A. Provide temporary equipment power feeds for temporary heating equipment. Temporary heating equipment shall be furnished by others.
- B. Branch circuits for heating equipment shall be connections with single phase 208 volt, 30-amp power. Coordinate exact locations with HC.

3.05 TEMPORARY CONSTRUCTION TRAILERS

- A. Provide a 120/240V temporary power service from the existing National Grid utility pole to the trailer area on the construction site.
- B. Provide a 400A, 120/240V 1PH/3W MCB distribution panel with 60A breakers for each trailer.

C. Provide 60A feeds from the temporary panel to the following contractor trailers.

1. Construction Manager
2. General Construction Contractor
3. Plumbing Contractor
4. Fire Protection Contractor
5. HVAC Contractor
6. Electric Contractor

3.06 WIRE AND CABLES

- A. Exterior Locations: Site wiring shall be by overhead methods where possible. Overhead wiring shall be a minimum of 18' above grade. For other locations, wiring shall be run underground in GRS conduit.
- B. Interior Locations: Lighting circuits shall utilize suspended open type festoon style wiring. Power circuits shall be run flexible or rigid conduit as appropriate for each application.

END OF SECTION 26 0016

PART 1 -GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

1.02 SECTION INCLUDES

- A. Conduit and equipment supports.
- B. Anchors and fasteners.

1.03 REFERENCES

- A. Refer to Division 1.
- B. NECA Standard of Installation (National Electrical Contractors Association).
- C. NFPA 70 - National Electrical Code.

1.04 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.01 ANCHORING DEVICES

- A. Sleeve Anchors (FS FF-S-325 Group II, Type 3, Class 3): Molly/Emhart's Parasleeve Series, Phillips' Red Head AN, HN, FS Series, or Ramset's Dynabolt Series.
- B. Wedge Anchors (FS FF-S-325 Group II, Type 4, Class 1): Hilti's Kwik Bolt Series, Molly/Emhart's Parabolt Series, Phillips' Red Head WS, or Ramset's Trubolt Series.
- C. Self-Drilling Anchors (FS FF-S-325 Group III, Type 1): Phillips' Red Head Series S or Ramset's Ram Drill Series.
- D. Non-Drilling Anchors (FS FF-S-325 Group VIII, Type 1): Hilti's Drop-In Anchor Series, Phillips' Red Head J Series, or Ramset's Dynaset Series.
- E. Stud Anchors (FS FF-S-325 Group VIII, Type 2): Phillips' Red Head JS Series.

2.02 CAST-IN-PLACE CONCRETE INSERTS

- A. Continuous Slotted Type Concrete Insert, Galvanized:
 - 1. Load Rating 1300 lbs./ft.: Kindorf's D-986.
 - 2. Load Rating 2400 lbs./ft.: Kindorf's D-980.
 - 3. Load Rating 3000 lbs./ft.: Hohmann & Barnard Inc.'s Type CS-H.
 - 4. Load Rating 4500 lbs./ft.: Hohmann & Barnard Inc.'s Type CS-HD.

- B. Threaded Type Concrete Insert: Galvanized ferrous castings, internally threaded.
- C. Wedge Type Concrete Insert: Galvanized box-type ferrous castings, designed to accept bolts having special wedge shaped heads.

2.03 MISCELLANEOUS FASTENERS

- A. Except where shown otherwise on the Drawings, furnish type, size, and grade required for proper installation of the Work, selected from the following: Furnish galvanized fasteners for exterior use, or for items anchored to exterior walls, except where stainless steel is indicated.
 - 1. Standard Bolts and Nuts: ASTM A 307, Grade A, regular hexagon head.
 - 2. Lag Bolts: FS FF-B-561, square head type.
 - 3. Machine Screws: FS FF-S-92, cadmium plated steel.
 - 4. Machine Bolts: FS FF-B-584 heads; FF-N-836 nuts.
 - 5. Wood Screws: FS FF-S-111 flat head carbon steel.
 - 6. Plain Washers: FS FF-W-92, round, general assembly grade carbon steel.
 - 7. Lock Washers: FS FF-W-84, helical spring type carbon steel.
 - 8. Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class and style as required to sustain load.
- B. Stainless Steel Fasteners: Type 302 for interior Work; Type 316 for exterior Work; Phillips head screws and bolts for exposed Work unless otherwise specified.

2.04 HANGER RODS

- A. Mid low carbon steel, unless otherwise specified; fully threaded or threaded each end, with nuts as required to position and lock rod in place. Unless galvanized or cadmium plated, provide a shop coat of red lead or zinc chromate primer paint.

2.05 "C" BEAM CLAMPS

- A. With Conduit Hangers:
 - 1. For 1 Inch Conduit Maximum: B-Line Systems Inc.'s BG-8, BP-8 Series, Caddy/Erico Products Inc.'s BC-8P and BC-8PSM Series, or GB Electrical Inc.'s HIT 110-412 Series.
 - 2. For 3 Inch Conduit Maximum: Appleton Electric Co.'s BH-500 Series beam clamp with H50W/B Series hangers, Kindorf's 500 Series beam clamp with 6HO-B Series hanger, or OZ/Gedney Co.'s IS-500 Series beam clamp with H-OWB Series hanger.
 - 3. For 4 Inch Conduit Maximum: Kindorf's E-231 beam clamp and E-234 anchor clip and C-149 series lay-in hanger; Unistrut Corp.'s P2676 beam clamp and P-1659A Series anchor clip with J1205 Series lay in hanger.
- B. For Hanger Rods:
 - 1. For 1/4 Inch Hanger Rods: B-Line Systems Inc.'s BC, Caddy/Erico Products Inc.'s BC, GB Electrical Inc.'s HIT 110, Kindorf's 500, 510, or Unistrut Corp.'s P1648S, P2398S, P2675, P2676.
 - 2. For 3/8 Inch Hanger Rods: Caddy/Erico Products Inc.'s BC, Kindorf's 231-3/8, 502, or Unistrut Corp.'s P1649AS, P2401S, P2675, P2676.

3. For 1/2 Inch Rods: Appleton Electric Co. BH-500 Series, Kindorf's 500 Series, 231-1/2, OZ/Gedney Co.'s IS-500 Series, or Unistrut Corp.'s P1650AS, P2403S, P2676.
4. For 5/8 Inch Rods: Unistrut Corp.'s P1651AS beam clamp and P1656A Series anchor clip.
5. For 3/4 Inch Rods: Unistrut Corp.'s P1653S beam clamp and P1656A Series anchor clip.

2.06 CHANNEL SUPPORT SYSTEM

- A. Channel Material: 12 gage steel.
- B. Finishes:
 1. Phosphate and baked green enamel/epoxy.
 2. Pre-galvanized.
 3. Hot dipped galvanized.
 4. Polyvinyl chloride (PVC), minimum 15 mils thick.
- C. Fittings: Same material and finish as channel.
- D. UL Listed Systems:
 1. B-line Systems Inc.'s B-22 (1-5/8 x 1-5/8 inches), B-12 (1-5/8 x 2-7/16 inches), B-11 (1-5/8 x 3-1/4 inches).
 2. Grinnell Corp.'s Allied Power-Strut PS 200 (1-5/8 x 1-5/8 inches), PS 150 (1-5/8 x 2-7/16 inches), PS 100 (1-5/8 x 3-1/4 inches).
 3. Kindorf's B-900 (1-1/2 x 1-1/2 inches), B-901 (1-1/2 x 1-7/8 inches), B-902 (1-1/2 x 3 inches).
 4. Unistrut Corp.'s P-3000 (1-3/8 x 1-5/8 inches), P-5500 (1-5/8 x 2-7/16 inches), P-5000 (1-5/8 x 3-1/4 inches).
 5. Versabar Corp.'s VA-1 (1-5/8 x 1-5/8 inches), VA-3 (1-5/8 x 2-1/2 inches).

2.07 MISCELLANEOUS FITTINGS

- A. Side Beam Brackets: B-Line Systems Inc.'s B102, B103, B371-2, Kindorf's B-915, or Versabar Corp.'s VF-2305, VF-2507.
- B. Pipe Straps:
 1. Two Hole Steel Conduit Straps: B-Line Systems Inc.'s B-2100 Series, Kindorf's C-144 Series, or Unistrut Corp.'s P-2558 Series
 2. One Hole Malleable Iron Clamps: Kindorf's HS-400 Series, or OZ/ Gedney Co.'s 14-G Series, 15-G Series (EMT).
- C. Deck Clamps: Caddy/Erco Products Inc.'s DH-4-T1 Series.
- D. Fixture Stud and Strap: OZ/Gedney Co.'s SL-134, or Steel City's FE-431.

- E. Supporting Fittings for Pendent Mounted Industrial Type Fluorescent Fixtures on Exposed Conduit System:
1. Ball Hanger: Appleton Electric Co.'s AL Series, or Crouse-Hinds Co.'s AL Series.
 2. Flexible Fixture Hanger: Appleton Electric Co.'s UNJ-50, UNJ-75, or Crouse-Hinds Co.'s UNJ115.
 3. Flexible (Hook Type) Fixture Hanger: Appleton Electric Co.'s FHMF, or Crouse-Hinds Co.'s UNH-1.
 4. Eyelet: Unistrut Corp.'s M2250.
 5. Eyelet with Stud: Kindorf's H262, or Unistrut Corp.'s M2350.
 6. Conduit Hook: Appleton Electric Co.'s FHSN, or Crouse-Hinds Co.'s UNH-13.
- F. Supporting Fasteners (Metal Stud Construction): Metal stud supports, clips and accessories as produced by Caddy/Erco Products Inc.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Where specific fasteners are not specified or indicated for securing items to in-place construction, provide appropriate type, size, and number of fasteners for a secure, rigid installation.
- B. Install anchoring devices and other fasteners in accordance with manufacturer's printed instructions.
- C. Make attachments to structural steel wherever possible.

3.02 FASTENER SCHEDULE

- A. Material:
1. Use cadmium or zinc coated anchors and fasteners in dry locations.
 2. Use hot dipped galvanized or stainless-steel anchors and fasteners in damp and wet locations.
 3. For corrosive atmospheres or other extreme environmental conditions, use fasteners made of materials suitable for the conditions.
- B. Types and Use: Unless otherwise specified or indicated use:
1. Cast-in-place concrete inserts in fresh concrete construction for direct pull-out loads such as shelf angles or fabricated metal items and supports attached to concrete slab ceilings.
 2. Anchoring devices to fasten items to solid masonry and concrete when the anchor is not subjected to pull out loads, or vibration in shear loads.
 3. Toggle bolts to fasten items to hollow masonry and stud partitions.

4. TPR fasteners to fasten items to plywood backed gypsum board ceilings.
5. Metallic fasteners installed with electrically operated or powder driven tools for approved applications, except:
 - a. Do not use powder driven drive pins or expansion nails.
 - b. Do not attach powder driven or welded studs to structural steel less than 3/16 inch thick.
 - c. Do not support a load, in excess of 250 lbs from any single welded or powder driven stud.
 - d. Do not use powder driven fasteners in precast concrete.

3.03 ATTACHMENT SCHEDULE

- A. General: Make attachments to structural steel or steel bar joists wherever possible. Provide intermediate structural steel members where required by support spacing. Select steel members for use as intermediate supports based on a minimum safety factor of 5.
 1. Make attachments to steel bar joists at panel points of joists.
 2. Do not drill holes in main structural steel members.
 3. Use "C" beam clamps for attachment to steel beams.
- B. Where it is not possible to make attachments to structural steel or steel bar joists, use the following methods of attachment to suit type of construction unless otherwise specified or indicated on the drawings:
 1. Attachment to Steel Roof Decking (No Concrete Fill):
 - a. Decking with Hanger Tabs: Use deck clamps.
 - b. Decking Without Hanger Tabs:
 1. Before Roofing Has Been Applied: Use 3/8 inch threaded steel rod welded to a 4 x 4 x 1/4 inch steel plate and installed through 1/2 inch hole in roof deck.
 2. After Roofing Has Been Applied: Use welding studs, or self-drilling/tapping fasteners. Exercise extreme care when installing fasteners to avoid damage to roofing.
 2. Attachment to Concrete Filled Steel Decks (Total thickness, 2-1/2 inches or more):

Before Fill Has Been Placed:

 - a. Use thru-bolts and fish plates.
 - b. Use welded studs. Do not support a load in excess of 250 pounds from a single welded stud.
 - c. After Fill Has Been Placed: Use welded studs. Do not support a load in excess of 250 lbs. from a single welded stud.
 3. Attachment to Cast-In-Place Concrete:
 - a. Fresh Concrete: Use cast-in-place concrete inserts.
 - b. Existing Concrete: Use anchoring devices.
 4. Attachment to Cored Precast Concrete Decks:
 - a. New Construction: Use thru-bolts and fish plates before Construction concrete fill is placed over decks.

5. Attachment to Hollow Block or Tile Filled Concrete Deck:
 - a. New Construction: Use cast-in-place concrete inserts by having Construction Work Contractor omitting blocks and pouring solid blocks with insert where required.
6. Attachment to Waffle Type Concrete Decks:
 - a. New Construction:
 1. Use cast-in-place concrete inserts in fresh concrete.
 2. If concrete fill has been applied over deck, thru-bolts and fish plates may be used where additional concrete or roofing is to be placed over the deck.
7. Attachment to Precast Concrete Planks: Use anchoring devices, except do not make attachments to precast concrete planks less than 2-3/4 inches thick.
8. Attachment to Precast Concrete Tee Construction:
 - a. New Construction:
 1. Use tee hanger inserts between adjacent flanges.
 2. Use thru-bolts and fish plates, except at roof deck without concrete fill.
 - b. Existing Construction:
 1. Use anchoring devices installed in webs of tees. Install anchoring devices as high as possible in the webs.
 - c. Do not use powder driven fasteners.
 - d. Exercise extreme care in drilling holes to avoid damage to reinforcement.
9. Attachment to Metal Stud Construction: Use supporting fasteners manufactured specifically for the attachment of raceways and boxes to metal stud construction.
 - a. Support and attach outlet boxes so that they cannot torque/twist. Either:
 1. Use bar hanger assembly, or:
 2. In addition to attachment to the stud, also provide far side box support.

3.04 CONDUIT SUPPORT SCHEDULE

- A. Provide number of supports as required by National Electrical Code. Exception: Maximum support spacing allowed is 4'-0" for conduit sizes 3 inches and larger supported from wood trusses.
- B. Use pipe straps and specified method of attachment where conduit is installed proximate to surface of wood or masonry construction.
 1. Use hangers secured to surface with specified method of attachment where conduit is suspended from the surface.
- C. Use "C" beam clamps and hangers where conduit is supported from steel beams.
- D. Use deck clamps and hangers where conduit is supported from steel decking having hanger tabs.
 1. Where conduit is supported from steel decking which does not have hanger tabs, use clamps and hangers secured to decking, utilizing specified method of attachment.
- E. Use channel support system supported from structural steel for multiple parallel conduit runs.
- F. Where conduits are installed above ceiling, do not rest conduit directly on runner bars, T-Bars, etc.
 1. Conduit Sizes 2-1/2 Inches and Smaller: Support conduit from ceiling supports or from construction above ceiling.

2. Conduit Sizes Over 2-1/2 Inches: Support conduit from beams, joists, or trusses above ceiling.

3.05 LIGHTING FIXTURE SUPPORT SCHEDULE

- A. General: Do not support fixtures from ceilings or ceiling supports unless it is specified or indicated on the drawings to do so.
 1. Support fixtures with hanger rods attached to beams, joists, or trusses. Hanger rod diameter, largest standard size that will fit in mounting holes of fixture.
 - a. Where approved, channel supports may span and rest upon the lower chord of trusses and be utilized for the support of lighting fixtures.
 - b. Where approved, channel supports may span and be attached to the underside of beams, joists, or trusses and be utilized for the support of lighting fixtures.
 2. Use 2 nuts and 2 washers on lower end of each hanger rod to hold and adjust fixture (one nut and washer above top of fixture housing, one nut and washer below top of fixture housing).
 - a. Where specified that an adequately supported outlet box is to support a fixture or be utilized as one point of support, support the box so that it may be adjusted to bring the face of the outlet box even with surface of ceiling.
- B. Number of Supports for Ceiling Mounted Lighting Fixtures: Provide at least the following number of supports. Provide additional supports when recommended by fixture manufacturer, or shown on the drawings.
 1. Commercial and Industrial Fixtures:
 - a. Support individual fixtures less than 2 feet wide at 2 points.
 - b. Support continuous row fixtures less than 2 feet wide at points equal to the number of fixtures plus one. Uniformly distribute the points of support over the row of fixtures.
 - c. Support individual fixture 2 feet or wider at 4 corners.
 - d. Support continuous row of fixtures 2 feet or wider at points equal to twice the number of fixtures plus 2. Uniformly distribute the points of support over the row of fixtures.
 - e. An adequately supported outlet box may be utilized as one point of support for fixtures weighing less than 50 pounds.
- C. Number of Supports for Wall Mounted Lighting Fixtures: Provide at least the following number of supports. Provide additional supports when recommended by fixture manufacturer, or shown on the drawings.
 1. Commercial and Industrial Fixtures:
 - a. Support individual fixtures 2 feet long or less at 2 points.
 - b. Support individual fixtures over 2 feet long at 3 points.
 - c. Support continuous row fluorescent fixtures at points equal to twice the number of fixtures. Uniformly distribute the points of support.
 - d. An adequately supported outlet box may be utilized as one point of support for fixtures weighing less than 50 pounds.

3.06 CHANNEL SUPPORT SYSTEM SCHEDULE

- A. Use channel support system where specified or indicated on the drawings.

- B. Channel supports may be used, as approved, to accommodate mounting of equipment.
- C. Material and Finish:
 - 1. Dry Locations: Use 12 gage steel channel support system having any one of the specified finishes.
 - 2. Damp Locations: Use 12 gage steel channel support system having any one of the specified finishes except green epoxy/enamel.
 - 3. Wet Locations: Use 12 gage steel channel support system having hot dipped galvanized, or PVC finish.

END OF SECTION 26 0190

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

1.02 SECTION INCLUDES

- A. Nameplates and labels.
- B. Wire and cable markers.
- C. Conduit markers.

1.03 REFERENCES

- A. Refer to Division 1.
- B. NFPA 70 - National Electrical Code.

1.04 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.01 NAMEPLATES AND LABELS

- A. Nameplates: Engraved three-layer laminated plastic, black letters on white background
 - 1. Locations:
 - a. Outside of each electrical panel. Indicate panel name and the upstream panel and breaker number that the panel is serviced from.
 - b. Control equipment enclosure. Indicate equipment name and branch circuit.
 - c. Disconnects Indicate equipment name and branch circuit.
 - d. Distribution panel breakers. Indicate load served.
 - 2. Letter Size: 1/8 -inch letters.
- B. Labels: Circuit designation shall be indicated with clear adhesive tape, 3/16 inch black letters on clear background. Use only for identification of individual wall switches and receptacles and control device stations. Tape label shall be adhered to the faceplate of each device.
- C. Provide flash protection label per NEC 110.16 for equipment furnished under this Contract including switchboards, panelboards, industrial control panels and motor control centers. Seton #M0547; or equal.

2.02 WIRE MARKERS

- A. Description: Tape type wire markers.
- B. Locations: Each conductor at panelboard gutters and each load connection.
- C. Legend: Branch circuit or feeder number indicated.

2.03 UNDERGROUND WARNING TAPE

- A. Location:
 - 1. Along length of each underground conduit buried 12" below finished grade.
 - 2. Yellow with black lettering, 6" wide tape, "CAUTION – Underground Electric".
 - 3. Orange with black lettering, 6" wide detectable tape made of durable plastic encased aluminum, "CAUTION – Fiber Optic Cable".

2.04 PANEL SCHEDULES

- A. Provide complete type written directory for each panelboard listing room number, function, etc., for each circuit breaker.
- B. Panel directory must also include the up-stream panel that services the panel. (i.e. "Fed from MDP Circuits 2,4,6")
- C. Include a Microsoft word or excel file with all panel schedules as part of the close out submittals.

2.05 DEVICES

- A. Provide a tape label on all receptacle and switch cover plates, power poles, etc. listing panel designation and circuit number. Tape shall be attached to outside of receptacle or switch cover plates.
- B. In permanent marker write the panel and circuit number on the wall behind receptacle cover plate or inside receptacle back box.

2.06 JUNCTION AND PULL BOXES

- A. Identify junction and pull boxes for particular service such as power, lighting, fire alarm, telephone, intercom, public address, nurse call, etc. using stencil lettering on cover.

2.07 CONDUIT

- A. Provide adhesive marking labels for raceway and metal-clad cable. The labels shall indicate voltage and service, and be located above ceilings every 75 feet and on wall mounted conduit in mechanical and equipment rooms.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Degrease and clean surfaces to receive nameplates and labels.

3.02 INSTALLATION

- A. Install nameplate and label parallel to equipment lines.
- B. Secure nameplate to equipment front using adhesive.

- C. Secure nameplate to inside surface of door on panelboard that is recessed in finished locations.

END OF SECTION 26 0195

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

1.02 WORK INCLUDED

- A. Conductors.
- B. MC Cable.
- C. Terminations.

1.03 SUBMITTALS

- A. Schedule of all wiring and cable usage.
- B. Product data sheets for all wire and cable types.

PART 2 - PRODUCTS

2.01 CONDUCTORS

- A. Feeder, branch circuit and control wiring:
 - 1. Annealed Copper, 98% conductivity.
 - 2. Minimum wire size:
 - a. #12 AWG for branch circuits
 - b. #14 AWG for control and signal circuits
 - 3. #8 AWG Wire and above shall be stranded.
 - 4. 600-volt insulation for all wiring above 50 volts.
 - 5. 300-volt insulation permitted for all wiring below 50 volts.
 - 6. Thermal plastic with PVC insulation with nylon jacket, suitable for wet or dry locations, THHN/THWN 90 degree Celsius.
 - 7. 90-degree C maximum operating temperature rating.
 - 8. UL 83 Listed
- B. Lighting fixture wire
 - 1. FREP/CPE coated stranded copper,
 - 2. Flame retardant EPR Insulation and CPE jacket.
 - 3. UL 44 listed

C. Flexible cords and cables shall be Type "SO" or "SJO."

D. Color Coding:

1. All circuits shall be color coded according to the following schedule:

Voltage	A PHASE	B PHASE	C PHASE	NEUTRAL
208Y/120V, 3 Phase	Black	Red	Blue	White
480Y/277V, 3 Phase	Brown	Orange	Yellow	Gray
*ALL GROUNDING CONDUCTORS SHALL BE GREEN				

2. #6 AWG and smaller shall have insulation continuously colored as called for above.
3. #4 AWG and larger may be identified using a minimum 3" tape band.
4. Color code all conductors at all pull boxes, enclosures, and terminations.
5. Switched legs shall be identified with the same color insulation as the phase leg.

E. Acceptable manufacturers:

1. Cablec
2. Southwire
3. Okonite
4. Rome Cable
5. Pirelli

2.02 TYPE MC METAL CLAD CABLE

A. Construction:

1. Galvanized Interlocking Steel Strip outer shield
2. Stranded or solid copper conductors, each individually insulated, and enclosed in an armor of flexible metal tape.
3. Suitable for wet or dry locations.
4. Suitable for cable tray installations.
5. Do not install direct buried, in concrete, or in the presence of corrosive vapors.
6. Provide with separate integral grounding conductor.
7. Support every 6 feet.
8. Manufactured and installed in accordance with NEC Article 330
9. Provide red stripe on outer shield where utilized for fire alarm wiring.
10. Make: Acceptable manufacturers:
 - a. AFC
 - b. Southwire
 - c. United Copper Industries

2.03 METAL CLAD COMBINATION LIGHTING POWER AND CONTROL CABLE.

- A. Cable Shall have following construction
 - 1. Armor: Galvanized Interlocking Steel Strip (blue armor) or Interlocking Aluminum Strip
 - 2. Solid or Stranded Copper Conductors
 - 3. Insulated Conductor Type THHN
 - 4. Neutral Conductor: White or Gray
 - 5. Control Cables: 16 AWG Solid TFN Twisted jacketed pair (Purple/Gray)
 - 6. Insulation Permitting conductors of control circuits to be placed in a cable with conductors of electric light, power, or Class 1 circuits
- B. Standards
 - 1. UL 66, 83, 1479, 1569, 1581, 2556, File Reference E80042
 - 2. NEC 250.118, 300.22(C), 392, 396, 330, 501, 502, 503, 530, 504, 505, 518, 520, 530, 645, 725
 - 3. Federal Specification A-A-59544 (formerly J-C-30B)
 - 4. Meets all applicable OSHA and HUD Requirements
 - 5. Cable Tray Rated
 - 6. UL Classified 1, 2, and 3 hour through penetration (Fire Stop) product, R 14141
 - 7. Environmental Air-Handling Space Installation per NEC 300.22(C)
 - 8. Power and/or lighting as well as signal and/or control conductors per NEC Section 725.136(I)(1)
- C. Design Make: AFC MC Tuff Luminary Cable

2.04 LOW VOLTAGE CONNECTORS AND TERMINATIONS

- A. Straight Splices, #26 AWG to #10 AWG:
 - 1. Nylon Insulated compression butt-splices.
 - 2. 600 volt, 90 degree C rated.
 - 3. Make: Burndy "Insulink", T&B "Sta-Kon", or approved equal
- B. Straight Splices, #8 AWG and Larger:
 - 1. Two way, long barrel, compression type, copper
 - 2. Provide heat shrink tubing over splice.
 - 3. 600 volt rated.
 - 4. Make: Burndy "Hylink", T&N 54800 Series, or approved equal.
- C. Pigtail Splices, #26 AWG to #10 AWG:
 - 1. Twist type pressure connector.
 - 2. 600 volt rated, 105 degree C.
 - 3. Size as required for number and size of conductors used.
 - 4. Make: T&B Scotchlock, or approved equal
- D. Three Way Splices, #8 AWG and Larger:
 - 1. Three way, long barrel, compression type, copper.

2. Provide tape or heat shrink tubing over splice.
 3. 600 volt rated.
 4. Make: Burndy "Hylink", T&B 54700 Series, or approved equal.
- E. Lug Terminations for Control and Signal Wiring:
1. Nylon insulated fork with compression termination of #26 AWG to #10 AWG.
 2. Nylon insulated ring with compression termination for #8 AWG and larger.
 3. 300 volt rated.
 4. Make: Burndy "Insulug", T&B "Sta-Kon", or approved equal.
- F. Lug Terminations for Power Wiring:
1. Long barrel, compression type, copper body, on hole for #8 AWG to #2/0 AWG.
 2. Long barrel, compression type, copper body, two hole, for #3/0 AWG and larger.
 3. 600 volt rated.
 4. Make:
 - a. One-hole lug: Burndy "Hylug", T&B 54900 Series, or approved equal.
 - b. Two-hole lug: Burndy "Hylug", T&B 54800 Series, or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Route wire and cable as required to meet Project Conditions.
- B. Install cable in accordance with the NECA "Standard of Installation."
- C. Use stranded conductors for control circuits.
- D. Use conductor not smaller than 12 AWG for power and lighting circuits.
- E. Use conductor not smaller than 16 AWG for control circuits.
- F. Use 10 AWG conductors for 20 amperes, 120 volt branch circuits longer than 100 feet.
- G. Identify and color code wire and cable under provisions of this section. Identify each conductor with its circuit number or other designation indicated.
- H. Install cables for emergency power feeders and circuits in raceway as called for after the entire raceway system has been completed.
- I. Install splices and connections in accessible outlet, pull, and junction boxes.
- J. Insulate all splices and connections with UL Labeled plastic tape, heat shrink tubing, or plastic molded caps.
- K. All wiring systems shall be properly grounded and continuously polarized throughout, following the color coding specified.
- L. Provide a green equipment ground with all feeders and all branch circuits' size per the NEC.

- M. Provide dedicated white insulated neutral conductor for each branch circuit. Shared neutrals are not allowed.
- N. Install a maximum of three phase conductors, three neutral conductors, and one grounding conductor in each home run. (Obtain approval for additional conductor fill where field conditions require. Adhere to NEC de-rating requirements.)
- O. Provide stranded wire to motors, transformers, equipment, and vibrating machinery.
- P. Feeder conductors shall be continuous from point of origin to load termination without splice. If this is not practical, contact the Owner's Representative and receive written approval for splicing prior to installation of feeder(s). Where feeder conductors pass through junction and pull boxes, bind and lace conductors of each feeder together. For parallel sets of conductors, match lengths of conductors.
- Q. Use pulling means including fish tape, cable, and rope and basket type grips which will not damage cables or raceways. Use approved mechanical pullers for feeders and branch circuits as required for #6 AWG cable and larger. Do not use mechanical means to pull conductors No. 8 or smaller.
- R. Branch circuit conductors installed in panelboards, and control conductors installed in control cabinets and panels shall be neatly bound together using "Ty-Raps" or equivalent.
- S. Reconnect branch circuit wiring at panelboards as required to obtain a balanced three phase load on the feeders.
- T. Properly splice and neatly coil extraneous wires in outlet boxes.
- U. Wiring in panelboards and equipment enclosures etc. shall be neatly trained and arranged so as not to preclude access to the space or equipment contained therein. Provide all additional cable supports and ties required to comply.
- V. The system shall be properly grounded and continuously polarized throughout, following the color coding specified.
- W. Wiring within panelboards, control cabinets, pull boxes, wiring troughs and annunciator and/or alarm panels shall be neatly bundled together with ties not requiring tools to install. Two, three and four wire circuits emerging from the bundle shall be trained and tied individually.
- X. Where multiple conductors are installed in a common raceway they shall be pulled simultaneously. Use of pulling compound or lubricant shall be avoided unless absolutely necessary. Where pulling lubricant is required, use UL approved compounds approved for cable type. Lubricant shall meet all OSHA and Toxic Control Act standards.

APPLICATION	CABLE TYPES	DESIGN MAKE
General purpose Construction & Maintenance	Rubber, Neoprene, Nylon, PVC, High Density XLP, Hypalon	Ideal - Yellow 77
High Temperature Construction & Maintenance	Rubber, Neoprene, Nylon, PVC, High Density XLP, Hypalon, Low Density Polyethylene, Semiconducting Jacket	Ideal - Yellow 190

Utility construction & Maintenance	Rubber, Neoprene, Nylon, PVC, High Density XLP, Hypalon, Low Density Polyethylene, Semiconducting Jacket	Aqua-Gel II
Cold Weather Construction & Maintenance	Rubber, Neoprene, Nylon PVC, High Density XLP, Hypalon, Low Density Polyethylene, Semiconducting Jacket	Aqua-Gel CW

3.02 CIRCUITING

- A. The following takes precedence over the drawings:
1. General purpose receptacle and lighting branch circuits may be combined in single conduits in accordance with NEC requirements and restrictions.
 2. Conductors serving individual pieces of equipment or grouped equipment or isolated ground branch circuits shall not be combined.
 3. Provide dedicated Neutrals.

3.03 SPLICES

- A. Dry locations: For conductors #10 AWG and smaller use standard spring type pressure connectors or compression type connectors with insulating jackets.
- B. For conductors #8 AWG and larger use compression type connectors and insulate in accordance with manufacturer's recommendations.
- C. Damp locations: Use same type splices as indicated for dry locations and wrap with moisture sealing tape.
- D. Wire runs shall be continuous. All splicing shall be done only in accessible boxes.

3.04 LOW VOLTAGE CONTROL WIRING

- A. Low voltage control wiring shall not be run in same conduit system as power feeds. All low voltage control wiring in equipment shall be neatly bundled, identified and installed remote from any and all mechanical moving parts. All low voltage control wiring in walls shall be installed in conduit, the same as required for power wiring. All low voltage wiring above inaccessible ceilings shall be installed in conduit. All low voltage wiring exposed in finished spaces shall be installed in wiremold surface raceway. All low voltage wiring exposed in unfinished spaces shall be installed in conduit. All low voltage control wiring above accessible ceilings shall be bundled, neatly run at right angles and/or parallel to building steel, tied to steel as high as possible with no more than 3" sags; wire may not be laid on ceiling framing or supported by ceiling framing. Low voltage wiring shall not be run between decking flutes or above structural members.

3.05 TYPE MC METAL CLAD CABLE

- A. MC Cable shall be permitted for branch circuit wiring only if they 100% concealed above a drop ceiling.
- B. All branch circuit wiring in the call center, IT Server room, and the War Room/Training and the adjoining support rooms must be installed in conduit.
- C. Type MC Cable is not permitted for panelboard feeders.
- D. MC cable shall not be allowed for branch circuit wiring exposed in finished spaces.
- E. Support cable at intervals not exceeding 4 feet.
- F. Bending radius shall comply with Article 330.24 of the NEC.
- G. Provide insulating bushing at all termination points between the metal sheath and outlet or junction box.
- H. Type MC Cable shall not be installed exposed with the exception of fixture drops in mechanical or equipment rooms. Secure the cable to fixture hangers using nylon or plastic ties.

END OF SECTION 26 0519

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

1.02 SECTION INCLUDES

- A. Grounding electrodes materials.
- B. Grounding and bonding conductor materials.
- C. Equipment grounding and bonding requirements.

1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. B3: Soft or Annealed Copper Wire.
 - 2. B8: Concentric-Lay-Stranded Copper Conductors, Hard, Medium Hard, or Soft.
 - 3. B33: Tinned Soft or Annealed Copper Wire for Electrical Purposes.
- B. Institute of Electrical and Electronic Engineers (IEEE):
 - 1. 81: Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System.
 - 2. 1100: Powering and grounding sensitive electronic equipment.
- C. International Electrical Testing Association (NETA).
- D. National Fire Protection Association (NFPA):
 - 1. 70: National Electrical Code (NEC).
 - 2. 780: Lightning Protection Code.
- E. Occupational Safety and Health Administration (OSHA):
 - 1. 29CFR 1910.7 Definitions and requirements for Nationally Recognized Testing Laboratories (NRTL).
- F. Underwriters Laboratories (UL):
 - 1. 486A: Wire Connectors and Soldering Lugs for Use with Copper Conductors.
 - 2. 467: Grounding and Bonding Equipment.

1.04 QUALITY ASSURANCE

- A. Testing Agency Qualifications: A NRTL as defined in OSHA Regulation 1910.7, or a full member company of NETA.
 - 1. Testing Agency Field Supervision: Use persons currently certified by NETA or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in PART 3.
- B. Comply with NFPA 70, National Electrical Code.
- C. Comply with UL 467.
- D. Listing and Labeling: Provide products specified in this Section that are listed and labeled.
 - 1. The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.
 - 2. Listing and Labeling Agency Qualifications: A NRTL as defined in OSHA Regulation 1910.7.

1.05 SUBMITTALS

- A. Product Data for grounding wiring, grounding rods, connectors and connection materials, ground busses or plates, identification materials and grounding fittings.
- B. Field tests showing that the service entrance and generator grounding meets required resistance levels.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Kearney/Cooper Power Systems.
 - 2. Lyncole XIT Grounding.
 - 3. Salisbury: W. H. Salisbury & Co.
 - 4. Thomas & Betts, Electrical.
 - 5. Chance/Hubbell.
 - 6. O-Z/Gedney Co.; a business of the EGS Electrical Group.

2.02 WIRE AND CABLE GROUNDING CONDUCTORS

- A. Conform to NEC Table 8, except as otherwise indicated, for conductor properties, including stranding. The requirements below apply for new cables installed as well as for upgrading of identification of existing cables as indicated on drawings.
 - 1. Material: Copper. Use only copper wire for both insulated and bare grounding conductors in direct contact with earth, concrete, masonry, crushed stone, and similar materials.
- B. Equipment Grounding Conductors: Insulated with green color insulation.
- C. Underground Conductors: Bare, tinned, stranded, except as otherwise indicated.

- D. Bare Copper Conductors: Conform to the following:
 - 1. Solid Conductors: ASTM B3.
 - 2. Assembly of Stranded Conductors: ASTM B8.
 - 3. Tinned Conductors: ASTM B33.
- E. Color coding of ground cables - Where new or existing cables are concealed and not color-coded, any exposed portion of the cable and each end of the cable for a minimum of 2 feet shall be color coded by green tape overlaid with bright tracer color tape to form the tracer. Where routed through raceways, wire ways, cable trays or under raised floors, the color-coding shall be such that by removing or opening any cover, color-coding shall be visible. Where conductors are routed through cable trays, color-coding for a minimum length of 4 inches shall be accomplished at intervals not exceeding three feet between marking.

2.03 MISCELLANEOUS CONDUCTORS

- A. Grounding Plates: Bare or tinned, annealed-copper. Size as per specifications or larger as indicated on drawings.
- B. Braided Bonding Jumpers: Where electrical continuity across shock mounts is necessary, bonding jumpers shall be installed across each shock mount. Jumpers of this application should have a maximum thickness of 0.025 inch, so that the damping efficiency of the mount is not impaired. In severe shock and vibration environments, solid straps may be corrugated, or flexible tinned copper wire braid may be used. Braids are to be terminated with tinned copper ferrules.
- C. Raceway Bonding Jumpers: Copper, minimum size #6 AWG unless otherwise noted.

PART 3 - EXECUTION

3.01 GENERAL

- A. A separate ground conductor (green wire) shall be installed in all raceways for feeders, power and receptacle branch circuits and where called for on drawings.
- B. Switchboards shall have a separate ground bus bonding all cubicles together.
- C. Equipment grounding terminals of normal and essential Panelboards serving common patient areas shall be bonded together.
- D. All distribution and branch circuit panels shall have a separate ground bar
- E. All metallic conduits 1-1/4" or larger shall have grounding bushings.
- F. All type SO cord, or equivalent, shall have a separate ground wire (green) of equal size to circuit conductor.
- G. Equipment ground conductor shall be copper with Type THHN insulation, green only, up to and including #4; larger sizes may be bare conductor, or black and identified with green tape.
- H. Paint, grease or other contaminates shall be cleaned from all surfaces before bonding ground conductor. (Painted surfaces shall be sanded and cleaned.)

- I. Equipment Grounding Conductors: All metallic non-current carrying parts of electrical equipment shall be grounded with equipment grounding conductors whether or not shown on the drawings. Equipment grounding conductors shall be green insulated copper conductors unless otherwise indicated.
 - 1. Install green, equipment grounding conductor with all feeder and branch circuit conductors.
- J. Signal and Communication Systems: For telephone, fire alarm, security, voice, and data systems in the equipment room, provide a #4/0 AWG minimum insulated grounding conductor in raceway from grounding-electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
- K. Service Locations and Wiring Closets: Terminate grounding conductor on a multipoint ground plate.
- L. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.
- M. Enclosures: Ground all enclosures of electrical and electronic wiring and distribution equipment in accordance with requirements of the NEC.
- N. Conduit or cable shields shall not be used as the equipment grounding conductor.
- O. Equipment Enclosure Grounding: Bare wire, wrapped around connecting screws or mounting bolts and screws is not acceptable as a grounding connection. All ground lugs shall be of a noncorrosive material suitable for use as a grounding connection, and must be compatible with the type of metal being grounded. Ground lugs shall be mounted on clean, bare metal surfaces that are free of paint, rust, etc. Wire brush clean each surface to remove paint or oxidation prior to bolting jumper connectors in place. In general use tinned copper connectors for connections of dissimilar metals. Use of bimetal connectors shall only be allowed in special circumstances and only with the prior written approval

3.02 CONNECTIONS

- A. General: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
 - 1. Use electroplated or hot-tin-coated materials to assure high conductivity and to make contact points closer in order of galvanic series.
 - 2. Make connections with clean, bare metal at points of contact.
 - 3. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
- B. Exothermic-Welded Connections: Use for connections to structural steel, for underground connections, and were indicated on drawings. Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable and will be redone at the contractor's expense. Utilize 'smokeless' type weld kits for all exothermic welds performed in interior of structure
- C. Terminate insulated equipment grounding conductors for feeders with pressure-type grounding lugs. Where metallic raceways terminate at non-metallic or non-conductive housings, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to the ground bus in the housing. Bond electrically non-continuous conduits at both entrances and exits with grounding bushings and bare grounding conductors.

- D. Raceway Grounding: Surface metal raceways, wireways, or cable trays or cable rack systems shall be installed in a manner that ensures electrical continuity. Short insulated green copper bonding jumpers shall be installed between adjacent raceway sections, on both sides of each joint, to ensure proper bonding. Unless otherwise indicated, the minimum size for these bonding jumpers shall be No. 6 AWG. Jumpers shall be provided with compression connectors at each end of cable. Surface metal raceways, wireways, cable trays or cable rack systems shall be field drilled to provide bolting point for securing bonding jumper. Wire brush clean each surface to remove paint or oxidation prior to bolting jumper connectors in place. Bolts and hardware shall be as per details or as approved for grounding purposes. All metallic raceway penetrations into a facility structure shall be bonded to the earth electrode system.
- E. Other Grounding Systems: Any additional grounding systems used for electronic equipment shall be connected to the facility main ground plate, structural steel or exterior earth electrode system as shown on drawings.
- F. Tighten grounding and bonding connectors and terminals, including screws and bolts, in accordance with torque tightening values specified in UL 486A.
- G. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Mechanical connections using a Burndy "Hyground Connector", Thomas and Betts Compression Connector or equivalent equipment when operated at the manufacturers recommended pressure to develop a minimum force of 12 tons is acceptable as approved pressure connectors. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on ground conductor. Hydraulically crimped connectors are not acceptable in the lightning protection system.

3.03 RACEWAY SYSTEMS

- A. All metal supports, cable trays, frames, sleeves, brackets, braces, etc. for the raceway system, panelboards, switchboards, switches, enclosures, starters, controls, etc., which are not rigidly secured to and in contact with the raceway system, or which are subject to vibration and loosening, shall be bonded to the raceway system. Size the bonding conductor in accordance with NEC Article 250, Table 250-122.
- B. Terminate rigid conduit at all boxes, cabinets, and enclosures tightly with two locknuts and a bushing.
- C. Conduit which runs to or from all boxes, cabinets, or enclosures having concentric or eccentric knockouts which partially perforate the metal around the conduit and hence impair the continuity of system ground circuits shall be provided with bonding jumpers sized in accordance with NEC Article 250, Table 250-122. Connect the bonding jumper between a grounding type bushing on the conduit and a ground bus or stud inside the box, cabinet, or enclosure.
- D. Provide bonding jumpers sized in accordance with NEC Article 250, Table 250-122 for all conduit expansion joints.
- E. Provide a grounding conductor in all flexible metallic conduit and liquid-tight conduit, sized in accordance with NEC Article 250, Table 250-122.
- F. Provide a grounding conductor in all nonmetallic runs of conduit and raceway, sized in accordance with NEC Article 250, Table 250-122.
- G. Provide isolated ground conductors of systems as called for on the plans.

- H. Provide bonding bushings and connections in all of the following:
 - 1. Service equipment enclosures.
 - 2. Openings with eccentric or concentric knockouts.
 - 3. Openings using reducing washers.
 - 4. Hazardous locations.
 - 5. Greater than 250V to ground systems.

3.04 SECONDARY ELECTRICAL SYSTEMS

- A. Solidly ground all transformer neutral conductors and enclosures to building steel, or a cold-water pipe 1" or larger in size as called for in Table 250-122 of the National Electrical Code.
- B. Provide an equipment grounding conductor from the point of termination back to the ground bus of the serving panelboard, switchboard, or transformer. Do not splice equipment grounding conductors.
- C. Provide an equipment grounding conductor from the point of termination back to the ground bus of the serving panelboard, switchboard, transformer, or switchgear.
- D. The grounding conductors contained in the interstices of interlocked armor cable shall be connected to the ground bus at every equipment termination point and to each other and to system ground; ground at every splice location.

3.05 TESTS

- A. Grounds and grounding systems shall have a resistance to solid earth ground not exceeding following values:
 - 1. For grounding non-current carrying metal parts associated with secondary distribution system: 25 Ohms.
- B. Providing grounding tests to verify the above values. Where these values are not met, add additional ground rods or connections in order to meet these values.

END OF SECTION 26 0526

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

1.02 WORK INCLUDED

- A. Metal conduit.
- B. Liquid tight flexible metal conduit.
- C. Electrical metallic tubing.
- D. Non-metallic conduit.
- E. Flexible metal conduit.
- F. Fittings and conduit bodies.

1.03 SUBMITTALS

- A. Submit for approval a list of each product and the manufacturer.

1.04 REFERENCES

- A. ANSI-C80.2, 1983: Specification for Rigid Steel Conduit, Enameled.
- B. ANSI C80.3: Electrical Metallic Tubing, Zinc Coated.
- C. ANSI/NEMA FB 1: Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
- D. NECA "Standard of Installation."
- E. NEMA TC 2: Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80).
- F. NEMA TC 3: PVC Fittings for Use with Rigid PVC Conduit and Tubing.
- G. NEMA, RN1, 1986: PVC Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
- H. NEMA, TC 6, 1983: PVC and ABS Plastic Utilities Duct for Underground Installations.
- I. NEMA, TC 8, 1983: Extra strength PVC Plastic Utilities Duct for Underground Installations.
- J. NEMA, TC 9, 1983: Fittings for ABS and PVC Plastic Utilities Duct and Fittings for Underground Installation.
- K. NEMA, TC 10, 1983: PVC and ABS Plastic Communications Duct and Fittings for Underground Installation.
- L. The following U.L. Standards:
 - 1. UL 1, 1985: Flexible Metal Electrical Conduit.
 - 2. UL 3, 1984: Flexible Nonmetallic Tubing for Electric Wiring.
 - 3. UL 6, 1981: Rigid Metal Electrical Conduit.
 - 4. UL 360, 1986: Liquid tight Flexible Steel Conduit, Electrical.
 - 5. UL 514B, 1982: Fittings for Conduit and Outlet Boxes.
 - 6. UL 651, 1981: Schedule 40 and 80 PVC Conduit.
 - 7. UL 797, 1983: Electrical Metallic Tubing.
 - 8. UL 870, 1985: Electrical Wireways, Auxiliary Gutters and Associated Fittings.

PART 2 - PRODUCTS

2.01 CONDUIT REQUIREMENTS

- A. Minimum Size: 3/4" unless otherwise specified.
- B. Underground Installations:
 - 1. Use thick wall non-metallic conduit.
 - 2. Under Slab on Grade: Use thick wall non-metallic conduit.
 - 3. Minimum Size: 1".
- C. Outdoor Locations, Above Grade: Use rigid steel conduit.
- D. In Slabs Above Grade:
 - 1. Use rigid steel conduit
- E. Indoor:
 - 1. Concealed: Use electrical metallic tubing.
 - 2. Exposed: Use EMT unless otherwise called for.

2.02 RIGID GALVANIZED STEEL CONDUIT

- A. Steel, hot dipped galvanized on the outside and inside, UL categorized as Rigid Ferrous Metal Conduit identified on UL Listing Mark as Rigid Metal Conduit - Steel or Rigid Steel Conduit.
- B. Acceptable manufacturers:
 - 1. LTV Steel
 - 2. Triangle
 - 3. Allied Tube
 - 4. Steel Duct
 - 5. Wheatland

2.03 ELECTRICAL METALLIC TUBING

- A. Steel, galvanized on the outside and enameled on the inside, UL categorized as Electrical Metallic Tubing (identified on UL Listing Mark as Electrical Metallic Tubing).
- B. Acceptable manufacturers:
 - 1. Triangle
 - 2. Wheatland
 - 3. Allied Tube
 - 4. Steel Duct
 - 5. LTV Steel

2.04 FLEXIBLE METAL CONDUIT

- A. Flexible Metal Conduit shall be constructed of one continuous length of spirally wound, interlocked, zinc coated strip steel. Interior surface shall be free from burrs or sharp edges. UL categorized as Flexible Metal Conduit (identified on UL Listing Mark as Flexible Steel Conduit or Flexible Steel Conduit Type RW).
- B. Acceptable manufacturers:
 - 1. Anaconda
 - 2. American Flexible Conduit Co.
 - 3. O-Z/Gedney
 - 4. Thomas and Betts

2.05 LIQUID TIGHT FLEXIBLE METAL CONDUIT

- A. Flexible Metal Conduit shall be constructed of one continuous length of spirally wound, interlocking zinc coated strip steel. Interior surfaces shall be free from burrs and sharp edges. Provide with a liquid-tight jacket of flexible polyvinyl chloride (PVC). UL categorized as liquid-tight flexible metal conduit (identified on UL Listing Mark as Liquid-Tight Flexible Metal Conduit, also specifically marked with temperature and environment application data).
- B. Acceptable manufacturers:
 - 1. Allied
 - 2. American Flexible Conduit
 - 3. Carlon
 - 4. Thomas and Betts

2.06 RIGID NON-METALLIC PVC CONDUIT

- A. Extra-Heavy wall conduit: Schedule 80, constructed of polyvinyl chloride, rated for use with 90-degree C conductors, and UL listed for direct burial and normal above ground use.
- B. Acceptable manufacturers:
 - 1. Carlon/Div. of Lamson and Sessions
 - 2. Beck Mfg./Picoma Industries
 - 3. Cantex Inc.
 - 4. National Pipe & Plastics Inc.
 - 5. Ipex Inc.

2.07 FITTINGS AND ACCESSORIES

- A. Rigid galvanized steel fittings shall be fully threaded and shall be of the same material as the respective raceway system.
- B. Fittings for electrical metallic tubing shall be single screw indenter fittings for conduits up to 2" and double screw indenter fittings for conduits 2" and larger.
- C. Fittings for flexible metal conduit shall be center stopped, insulated throat, U.L. E-11852 listed.
- D. Fittings for liquidtight flexible metal conduit shall have zinc plated steel ferrule, compression type with sealing ring.

- E. Fittings for rigid non-metallic conduit shall be solvent cemented in accordance with the manufacturer's instructions.
- F. Connectors shall have insulated throat up to and including 1" size. For sizes 1-1/4" and larger, provide plastic insulating bushing.
- G. Die-cast or pressure cast fittings are not permitted.
- H. Provide conduit bodies' types, shapes and sizes as required to suit application and NEC requirements. Provide matching gasketed covers secured with corrosion-resistant screws.
- I. Insulated Bushings:
 - 1. Threaded, malleable iron/zinc electroplate with 105 degrees C minimum plastic insulated throat; Appleton Electric Co.'s BU50I Series, Cooper/Crouse-Hinds' 1031 Series, OZ/Gedney Co.'s IBC-50 Series, Raco Inc.'s 1132 Series, Steel City/T & B Corp.'s BI-901 Series, or Thomas & Betts Corp.'s 1222 Series.
 - 2. Threaded malleable iron with 150 degrees C plastic throat; Appleton Electric Co.'s BU501 Series, Cooper/Crouse-Hinds' H1031 Series, or OZ/Gedney Co.'s IBC-50 Series.
- J. Plastic Bushings for 1/2 and 3/4 Inch Conduit:
 - 1. 105 degrees C minimum temperature rating; Appleton Electric Co.'s BBU50, BBU75, Blackburn (T & B Corp.'s) 50 BB, 75 BB, Cooper/Crouse-Hinds' 931,932, or OZ/Gedney Co.'s IB-50, IB-75, Raco Inc.'s 1402, 1403, Steel City/T & B Corp.'s BU-501, BU-502, or Thomas & Betts Corp.'s 222, 223.
 - 2. 150 degrees C temperature rating; Appleton Electric Co.'s BBU50H, BBU75H, Cooper/Crouse-Hinds' H-931, H-932, or OZ/Gedney Co.'s A-50, A-75.
- K. Insulated Grounding Bushings:
 - 1. Threaded, malleable iron/zinc electroplate with 105 degrees C minimum plastic insulated liner, and ground lug; Appleton Electric Co.'s GIB-50 Series, Cooper/Crouse-Hinds' GLL Series, OZ/Gedney Co.'s IBC-50L Series, Raco Inc.'s 1212 Series, Steel City/T & B Corp.'s BG-801 (1/2 to 2") Series, or Thomas & Betts Corp.'s 3870.
 - 2. Threaded malleable iron/zinc electroplate with 150 degrees C plastic insulated liner, and ground lug; Appleton Electric Co.'s GIB Series, Cooper/Crouse-Hinds' HGLL Series, or OZ/Gedney Co.'s IBC-50L Series, or Thomas & Betts Corp.'s 3870.
- L. Sealant for Raceways Exposed to Different Temperatures: Sealing compounds and accessories to suit installation; Appleton Electric Co.'s DUC, or Kwiko Sealing Compound with fiber filler, Cooper/Crouse-Hinds' Chico A Sealing Compound with Chico X fiber, Electrical Products Division 3M Scotch products, OZ Gedney Co.'s DUX or EYC sealing compound with EYF damming fiber, or Thomas & Betts Corp.'s Blackburn DX.
- M. Vertical Conductor Supports: Kellems/Hubbell Inc.'s Conduit Riser Grips, or OZ/Gedney Co.'s Type M, Type R.
- N. Pulling-In-Line for Installation in Spare and Empty Raceways: Polypropylene monofilament utility line; Greenlee Textron Inc.'s Poly Line 430, 431, or Ideal Industries Powr-Fish Pull-Line 31-340 Series.

- O. Acceptable manufacturers:
 - 1. O.Z. Gedney
 - 2. Steel City
 - 3. Thomas & Betts
 - 4. Cooper Crouse-Hinds
 - 5. Carlon
 - 6. Raco

2.08 EXPANSION FITTINGS

- A. Galvanized steel expansion joints for RGS or EMT conduit, PVC for PVC conduit. Minimum 4" movement in either direction.
- B. Weatherproof for outdoor applications.
- C. At expansion joints in concrete pours, provide Deflection/Expansion fittings capable of movement of 3/4" in all directions from the normal.
- D. Design Make: O.Z./Gedney, Type "AX" (exposed), "DX" (Concrete Pour)
- E. Acceptable manufacturers:
 - 1. O.Z./Gedney
 - 2. Crouse-Hinds
 - 3. Appleton

2.09 EXPANDABLE CONDUIT PLUGS

- A. Seal open underground telecommunications conduits entering the building with expandable conduit plugs with rope ties.
- B. Refer to drawings for underground entrance locations.
- C. Design Make: Osburn Associates or approved equal.

PART 3 - EXECUTION

3.01 GENERAL

- A. Install conduit in accordance with NECA "Standard of Installation".
- B. All conduit penetrations through fire-rated construction must be sealed with UL listed fire stopping. Refer to architectural drawings for locations.
- C. Size raceways as indicated on the drawings. Where sizes are not indicated, raceways shall be sized as required by the National Electrical Code in accordance with the quantity, size, type and insulation of conductors to be installed.
- D. Minimum 1/2" trade size for branch circuit and fire alarm wiring.
- E. Minimum 3/4" trade size for voice/data outlets, television outlets, and branch circuit "Home Runs" to panelboards.

- F. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25% additional conduits.
- G. Provide a code compliant ground path between all outlets and the established electrical system ground.
- H. Coordinate all raceway runs with other trades.
- I. Do not install raceways adjacent to hot surfaces or in wet areas. Maintain 12" clearance between conduit and surfaces with temperatures exceeding 104° F (40° C).
- J. Provide expansion fittings with external grounding straps at building expansion joints.
- K. Arrange neatly to permit access to the raceway, outlet, pull, and junction boxes, and work installed by other trades.
- L. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations.
- M. All exposed conduit mounted to a painted surface shall be painted to match that surface.
- N. No conduit shall be run in or through an Elevator Machine Room, hoistway or pit unless it contains circuitry specifically required for the elevator or elevator related equipment.
- O. No conduit shall be run in or through a Stairwell unless it contains circuitry specifically required for the Stairwell related equipment.
- P. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
- Q. Provide at least one junction or pull box for each 360 degrees of bends.
- R. Provide green ground wire in all EMT, flexible conduit, and non-metallic conduit.

3.02 INSTALLATION

- A. Install raceways parallel or perpendicular to building walls, floors and ceilings.
- B. Cut raceways square, ream ends to remove burrs, and bush where necessary.
- C. Route conduit in and under slab from point to point. Do not cross conduits in slab. Provide U.L. approved rain-tight and concrete tight couplings and connectors. All conduit in concrete floor slabs shall be rigid galvanized steel with concrete tight threaded fittings. Install conduit below the reinforcing mesh. Locate conduits to provide a minimum of 1" of concrete around conduit. Obtain approval from the Owner's Representative prior to installing conduit larger than 1" trade size in concrete slabs.
- D. Install with a minimum of bends and offsets. Bends shall not kink or destroying the interior cross section of the raceway. Factory made bends shall be used for raceways 1" trade size and larger.
- E. Support raceways from building construction. Do not support raceways from ductwork, piping, or equipment hangers. Arrange supports to prevent misalignment during wiring installation. Support conduit using coated steel or malleable iron straps, lay in adjustable hangers, clevis hangers, and split hangers. Do not attach conduit to ceiling support wires. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.

- F. Plug the ends of each roughed-in raceway with an approved cap or disc to prevent the entrance of foreign materials during construction.
- G. Secure conduit within three feet of each outlet box, junction box, cabinet or fitting.
- H. Provide a #14 AWG fish wire in all "Spare" or "Empty" conduit runs to facilitate future installation of conductors.
- I. Provide expansion fittings where conduits cross building expansion joints.
- J. Wherever a cluster of (4) or more conduits rise out of floor exposed, provide neatly formed 4 in. high concrete envelope, with chamfered edges, around raceways.
- K. Provide 4 spare 3/4-in. raceways from each flush mounted panelboard or cabinet to an area above the nearest accessible ceiling space. Make 90° turn above the ceiling, arranged for further continuation of raceway, and cap.
- L. Join non-metallic conduit using cement as recommended by manufacturer. Wipe non-metallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.
- M. Where conduits puncture roof, install pitch pockets as required in order that the roof warranty is maintained.
- N. If it is necessary to burn holes through webs of beams or girders, call such points to the attention of the Owner's Representative and receive written approval both as to location and size of hole before proceeding with work. All holes shall be burned no larger than absolutely necessary.
- O. Core drill, sleeve, and fire stop all penetrations through existing floors.
- P. In exterior or wet locations, provide minimum 1/4" air space between raceway and wall. Secure raceway within 3 ft. of each outlet box, junction box, cabinet or fitting.
- Q. Provide conduit supports based on the following table:

Conduit Trade Size	Type of Run	Horizontal Spacing in Feet	Vertical Spacing in Feet
1/2", 3/4"	Concealed	7	10
1", 1-1/4"	Concealed	8	10
1-1/2" & larger	Concealed	10	10
1/2", 3/4"	Exposed	5	7
1", 1-1/4"	Exposed	7	8
1-1/2" & larger	Exposed	10	10

- R. Conceal conduits in all locations except for mechanical and equipment rooms. Obtain owner's permission to run exposed conduits in other areas if existing conditions warrant exposed conduit.

3.03 REUSE OF EXISTING RACEWAYS

- A. Do not change number of raceways to less than the number indicated on the drawings except when appropriate for advantageous reuse of existing exposed and concealed raceways (the contract documents do not indicate location, number, size or condition of existing raceways).

- B. The existing raceway must be of adequate size for the new conductors to be installed therein (NFPA 70 Chapter 9, Tables 1, 4, & 5; Appendix C, Tables C1-C12a). More circuits may be enclosed by existing raceways than the circuiting shown on the drawings provided conductor sizes are increased to compensate for derating (adjustment factors) and other considerations required by NFPA 70 Article 310-15.
- C. Remove existing conductors.
- D. Demonstrate to the Director's Representative that the existing raceway is clear of obstructions and in good condition.
- E. Check ground continuity. When ground continuity of existing raceway is inadequate install insulated grounding bushings, grounding wedges, bonding straps, grounding jumpers or equipment grounding conductors to establish effective path to ground.
- F. Install insulated bushings to replace damaged or missing bushings. Replace non-insulated bushings with insulated bushings on raceway sizes 1 inch and larger.
- G. Install vertical conductor supports to replace existing or missing vertical conductor supports.
- H. Install extension rings on existing boxes when the number of new conductors installed therein exceeds NFPA 70 requirements.
- I. Furnish the Owners' Representative with marked up drawings showing size and routing of existing raceways with number and size of new conductors installed therein. The drawings will be forwarded to the design engineer for verification of NFPA 70 compliance.

3.04 RACEWAYS FOR FUTURE USE (SPARE RACEWAYS AND EMPTY RACEWAYS)

- A. Draw fish tape through raceways in the presence of the Owners Representative to show that the raceway is clear of obstructions. Leave a pulling-in line in each spare and empty raceway.

3.05 RACEWAY INSTALLATION - SPECIAL AREAS

- A. Raceways Exposed to Different Temperatures: Where portions of an interior raceway system are exposed to widely different temperatures, seal interior and exterior of raceway to prevent circulation of air from a warmer to a colder section through the raceway installation.
- B. Heated Areas to Unheated Areas: After conductors are installed, seal interior of the raceway at the nearest conduit body, outlet or junction box in the heated area adjoining the unheated area.
- C. Conduit in Waterproofed Floors: Install conduit runs in waterproof floors to avoid penetrating the waterproofing. Avoid penetration of waterproofing with conduit risers so far as practicable.
- D. Where it is necessary to puncture the waterproofing for a conduit riser, install a standard weight steel pipe sleeve extending one inch above the finished floor level. Flash the steel pipe sleeve to the waterproofing with 16-ounce copper. Construct the flashing with a copper tube extending the full height of the sleeve, soldered to a copper base extending 6 inches in all directions from the sleeve.
- E. The flashing will be integrated into the waterproofing by the Construction Contractor. Provide solid cast brass floor plates with chromium finish where pipe sleeves are exposed in rooms.
- F. Install sealing fittings in concealed conduit runs in a recessed box with blank face plate to match other face plates in the area.

3.06 RACEWAY SCHEDULE

A. Rigid Ferrous Metal Conduit

1. Exterior above grade
2. Transition elbows from above to below grade.
3. Where specifically called for on plans.

B. Electrical Metallic Tubing:

1. May be installed concealed as branch circuit conduits above suspended ceilings where conduit does not support fixtures or other equipment.
2. May be installed concealed as branch circuit conduits in hollow areas in dry locations, including:
 - a. Hollow concrete masonry units, except where cores are to be filled.
 - b. Drywall construction with sheet metal studs, except where studs are less than 3-1/2 inches deep.
3. May be installed exposed as branch circuit conduits in dry non-hazardous locations at elevations over 10'-0" above finished floor where conduit does not support fixtures or other equipment.

C. Flexible Metal Conduit: Install equipment grounding conductor in the flexible metal conduit and bond at each box or equipment to which conduit is connected:

1. Use for final conduit connection to recessed lighting fixtures in suspended ceilings. Use 4 to 6 feet of flexible metal conduit, minimum size 1/2 inch, between junction box and fixture. Locate junction box at least 1 foot from fixture and accessible if the fixture is removed.
2. Use 1 to 3 feet of flexible metal conduit for final conduit connection to:
 - a. Emergency lighting units.
 - b. Dry type transformers.
 - c. Motors with open, drip-proof or splash-proof housings.
 - d. Equipment subject to vibration (dry locations).
 - e. Equipment requiring flexible connection for adjustment or alignment (dry locations).
3. Use for concealed branch circuit conduits above existing non-removable suspended ceilings where rigid type raceways cannot be installed due to inaccessibility of space above ceiling.
4. May be installed concealed as branch circuit conduits in drywall construction with sheet metal studs, except where studs are less than 3-1/2 inches deep.

D. Liquid-tight Flexible Metal Conduit: Install equipment grounding conductor in liquid-tight flexible metal conduit and bond at each box or equipment to which conduit is connected:

1. Use 1 to 3 feet of liquid-tight flexible metal conduit (UL listed and marked suitable for the installation's temperature and environmental conditions) for final conduit connection to:
 - a. Motors with weather-protected or totally enclosed housings.
 - b. Equipment subject to vibration (damp and wet locations).
 - c. Equipment requiring flexible connection for adjustment or alignment (damp and wet locations).

E. Rigid Nonmetallic PVC Conduit:

1. Schedule 80:
 - a. Exterior underground
 - b. Exterior above ground only when specifically noted on plans.

3.07 FITTINGS AND ACCESSORIES SCHEDULE

A. General:

1. Use fittings and accessories that have a temperature rating equal to, or higher than the temperature rating of the conductors to be installed within the raceway.
2. Use zinc electroplate or hot dipped galvanized steel/malleable iron or cast iron alloy fittings and accessories in conjunction with ferrous raceways in dry and damp locations unless otherwise specified or indicated on the drawings.
3. Use insulated grounding bushings or grounding wedges on ends of conduit for terminating and bonding equipment grounding conductors, when required, if cabinet or boxes are not equipped with grounding/bonding screws or lugs.
4. Use caps or plugs to seal ends of conduits until wiring is installed to exclude foreign material.
5. Use insulated grounding bushings on the ends of conduits that are not directly connected to the enclosure, such as stub-ups under equipment, etc., and bond between bushings and enclosure with equipment grounding conductor.
6. Use expansion fittings where raceways cross expansion joints (exposed, concealed, buried).
7. Use deflection fittings where raceways cross expansion joints that move in more than one plane.
8. Use 2 locknuts and an insulated bushing on end of each conduit entering sheet metal cabinet or box in dry or damp locations.
9. Plastic bushing may be used on 1/2 and 3/4-inch conduit in lieu of insulated bushing.
10. Terminate conduit ends within cabinet/box at the same level.

B. For Rigid and Intermediate Metal Conduit: Use threaded fittings and accessories. Use 3-piece conduit coupling where neither piece of conduit can be rotated.

C. For Electrical Metallic Tubing: Use compression type connectors and couplings.

D. For Flexible Metal Conduit: Use flexible metal conduit connectors.

E. For Liquid-tight Flexible Metal Conduit: Use liquid-tight connectors.

F. For Rigid Nonmetallic PVC Conduit: Use conduit manufacturer's standard fittings and accessories.

END OF SECTION 26 0533

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

1.02 SECTION INCLUDES

- A. Surface metal raceways.
- B. Wireways.

1.03 REFERENCES

- A. NECA (National Electrical Contractors Association) Standard of Installation.
- B. NEMA WD 6 - Wiring Device Configurations.

1.04 QUALITY ASSURANCE

- A. Perform Work in accordance with NECA Standard of Installation.

1.05 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum (3) years' experience.

PART 2 - PRODUCTS

2.01 SURFACE METALLIC RACEWAY

- A. Multiple Communications or Branch Circuits (Medium Capacity):
 - 1. 0.82" H x 1.9"W.
 - 2. Metallic two piece raceway with single compartment.
 - 3. Color shall be Ivory color durable finish scratch-resistant surface that can be painted.
 - 4. Provide the following fittings as required for installation:
 - a. Entrance End Fitting: nominal maximum dimensions of 2.75"W x 2.75"H x 4"L and 1.5" or 1.25" conduit opening
 - b. Back Entrance End Fitting: same as entrance end fitting with internal radius.
 - c. T fittings.
 - d. Bridge fitting with radius for spanning existing raceways in varying widths from 1/2" to 4.
 - e. Flat internal and external elbows UL verified for a 2" bend radius and exceeding the recommendations of EIA/TIA 569A.
 - 5. Design Make: Mono-Systems SMS2400 series raceway, SMS2457 series bridge fittings, SMS2410 series entrance end fittings, SMS 2442 and 2430 T fittings.

6. Acceptable Manufacturers:
 - a. Mono-Systems SMS2400 Series.
 - b. Wiremold 2400 Series.
- B. Combination Power and Data Cables:
1. 1.75" H x 4.75"W.
 2. Metallic two piece raceway with single or split compartment as called for on plans.
 3. Color shall be Ivory color durable finish scratch-resistant surface that can be painted.
 4. Provide the following fittings:
 - a. Entrance End Fitting: nominal maximum dimensions of 4.75"W x 3"H x 4"L and 2.5" or 2" conduit openings
 - b. Back Entrance End Fitting: same as entrance end fitting with internal radius.
 - c. T fittings.
 - d. Flat internal and external elbows with fiber optic radius.
 5. Design Make: Mono-Systems SMS4200 series raceway, with SMS4205 SMS4214FO, SMS4211FO and SMS4209FO fittings
 6. Acceptable Manufacturers:
 - a. Mono-Systems SMS4200 Series.
 - b. Wiremold 4000 Series.
- C. Single Branch Circuit or Data Cable
1. One-piece raceway
 2. Color shall be Ivory
 3. Utilized for wall mounted phones and miscellaneous branch circuit power only.
 4. Provide internal and external 90 degree fittings with radius.
 5. Design Make: Mono Systems SMS700
 6. Acceptable Manufacturers:
 - a. Mono-Systems SMS700 Series.
 - b. Wiremold 700 Series.
- D. Provide miscellaneous boxes, extension rings, fittings and supports designed and manufactured by the raceway manufacturer as required making a complete job.

2.02 MULTI-OUTLET ASSEMBLY

- A. Sheet metal channel with fitted cover, with pre-wired receptacles, suitable for use as multi-outlet assembly.
- B. Size: 1.28" x 0.75".
- C. Receptacles: NEMA WD 6, type 5-15R, single receptacle.
- D. Receptacle Spacing: As indicated on the drawings.
- E. Receptacle Color: Ivory.
- F. Channel Color: Ivory enamel.
- G. Fittings: Furnish manufacturer's standard couplings, elbows, and connectors.
- H. Design Make: Wiremold 2000.

2.03 WIREWAY

- A. Manufacturers:
 - 1. Square D.
 - 2. Substitutions: Refer to Division 1.
- B. Description: General purpose, Oil-tight, dust-tight, and Rain-tight type wireway.
- C. Knockouts: Manufacturer's standard.
- D. Size: As indicated on Drawings.
- E. Cover: Hinged cover.
- F. Connector: Flanged.
- G. Fittings: Lay-in type with removable top, bottom, and side; captive screws.
- H. Finish: Rust inhibiting primer coating with gray enamel finish.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Support with expansion anchors, concrete inserts, masonry inserts or toggle bolts as field conditions require. Provide supports at five foot centers.
- B. Install a separate green ground conductor in raceway from the junction box where surface raceway begins to the ground terminal of the device, fixture or equipment being supplied.
- C. Provide all fittings, connectors, elbows, tees, boxes etc. as required for the installation.
- D. Raceway shall be factory painted. Touch up raceway and outlet boxes as required upon completion of installation.
- E. Provide new covers and device brackets in areas where existing raceway is called for reuse. Paint raceway to match existing upon completion.
- F. Provide all required conduit entrance end fittings and elbows required for a complete installation.
- G. Raceway shown on plans is diagrammatical only. Route raceway around existing room features as required.
- H. Where existing conduits, pipes and other obstacles interfere with the installation of new raceway at 90 degree angles, provide bridge fittings to traverse the obstacle without rerouting. If this is not possible reroute the surface raceway or the existing raceway as directed by owners' representative.
- I. Install Products in accordance with manufacturer's instructions.
- J. Use flat-head screws, clips, and straps to fasten raceway channel to surfaces. Mount plumb and level. This shall be done for WM400BAC as well, even though raceway comes with adhesive.
- K. Use suitable insulating bushings and inserts at connections to outlets and corner fittings.
- L. Wireway Supports: Provide steel channel as specified in section 260190.
- M. Close ends of wireway and unused conduit openings.
- N. Ground and bond under provisions of section 260526.

END OF SECTION 26 0534

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

1.02 SECTION INCLUDES

- A. Electrical connections to equipment.

1.03 REFERENCES

- A. NEMA WD 1 - General Purpose Wiring Devices.
- B. NEMA WD 6 - Wiring Devices - Dimensional Requirements.
- C. NFPA 70 - National Electrical Code.

1.04 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

1.05 COORDINATION

- A. Refer to Division 1.
- B. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.
- C. Determine connection locations and requirements.
- D. Sequence rough-in of electrical connections to coordinate with installation of equipment.
- E. Sequence electrical connections to coordinate with start-up of equipment.

PART 2 - PRODUCTS

2.01 ELECTRIC CORDS

- A. Provide multi-conductor SO cords, comprised of 2 or more conductors. Type SJEOOW or Type SEOOW flexible cords manufactured using bare flexible stranded Class K copper conductors, and heat, moisture and oil resistant thermoplastic-elastomer (TPE) insulation. The insulated conductors shall be cabled with non-wicking polypropylene fillers, with a tissue-paper separator wrapped around the assembly for easier removal. A heat, moisture and oil resistant flexible TPE jacket is extruded over the assembly.
- B. Type SJEOOW 300 Volt and type SEOOW 600 Volt flexible cords are permitted for use as specified by Article 400 and related articles of the National Electrical Code.

- C. Typical applications include:
1. Industrial Machinery.
 2. Large Appliances.
 3. Motors.
 4. Temporary power.
- D. Suitable for use in:
1. Dry locations not to exceed minimum -50°C (-58°F) or maximum 105°C (221°F).
 2. Wet locations or other applicable locations.
 3. S type cords may be completely immersed in water, or exposed to oil or coolant at temperatures not to exceed 60°C (140°F).
- E. Acceptable Manufacturers:
1. Allied Wire.
 2. WesBell.
 3. Consolidated electronic wire and cable.

2.02 PLUG CAPS, CONNECTORS AND SWITCHES

- A. Provide twist lock type plugs and receptacles when used for connecting equipment with fabricated SO cord connection.
- B. Provide the following as project conditions require.
1. Standard 20 and 30 Amp Plugs and Connectors:
 - a. Two-part cord grip tightens with two screws for maximum retention force. Broad gripping area to accommodate wide range of cable diameters.
 - b. Tough ribbed nylon housing for secure gripping.
 - c. Insulated nylon construction to keep non-current carrying parts from becoming energized.
 - d. Self-threading screws specially designed for secure assembly.
 - e. Wiring chambers separate and positively insulate conductors and promote easy inspection.
 - f. Integral dust shield protects wiring chamber from dust or contaminants. Single-piece shield/housing eliminates need for separate step at installation.
 - g. Design Make: Hubbell HBL2311 plug and HBL2313 receptacle.
 2. Standard Receptacle:
 - a. High-impact, abuse-resistant nylon face.
 - b. All-brass mounting and grounding system provides a lower resistance ground path and greater resistance to corrosion than steel mounting systems.
 - c. Glass-Reinforced thermoplastic polyester base (RTP) has the desirable characteristics of a thermoset material, including heat, flame resistance and dimensional stability.
 - d. One-piece contact with long spring arm (low stress) and oxide cutting nibs: prevents stress and overheating associated with riveted contact and short spring arms.
 - e. #10 silicon bronze terminal screw provides greater strength and resistance to corrosion and stripping. Anti-rotational clamp has a stop to limit the amount of cocking when only one side is used. Accommodates both back and side wiring.
 - f. Wire restraint recess for both back and side wiring, greatly reduces the possibility of loosening the terminal connection.

- g. Design Make: Hubbell HBL2310.
- 3. Mechanical Interlock Switched Safety Enclosures:
 - a. Lockable handle provides lockout protection for greater safety and complies with OSHA lockout requirements.
 - b. Horsepower rated switch.
 - c. Angled 20 or 30 amp water tight Twist-Lock receptacle.
 - d. Heavy-duty interlock linkage prevents make and break under load.
 - e. Moveable feet may be used in horizontal or vertical position or may be removed and pre-marked holes drilled for Type 1 or 3R installations.
 - f. Heavy-duty internal frame bonds conduit and all grounds and has a DIN rail to accommodate the switch.
 - g. Pre-molded conduit entry hole is offset to prevent water condensation from falling directly on interior electrical components.
 - h. Design Make: Hubbell HBLMITL.
- 4. 50 Ampere Plugs and Connector Bodies:
 - a. Stainless steel shroud restricts mis-mating with the wrong device.
 - b. Thermoplastic polyester interior provides heat resistance and impact strength.
 - c. Housing assembly latch slotted to fit standard flat-blade screwdriver.
 - d. Padlock capable shroud allows compliance to OSHA lockout tag out regulation 29 CFR 1910.147.
 - e. Three-piece thermoplastic clamp assembly with stainless steel fast lead screws provides a more consistent, durable grip. Sealed cable entry keeps out moisture and dust.
 - f. 6/6 nylon nose - thermoplastic polyester terminal cover provides heat resistance in terminal area and impact strength of nose piece.
 - g. One-piece grounding contact on 4-wire devices provides a more reliable grounding system.
- C. Acceptable Manufacturers:
 - 1. Hubbell
 - 2. Legrand
 - 3. Leviton

2.03 DISCONNECT SWITCHES, MOTOR CONTROLS AND ENCLOSED CIRCUIT BREAKERS

- A. Provide fused or Non-fused disconnects as called for on drawings.
- B. Where motor controls are furnished by others and not located within sight of the equipment provide a non fused disconnect at the equipment.
- C. Provide motor controls as called for on the electric equipment control schedule.
- D. Provide KAIC ratings equivalent to the panel or switchboard feeding the electrical equipment.
- E. Refer to Specification Section 262400 for technical specifications.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that equipment is ready for electrical connection, wiring, and energization.

3.02 BREAKERS FOR EQUIPMENT FURNISHED BY OTHERS

- A. Where equipment or motors are furnished by others field verify the exact breaker and wiring requirements prior to installation. Upsize breakers and wiring within the same breaker frame at no additional cost to the contract if required.
- B. Provide breakers with KAIC rating equivalent to the panel or switch board.

3.03 DISCONNECTS

- A. Unless a disconnect is specifically called out on mechanical/HVAC drawings provide a lockable disconnect for all rooftop equipment. Disconnect shall be located within sight of the equipment. Provide fused disconnects where called for.
- B. Provide disconnects for ahead of VFDs furnished by the mechanical contractor.
- C. Provide mounting hardware and unistrut for installation of disconnects.
- D. Provide all power wiring from disconnect to motors.

3.04 MOTOR CONTROLS

- A. Install motor controls furnished by mechanical contractor or provide motor controls as called for in the electric equipment control schedule.
- B. For indoor equipment mount controls within sight of equipment.
- C. Where controls are not packaged with equipment locate as approved by the engineer and construction manager.
- D. For rooftop equipment install controls indoors in electrical, mechanical or storage room.
- E. Provide all wiring and raceways from the control equipment to the motor.
- F. Gang controls for multiple motors where practical.

3.05 ELECTRICAL CONNECTIONS

- A. Provide complete power connections to all electrical equipment. Provide control connections to equipment where indicated on the drawings. Provide disconnect ahead of each piece of equipment. Ground all equipment in accordance with the latest version of the National Electrical Code.
- B. Provide all power wiring, electric equipment, control wiring, switches, lights, receptacles, and connections as required for proper equipment operation of Owner-Furnished Equipment and Equipment furnished by other contracts.
- C. Refer to Manufacturer's drawings/specifications for requirements of special equipment. Verify connection requirements prior to roughing.
- D. Make electrical connections in accordance with equipment manufacturer's instructions.
- E. Make conduit connections to equipment using flexible conduit. Use liquid-tight flexible conduit with watertight connectors in damp or wet locations.

- F. Connect heat-producing equipment using wire and cable with insulation suitable for temperatures encountered.
- G. Provide receptacle outlet to accommodate connection with attachment plug.
- H. Provide cord and cap where field-supplied attachment plug is required.
- I. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- J. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.
- K. Install terminal block jumpers to complete equipment wiring requirements.
- L. Install control devices furnished by others.
- M. Provide control devices as called for on electric equipment control schedule.
- N. Coordinate all work with other contractors and the manufacturers who are furnishing equipment and controls.
- O. Where drawings call for controllers to be mounted remote from the equipment provide non-fused disconnect switch at the unit.
- P. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

END OF SECTION 26 0536

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

1.02 WORK INCLUDES

- A. Wall and ceiling outlet boxes.
- B. Pull and junction boxes.
- C. Floor boxes.
- D. Poke through boxes.

1.03 REFERENCES

- A. NECA - Standard of Installation.
- B. NEMA FB 1 - Fittings and Supports for Conduit and Cable Assemblies.
- C. NEMA OS 1 - Sheet-steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
- D. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports.
- E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- F. NFPA 70 - National Electrical Code.

1.04 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Provide Products listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

1.05 SUBMITTALS FOR REVIEW

- A. Provide Product Data for the following:
 - 1. Floor Boxes

PART 2 - PRODUCTS

2.01 OUTLET BOXES

- A. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel. Not less than 1-1/2" deep, 4" square or octagonal, with knockouts. Outlet boxes exposed to moisture, exterior, wet or damp locations shall be cadmium cast alloy complete with threaded hubs and gasketed screw fastened covers. Minimum box size shall be as indicated in Article 314 of the National Electrical Code for the conductors and devices installed. Boxes shall be approved for the environmental condition of the location where they will be installed.
- B. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 1/2" male fixture studs where required.

C. Acceptable manufacturers:

1. Steel City
2. Raco
3. Appleton
4. Crouse Hinds

2.02 PULL AND JUNCTION BOXES

- A. Sheet Metal Boxes: NEMA OS 1, galvanized steel. Shall be constructed of not less than 14 gauge galvanized steel with trim for flush or surface mounting in accordance with the location to be installed. Provide screw-on type covers. Boxes installed in damp or wet locations shall be of raintight construction with gasketed cover and threaded conduit hubs. In no case shall boxes be sized smaller than as indicated in Article 314 of the National Electrical Code for conduit and conductor sizes installed. Boxes shall be approved for the environmental condition of the location where they will be installed.

2.03 TERMINAL AND EQUIPMENT CABINETS IN NON HAZERDOUS LOCATIONS

- A. Steel Equipment Cabinets shall be code gauge galvanized steel with removable end walls. Fronts shall be of code gauge steel, flush or surface type (as indicated) with concealed trim clamps, concealed hinges, flush lock, and grey baked enamel finish. Boxes and front shall be U.L. listed and shall be minimum 24"H x 24"W x 6"D or as called for on plans. Provide provisions for terminal board mounted on inside back wall of cabinet as required.
- B. Fiber glass equipment cabinets shall be Compression-molded fiberglass for chemical and temperature-resistance. Gasketed for water-tight and dust-tight seal. Polyester mounting brackets and stainless steel attachment screws, molded-in-place threaded brass inserts and plated steel screws for mounting optional panels and terminal block kits. Removable hinged cover attached to body with Type 316 stainless steel hinge pin or Screw-cover enclosure secured with two captivated Type 316 stainless steel slotted cover screws.
- C. Stainless Steel terminal and equipment cabinets shall have continuous hinge, seamless foam-in-place gasket and stainless steel screw-down clamps for a reliable seal that protects components from corrosive environments. 14-gauge Type 304 stainless steel with seams continuously welded and ground smooth, seamless foam-in-place gasket. Weld nuts for mounting optional panels and terminal block kits. Provide bonding provision on door and body.
- D. Poly carbonate boxes shall be non-glass-filled polyester material offers superior UV resistance. Chemical resistance to a broad range of solvents, alkalis and acids. Crack and impact resistant. Shall be recyclable.
- E. Provide following accessories and options where called for.
1. Continuous hinged door (unless otherwise noted provide screw type covers).
 2. Scratch-resistant polycarbonate windows permanently bonded in place.
 3. Quick-release latches and corrosion-resistant polyester latches located in corners that provide unobstructed access to enclosure.
 4. Padlock provisions in latch.

F. Provide the NEMA type listed below as required for the environment and use:

1. Type 1: for indoor use to provide a degree of protection to personnel against access to hazardous parts and to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt).
2. Type 3R: for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow); and that will be undamaged by the external formation of ice on the enclosure.
3. Type 4X: for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (windblown dust); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow, splashing water, and hose directed water); that provides an additional level of protection against corrosion; and that will be undamaged by the external formation of ice on the enclosure.
4. Type 12: for indoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt and circulating dust, lint, fibers, and flyings); and to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (dripping and light splashing).

G. Acceptable Manufacturers:

1. Hoffman
2. Thomas & Betts
3. Wiegmann
4. Appleton

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify locations of boxes and outlets prior to rough in. Thoroughly examine the architectural elevations and millwork shop drawings.
- B. If outlets are not specifically shown on elevations and there is millwork or equipment associated with the outlets issue an RFI prior to rough in.

3.02 ENCLOSURE RATINGS AND LOCATIONS

- A. Provide NEMA Ratings as required for specific application. Submit specific NEAM Ratings proposed with electrical equipment, panelboard, device and motor control submittals.

NEMA RATING	LOCATIONS
1	General-purpose indoors and under normal atmospheric conditions.
2	Drip-tight. Similar to Type 1 but with addition of drip shields; used where condensation may be severe such as in cooling and laundry rooms
3	Weather-resistant. Protects against falling dirt and windblown dust, against weather hazards such as rain, sleet and snow, and is undamaged by the formation of ice. Used outdoors on ship docks, in construction work, and in tunnels and subways.
3R	As 3, but <i>omits</i> protection against windblown dust. Utilize for exterior and rooftop locations
3S	As 3, but also operable when laden with ice. Utilize for motor controls located of rooftops or exterior walls subject to snow cover.
4 and 4X	Watertight. Must exclude at least 65 GPM of water from a 1 in nozzle delivered from a distance not less than 10 ft for 5 min. Use outdoors on ship docks, in dairies, in wastewater treatment plants and breweries. X indicates additional corrosion resistance. Provide 4X where specifically called for on plans.
5	Dust-tight. Provided with gaskets or equivalent to exclude dust; use in steel mills and cement plants.
6 and 6P	Submersible. Design depends on specified conditions of pressure and time; submersible in water or oil; used in quarries, mines, and manholes. 6 is temporarily submersible, 6P withstands occasional prolonged submersion. Neither are intended for continuous submersion.
7	Certified and labelled for use in areas with specific hazardous conditions: for indoor use in Class I, Groups A, B, C, and D environments as defined in NFPA standards such as the NEC.
8	Certified and labeled for use in areas with specific hazardous conditions: for indoor and outdoor use in locations classified as Class I, Groups A, B, C, and D as defined in NFPA standards such as the NFPA 70.
9	Certified and labelled for use in areas with specific hazardous conditions: for indoor and outdoor use in locations classified as Class II, Groups E, F, or G as defined in NFPA standards such as the NEC.
10	MSHA. Meets the requirements of the Mine Safety and Health Administration, 30 CFR Part 18 (1978).
11	General-purpose. Protects against the corrosive effects of liquids and gases. Meets drip and corrosion-resistance tests.
12 and 12K	General-purpose. Intended for indoor use, provides some protection against dust, falling dirt, and dripping non-corrosive liquids. Meets drip, dust, and rust resistance tests.
13	General-purpose. Primarily used to provide protection against dust, spraying of water and non-corrosive coolants. Meets oil exclusion and rust resistance design tests

3.03 INSTALLATION

- A. Install boxes in accordance with NECA "Standard of Installation."
- B. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements. Install junction and pull boxes in readily accessible locations. Access to boxes shall not be blocked by equipment, piping, ducts and the like. Provide all necessary junction or pull boxes required due to field conditions and size as required by the National Electrical Code.

- C. Consider location of outlets shown on drawings as approximate only. Study architectural, process piping, mechanical, plumbing, structural, roughing-in, etc., drawings and note surrounding areas in which each outlet is to be located. Locate outlet so that when fixtures, motors, cabinets, equipment, etc., are placed in position, outlet will serve its desired purpose. Where conflicts are noted between drawings, contact Owner's Representative for decision prior to installation. Comply with Article 314 of National Electrical Code relative to position of outlet boxes in finished ceilings and walls. Adjust box location up to 10 feet if required to accommodate intended purpose.
- D. Orient boxes to accommodate wiring devices oriented as specified in Section 262726
- E. Maintain headroom and present neat mechanical appearance.
- F. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- G. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Division 1.
- H. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
- I. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.
- J. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.
- K. Do not install flush mounting box back to back in walls; provide minimum 6" separation.
- L. Do not fasten boxes to ceiling support wires.
- M. Support boxes independently of conduit.
- N. Outlet boxes installed in plaster, gypsum board or wood paneled walls shall be installed with raised plaster covers or raised tile covers. Use gang box where more than one device is mounted together. Do not use sectional box.
- O. Use gang box with plaster ring for single device outlets.
- P. Use cast outlet box in exterior locations exposed to the weather and wet locations.
- Q. Outlet boxes shall be sized to accommodate the wiring device(s) to be installed.
- R. Outlet boxes installed in tile, brick or concrete block walls shall be installed with extra-deep type raised tile covers or shall be 3-1/2" deep boxes with square corners and dimensions to accommodate conductors installed.
- S. Surface ceiling mounted outlet boxes shall be minimum 4" square, 1-1/2" deep, galvanized sheet metal.
- T. Surface wall mounted outlet boxes shall be cast type boxes having threaded or compression type threadless hubs. Exterior boxes shall be cast type with threaded hubs and gasketed cover plates secured by non-ferrous screws.

- U. Floor outlet boxes shall be installed flush with finished floor, adjust level and tilt as required. Where finished floor is terrazzo, provide boxes specifically designed for installation in terrazzo. Where floors are to receive carpet, provide floor outlet with carpet flange.
- V. Unless otherwise noted, mount devices and equipment at heights measured from finished floor to device/equipment centerline as follows:

1. Toggle switches	46"
2. Receptacle outlets (outside resident rooms)	18"
3. Receptacles and communication outlets in resident rooms	24"
4. Do not install receptacle outlets above electric baseboard heaters.	30"
5. Receptacle outlets, hazardous areas	48"
6. Receptacle outlets, weatherproof, above-grade	24"
7. Clock outlets	90"
8. Telephone outlets	18"
9. Telephone outlets, wall mounted	46"
10. T.V. outlet	78"
11. Fire alarm manual station	46"
12. Fire alarm audio/visual	80"
13. Branch circuit panelboards, to top of backbox	72"
14. Distribution panelboards, to top of backbox	72"
15. Terminal cabinets, control cabinets	72"
16. Disconnect switches, motor starters, enclosed circuit breakers	48"
17. Where structural or other interferences prevent compliance with mounting heights listed above, consult Owner's Representative for approval to change location before installation.	

3.04 INTERFACE WITH OTHER PRODUCTS

- A. Coordinate installation and location of outlet box for equipment with equipment supplier and other trades as applicable.
- B. Cut boxes in millwork using methods approve by manufacturer and architect.

3.05 ADJUSTING

- A. Adjust flush mounting outlets to make front flush with finished wall material.
- B. Adjust vertical and horizontal alignment of boxes as required.
- C. Install knockout closures in unused box openings.

3.06 CLEANING

- A. Clean interior of boxes to remove dust, debris, and other material.
- B. Clean exposed surfaces and restore finish.

END OF SECTION 26 0540

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

1.02 SECTION INCLUDES

- A. Circuit Breakers.
- B. Switchboards.
- C. Distribution Panelboards.
- D. Branch Circuit Panelboards.
- E. Retrofit Panelboards.
- F. Transient Voltage Surge Suppression.
- G. Power Monitor.
- H. Disconnect Switches.
- I. Enclosed Circuit Breakers.
- J. Low Voltage Fuses.
- K. Sub-Metering Hardware and Software

1.03 REFERENCES

- A. The equipment referenced herein are designed and manufactured according to the following appropriate specifications.
 - 1. ANSI/NFPA70 - National Electric Code (NEC).
 - 2. ANSI/IEEE C12.1 - Code for Electricity Metering.
 - 3. ANSI C39.1 - Electrical Analog Indicating Instruments.
 - 4. ANSI C57.13 - Instrument Transformers.
 - 5. NEMA AB 1 - Molded Case Circuit Breakers and Molded Case Switches.
 - 6. NEMA KS 1 - Enclosed Switches.
 - 7. NEMA PB 2 - Deadfront Distribution Switchboards, File E8681.
 - 8. NEMA PB 2.1 - Proper Handling, Installation, Operation & Maintenance of Deadfront Switchboards Rated 600V or Less.
 - 9. NEMA PB 2.2 - Application Guide for Ground Fault Protective Devices for Equipment.
 - 10. UL 50 - Cabinets and Boxes.
 - 11. UL 98 - Enclosed and Dead front Switches.
 - 12. UL 489 - Molded Case Circuit Breakers.
 - 13. UL 891 - Dead Front Switchboards.
 - 14. UL 943 - Ground Fault Circuit Interrupters.
 - 15. UL 1053 - Ground Fault Sensing and Relaying Equipment.
 - 16. UL 977 - Fused Power Circuit Devices.
 - 17. CSA 22.2 No. 5 - M1986 Molded Case Circuit Breakers.
 - 18. Federal Specification W-C-375B/Gen - Circuit Breakers, Molded Case, Branch Circuit and Service.
 - 19. Federal Specification W-C-870 - Fuse holders (for plug and enclosed cartridge fuses).
 - 20. Federal Specification W-S-865 - Enclosed Knife Switch.
 - 21. NECA Standard of Installation (published by the National Electrical Contractors Association).
 - 22. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment (published by the International Electrical Testing Association).

23. NFPA 70 - National Electrical Code.

1.04 SUBMITTAL FOR REVIEW

- A. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker arrangement and sizes.
- B. Prior to releasing the service switchgear equipment verify the tenant service requirements with the construction manager and owner. Do not release the switch gear for fabrication until receiving written permission from the owner.

1.05 SUBMITTALS FOR CLOSEOUT

- A. Maintenance Data: Include spare parts listing; source of replacement parts and supplies; and recommended maintenance procedures and intervals.

1.06 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum (10) years' experience.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, protect and handle products in conformance with manufacturer's recommended practices as outline in applicable Installation and Maintenance Manuals.
- B. Each switchboard section shall be delivered in individual shipping splits for ease of handling. They shall be individually wrapped for protection and mounted on shipping skids.
- C. Inspect and report concealed damage to carrier within their required time period.
- D. Store in a clean, dry space. Maintain factory protection and/or provide an additional heavy canvas or heavy plastic cover to protect structure from dirt, water, construction debris, and traffic. Where applicable, provide adequate heating within enclosures to prevent condensation.
- E. Handle in accordance with NEMA PB 2.1 and manufacturer's written instructions. Lift only by lifting means provided for this express purpose. Handle carefully to avoid damage to switchboard internal components, enclosure, and finish.

PART 2 - PRODUCTS

2.01 CIRCUIT BREAKERS

- A. General:
 - 1. Molded case circuit breakers shall be constructed of a glass reinforced insulating material. All current carrying components shall be completely insulated and isolated from the outside of the circuit breaker.
 - 2. Provide an over-center, trip-free handle to provide quick-make, quick-break contact action.
 - 3. Provide multi-pole breakers with common trip.

4. When the circuit breaker has tripped, the handle shall move to a position between the "on" and "off" positions. Provide a visual indication that the circuit breaker has tripped.
 5. The ampere rating shall be clearly marked on the face of the circuit breaker.
 6. Any series rated fuse/circuit breaker installations shall be UL listed as recognized component combinations. Provide a label at the Series rated device reading "Caution - Series Rated System. _____A available". Provide identical replacement of equipment".
 7. Make provisions to add circuit breaker handle locks.
 8. Circuit breakers shall have voltage, ampere, and interrupting ratings as called for on the Panelboard Schedule.
- B. Thermal Magnetic Molded Case Branch Circuit Breakers:
1. Permanent trip unit containing individual thermal and magnetic trip elements.
 2. Thermal trip unit shall be long time, non-adjustable, thermal overload trip.
 3. Magnetic trip unit shall be instantaneous, electro-magnetic trip. Magnetic trip unit shall be adjustable for all frame sizes 225 amperes and larger.
 4. Interchangeable rating plugs shall be provided for all frame sizes 400 amperes and larger.
 5. 60°C terminal temperature rating for circuit breakers rated 125 amperes or below.
 6. 75°C terminal temperature rating for circuit breakers rated above 125 amperes.
 7. All 20 and 30 ampere, single pole circuit breakers shall be UL listed for switching duty.
 8. Circuit breakers shall be plug-on [bolt-on]. I-Line type distribution circuit breakers are acceptable.
 9. Circuit breakers rated 250 amperes and below shall be UL listed HACR type.
 10. Where ground fault circuit breakers are required, provide a shunt trip circuit breaker with a zero sequence sensing ground fault module.
 11. Acceptable Manufacturers:
 - a. Eaton
 - b. Square D.
 - c. General Electric.
 - d. Siemens ITE.

2.10 DISCONNECT SWITCHES

- A. Three pole, single throw, or as called for on the drawings.
- B. Quick-make, quick-break switch operating mechanism.
- C. Heavy-duty, current rating as called for on the drawings, voltage rating as required by the equipment served.
- D. All current carrying parts shall be plated to resist corrosion.

- E. Lugs shall be removable and rated for 75°C temperature rating.
- F. Switch blades shall be visible when the switch is in the open position and the door is open
- G. Switch shall be padlockable in the OFF and ON positions.
- H. Provide fusible switches with rejection type fuse holders and fuses as indicated on the plans or as per fed equipment requirements.
- I. Provisions for a field installable electrical interlock.
- J. Provide external override mechanism to open the disconnect switch door without opening the disconnect switch.
- K. Enclosure shall be steel with gray baked enamel paint.
- L. Provide NEMA type enclosures as called for on the drawings.
- M. NEMA type 1 enclosures shall be equipped with knockouts.
- N. Acceptable Manufacturers:
 - 1. Eaton
 - 2. Square D.
 - 3. General Electric.
 - 4. Siemens ITE.

2.11 LOW VOLTAGE FUSES

- A. All fuses rated 600 volts and below shall be rejection type dual-element, time-delay type. Provide (1) complete set(s) of fuses for all fusible disconnect switches, plus (3) spare fuses of each size. Deliver spare fuses to the Owner and obtain receipt.
- B. Acceptable manufacturers: Fuses 600 amperes and below: Bussman Type FRN-R (300 volts), Type FRS-R (600 volts) or equivalent.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install equipment to coordinate with installation details of other equipment associated with the power distribution system.
- B. Provide miscellaneous bolts, washers, nuts, clips, lock washers, small hardware, etc., of durium or equal rust resistant material, to make a complete installation.
- C. Provide complete installation in strict accordance with the equipment manufacturer's instructions, drawings and recommendations and as called for.
- D. In the event of conflict, discrepancy or difference between manufacturer's instructions and Contract Documents, the more stringent requirements shall apply.
- E. Unload, move, handle, set in place, install, erect, assemble, connect, test, and operate, etc. all items of electrical equipment as required.
- F. Provide rigging to unload, move, transport, set in place, erect, etc. the switchboards.
- G. Provide grounding as called for.
- H. Provide minimum working clearance as described in NEC Article 110-26 and 110-34 for all electric equipment.

- I. Provide additional working or aisle clearance as called for.
- J. Verify cable/lug sizes for terminations. Where a feeder is sized larger than the lug, provide in-line splice to reduce conductor size to match equipment or breaker terminations.
- K. Provide conduit lengths and types, equipment information and breaker information to the engineer after rough in is complete. The engineer will provide a coordination study and proper breaker settings,

3.02 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Perform inspections and tests listed in NETA ATS, Section 7.4 for switches, and Section 7.5 for circuit breakers.

3.03 ADJUSTING

- A. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads to within 20% of each other. Maintain proper phasing for multi-wire branch circuits.

END OF SECTION 26 2400

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

1.02 SECTION INCLUDES

- A. Wall switches.
- B. Receptacles.
- C. Cover plates.
- D. Occupancy Sensors.

1.03 REFERENCES

- A. NECA - Standard of Installation.
- B. NEMA WD 1 - General Requirements for Wiring Devices.
- C. NEMA WD 6 - Wiring Device - Dimensional Requirements.
- D. NFPA 70 - National Electrical Code.

1.04 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum (3) years' experience.

1.05 COORDINATION

- A. The contractor and lighting fixture manufacturer are responsible for coordinating and guaranteeing that the driver/ballast dimmer combination will dim the driver or ballast to 1% or 10% as applicable. Utilize design make or acceptable manufacturers where possible. Provide equivalent devices from alternate manufacturers where required.

1.06 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Provide Products listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Color of devices shall be as selected by the Architect.
- B. Receptacles connected to emergency circuits must be Red
- C. Where devices are added to existing facilities the color shall match other existing devices in the room or vicinity.
- D. All devices must be specification grade at a minimum.
- E. Where devices are ganged together provide multi-device cover plates configured as required.
- F. Design Makes are from Pass & Seymour. Equivalent products from the following manufacturers are acceptable.
 - 1. Hubbell.
 - 2. Leviton.
 - 3. Lutron.

2.02 SPECIFICATION GRADE SWITCHES

- A. Specification Grade one-piece brass alloy contact arm for reliable electrical performance.
- B. One-piece steel strap with integral ground is plated for corrosion resistance.
- C. High strength thermoplastic polycarbonate toggle resists breaking and chipping under heavy abuse.
- D. Heavy-duty toggle bumpers for smooth and quiet operation.
- E. Back body made of glass-reinforced nylon.
- F. Locking support provides resistance to face and back body separation.
- G. Available with side wire or external screw-pressure-plate back and side wire models capable of accepting #14 - #10 AWG copper or copper-clad wire.
- H. Cam designed for fast make with positive break action to minimize arcing and prolong switch life.
- I. Oversized silver alloy contacts for longer dependable switch life.
- J. Provide double pole, single pole, three way or four way as called for or required.
- K. 120/277V, 20 Ampere rated.
- L. Design Make: Pass and Seymour CSB series.

2.03 KEY SWITCHES

- A. 120-277 VAC, 20 ampere rated.
- B. Locking type. Provide (1) key per switch, all keyed alike.
- C. Side or back wired.
- D. Quiet operation with key removable in both positions.
- E. Single pole, three-way, and four way as called for on the plans.
- F. Design Make: Pass & Seymour PS20AC series.

2.04 MOMENTARY SWITCHES

- A. 120-277 VAC, 20 ampere rated.
- B. Momentary contact.
- C. 2 circuit, 3 position, "center off".
- D. Side wired.
- E. Quiet operation.
- F. Color as selected by the architect.
- G. Design Make: Pass & Seymour TM811DTMO.

2.05 DIMMERS

- A. Two Wire Fluorescent or LED:
 - 1. For use with 2 wire 120V and 277V dimming ballasts and drivers.
 - 2. Field configurable wall plate system.
 - 3. Labeling system.
 - 4. Adjustable low end output voltage.
 - 5. Minimum of de-rating when ganged.
 - 6. Single pole slide-to-OFF or single pole/3-way as required.
 - 7. 1200 Watt rating.
 - 8. Design Make: CDFB10 Series.
- B. Four Wire Fluorescent and LED:
 - 1. For use with 0-10V, 4 wire, 120V and 277V dimming ballasts and drivers.
 - 2. Field configurable wall plate system.
 - 3. Labeling system.
 - 4. Adjustable low end output voltage.
 - 5. Rugged construction.
 - 6. Minimum of de-rating when ganged.
 - 7. Provide with power pack.
 - 8. Single pole slide-to-OFF and single pole/3-way as required.
 - 9. Design Make: Pass & Seymour CD4FB Series.
- C. Three Wire Fluorescent and LED:
 - 1. For use with 3 wire 120V and 277V dimming ballasts and drivers.
 - 2. Field configurable wall plate system.
 - 3. Labeling system.
 - 4. Adjustable low end output voltage.
 - 5. Rugged construction.
 - 6. Minimum of de-rating when ganged.
 - 7. Single pole slide-to-OFF and single pole/3-way preset models.
 - 8. Design Make: Pass & Seymour CD3FB10 series.

2.06 OCCUPANCY SENSORS

- A. Ceiling Mounted Sensors:
 - 1. Advanced signal processing circuitry helps to eliminate false ONs.
 - 2. Utilizes advanced, omni-directional (360 degrees), Doppler technology for reliable occupancy detection.

3. Angled transmitter and receiver pairs help optimize sensitivity while eliminating unwanted detection from ceiling air movement.
4. Digital DIP switch time delay (15 seconds to 30 minutes).
5. LED indicates occupancy detection.
6. Reliable solid-state construction.
7. Temperature and humidity resistant 32 kHz receivers.
8. Mounts to ceiling tiles or box.
9. Units per power pack: up to 4.
10. UL listed.
11. 5-year warranty.
12. Design Make: Pass & Seymour;
 - a. CSU600 (rooms less 500 square feet).
 - b. CSU1100 (rooms 500-1000 square feet).
 - c. CSU2200 (rooms 1000-2000square feet).

B. Vacancy Sensor:

1. Manual-ON operation. Auto adjustable time delays: automatic, fixed (5, 10, 15, 20, 25 or 30 minutes), walk-through, test-mode.
2. Selectable time delay automatically adjusts. Selectable walk-through mode turns lights off three minutes after the room is initially occupied if no motion is detected after the first 30 seconds. Selectable test mode allows quick and easy adjustments.
3. Selectable audible alert for impending shutoff.
4. LED indicating occupancy detection.
5. Built-in light level sensing with simple, one-step setup.
6. Override mode allows sensor to operate as a service switch in the event of a failure. NEMA WD 7 guideline utilized for coverage testing. Sensitivity adjustment: PIR (high/low).
7. Coverage: 180 degrees, up to 1050 sq. ft.; major motion 35' x 30'; minor motion 20' x 15'.
8. 5-year warranty.
9. Loads: Incandescent, fluorescent, compact fluorescent (CFL), magnetic low-voltage (MLV) and electronic low-voltage (ELV), 1/6 hp.
10. Design Make: Pass & Seymour OS300SW.

C. Dual Technology Wall Switch Sensor:

1. Dual Technology Passive Infrared & Ultrasonic.
2. PIR Adjustment Two Settings – Maximum (100%) and Minimum (50%).
3. Ultrasonic Adjustment Ultrasonic sensitivity can be adjusted using a trimpot.
4. Output frequency of transmitter is fixed at 40kHz.
5. Time Delay Adjustable 5 min. to 30 min.
6. Light Level Adjustment Yes, 8fc to 180+fc.
7. Spectral Response 6 to 14 μ m.
8. Field of View 88°;110° Vertical, 360° Horizontal.
9. Frequency 50-60 Hz.

10. Coverage 1050 square feet, 180°.
11. Indicator Light(s) Red & Green LEDs.
12. Sensor Type Multi-directional transmitter/receiver with quartz oscillator.
13. Alerts Selectable, Audible.
14. Pass & Seymour WDT Series.

D. Dimmable wall switch Occupancy/Vacancy Sensor

1. For use with 0-10V, 4 wire, 120V and 277V dimming ballasts and drivers.
2. Pressing and holding the UP button will ramp the lights up to the maximum value as determined by the high trim setting. Pressing and holding the DOWN button will dim the lights down to the minimum value as determined by the low trim setting. By default, the values are set at 100% (10v) for high trim and OFF (0v) for low trim.
3. Automatic-ON (Occupancy) or Manual-ON (Vacancy) operation. Refer to plans for Occupancy and Vacancy Sensor requirements and adjust dip switches accordingly to either Automatic-ON (Occupancy) or Manual-ON (Vacancy).
4. Adjustable time delay from 3, 5, 15 and 30 minutes.
5. Multi-way wiring available up to 4 sensors. All switches can sense each other's dimming events and respond accordingly.
6. 180 degree field of view for use in spaces no larger than 12' x 15'.
7. Design Make: Pass & Seymour PW-311.

E. Power Packs:

1. Provide power packs for low voltage control devices.
2. Universal Voltage Pack with 24 VDC operating voltage to low-voltage occupancy sensors and similar controls.
3. High-efficiency power supply and a high-current relay. Transformer with a primary high voltage input, and a secondary low-voltage output (24 VDC, 114 mA, with relay connected)
4. Secondary output will turn the connected load on and off automatically based on device input.
5. Secondary output will control 24V dampers where called for. Coordinate the exact requirements and location of power pack with the mechanical contractor. Provide raceways as required by the mechanical contractor.
6. When the lighting system detects motion or inadequate ambient light, sensor shall electrically close an internal circuit which sends 24 VDC back to the Power Pack.
7. Design Make Pass & Seymour PWP series.

2.07 SPECIFICATION GRADE DUPLEX RECEPTACLES

- A. Corrosion-resistant, plated steel strap locked in to face and back body to resist pulling away from face/body assembly.
- B. 0.032 inch thick, brass, triple-wipe power contacts for lasting retention.
- C. Easily accessed break-off, line-contact connecting tab for fast, easy split-circuit wiring.
- D. Impact-resistant nylon face and thermoplastic back body.
- E. Accepts #14 - #10 AWG solid or stranded copper or copper-clad wire.
- F. Terminal compartments isolated from each other for positive conductor containment.
- G. Tri-drive terminal and mounting screws.
- H. Auto-ground clip assures positive ground.
- I. Design Make: Pass & Seymour CR20 Series.

2.08 TAMPER RESISTANT SPECIFICATION GRADE DUPLEX RECEPTACLES

- A. Dual mechanical shutter system to help prevent insertions of foreign objects.
- B. Two drive screws anchor strap to back body and face where abrupt removal torque is greatest.
- C. 0.032 inch thick brass triple-wipe power contacts for lasting retention.
- D. Corrosion-resistant plated steel strap is locked in to the face and back body to resist pulling away from the face/body assembly.
- E. Auto-ground clip for positive ground.
- F. Easily accessed break-off line-contact connecting tab for fast and easy split-circuit wiring.
- G. Backed-out tri-drive steel terminal screws.
- H. Side wire capability.
- I. Design Make: Pass & Seymour TR20 series.

2.10 GFCI RECEPTACLES

- A. 20 ampere rated.
- B. No exposed terminals to a finger safe application before, during, and after installation.
- C. Built-in connector features large brass terminal blades to ensure consistent, reliable electrical connections to Plug Connector.
- D. Protection: if critical components are damaged and ground fault protection is lost, power to receptacle is disconnected.
- E. Prevents line-load reversal miswire: no power to the face or downstream receptacles if wired incorrectly.
- F. FSUL Listed (Federal Specification WC596).
- G. Exceeds UL943 voltage surge requirements; survives 100x the required UL 3kA/6kV voltage surge test cycles.

- H. Trip indicator light (red LED).
- I. Mounting screws are shipped captive in the device and wall plate for easier installation.
- J. High-impact-resistant thermoplastic construction.
- K. Zinc-plated steel mounting strap.
- L. Button colors matching the device face.
- M. Dual-direction test and reset buttons.
- N. Class A rated GFCI.
- O. Provide LED type where indicated for healthcare applications.
- P. Design Make: Pass & Seymour PT2095 & Pass & Seymour PT2095HG series

2.11 COVER PLATES

- A. Nylon Cover Plates:
 - 1. Smooth unbreakable nylon construction. (thermoplastic type are not acceptable)
 - 2. Color shall be ivory
 - 3. Flush mounting plates shall be beveled with smooth rolled outer edge.
 - 4. Surface mounting plates shall be beveled and pressure formed for smooth edge to fit box.
 - 5. Where two-gang boxes are required for single gang devices. Provide special plates with device opening in one gang and second gang blank.
- B. Weatherproof Cover Plates:
 - 1. Weatherproof plastic in-use cover
 - 2. Horizontal/vertical cover in clear MM410C that safely covers any electrical outlet
 - 3. Universal Fit to enable same product for all types of receptacles.
 - 4. Attached gasket and mounting hardware
 - 5. Meet or exceeds OSHA and NEC (article 406.8[b][1] wet location requirements with the cord plugged into the receptacle.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to installation verify that outlet boxes are cut in at proper height; that wall openings are neatly cut and will be completely covered by wall plates.
- B. If wall openings were made by general trades notify that contractor and owners representative and direct the cutting and patching requirements. If the openings were made by electrical contractor cut and patch opening using a qualified trades person.
- C. Prior to installation of backbox verify height with architectural elevations. If the device is not shown confirm the height with the architect and engineer. If conflicts arrive and the architect has not been consulted the box shall be relocated at no cost to the owner.
- D. Exact locations and heights of devices in resident rooms will be determined as part of the typical room mock requirement described in 260010.

3.02 OUTLET REQUIREMENTS

- A. Specific outlet types are not called out on the floor plans. Provide outlets as called for as follows:
- B.

<u>Location</u>	<u>Type</u>
C. Common Spaces	Tamper Proof
D. Visitor and Staff Common Spaces	Specification Grade
E. Maintenance and Administrative	Specification Grade
F. Corridors	
G. Mechanical Spaces	Specification Grade
H. Storage Rooms	Specification Grade
I. Offices	Specification Grade with USB Charger
J. Exterior	Specification Grade

3.03 INSTALLATION

- A. Install in accordance with NECA "Standard of Installation."
- B. Install devices plumb and level.
- C. Do not install devices back-to-back
- D. Provide fire proof putty around all device back boxes in resident rooms and other rated walls.
- E. Install switches with OFF position down.
- F. Install wall dimmers to achieve full rating specified and indicated after de-rating for ganging as instructed by manufacturer.
- G. Do not share neutral conductor on load side of dimmers.
- H. Install receptacles with grounding pole on top.
- I. Connect wiring device grounding terminal to outlet box with bonding jumper and to branch circuit equipment grounding conductor.

- J. Install decorative plates on switch, receptacle, and blank outlets in finished areas.
- K. Connect wiring devices by wrapping conductor around screw terminal.
- L. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas and above accessible ceilings.
- M. Install protective rings on active flush cover service fittings.
- N. When receptacle is mounted horizontally, neutral pole shall be on top.
- O. Provide extension rings to bring outlet boxes flush with finished surface.
- P. Provide receptacles at locations indicated and where required by special equipment with plug connection. Mount at height 18" AFF; unless noted otherwise on drawings.
- Q. Receptacles shall not be installed back to back unless otherwise noted.
- R. Mount receptacles in offices, corridors, common spaces and utility spaces at 18" AFF to center.
- S. Mount receptacles in patient rooms at 24" AFF to center.
- T. Where "AC" is noted on plans adjacent to a wiring device refer to the architectural elevations and install so outlet is above backsplash. If it is not clear on the elevation issue a request for information prior to roughing.

3.04 FIELD QUALITY CONTROL

- A. Inspect each wiring device for defects.
- B. Operate each wall switch with circuit energized and verify proper operation.
- C. Verify that each receptacle device is energized.
- D. Test all receptacles for proper voltage, grounding and polarity.
- E. Test all GFCI receptacles for proper voltage, polarity, grounding, and verify the receptacle trips at 6 milliamperes or less.
- F. Test all receptacles for polarity, ground continuity and ground blade retention force per NFPA 99 Chapter 3-3 Section 3-3.3.3.
- G. Rewire receptacles as required until receptacles test properly.
- H. Clean exposed surfaces to remove splatters and restore finish.

3.05 FUNCTIONAL TESTING

- A. Where Dimmers, Occupancy Sensors, time switches, programmable schedule controls, photo sensors are installed, the following procedures shall be performed:
 - 1. Confirm that the placement, sensitivity and time-out adjustments for occupant sensors yield acceptable performance.
 - 2. Confirm that the time switches and programmable schedule controls are programmable to turn the lights off.
 - 3. Confirm that the placement and sensitivity adjustments for the photo sensor controls reduce electric light based on the amount of usable daylight in the space as specified.
- B. Contractor shall submit a written report to Architect, copy to Engineer, on results of each functional test on equipment installed. Report shall contain owner's representative's signature.

3.06 SWITCHES

- A. Provide switches to control outlets, appliances, lighting, etc. as indicated. Mount 48" above finished floor unless noted otherwise.
- B. Do not feed thru local switches unless specifically noted.
- C. Where more than one switch is indicated at one location on 120 volt circuits mount in gangs under common plate.
- D. Locate switches on strike side of door. If switch is indicated at location which would be concealed (behind equipment, etc.) or not on strike side of door, obtain approval of Architect before installation.
- E. Switches shall not be installed back to back unless otherwise noted.

3.07 WALL PLATES

- A. Provide at locations indicated with size openings required for devices indicated.
- B. Multi-gang switches, receptacles, etc. shall be in a common one-piece plate.
- C. Coordinate the configuration of multi-gang switches of four or more with the architect or construction manager prior to rough in

END OF SECTION 26 2726

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

1.02 SECTION INCLUDES

- A. Interior luminaires and accessories.
- B. Exit signs.
- C. Emergency lights
- D. LED drivers and light engines.
- E. Power extenders.
- F. Generator transfer devices.

1.03 STANDARDS REFERENCES

- A. Design Lighting Consortium (DLC).
- B. Energy Star.
- C. NEMA Compliance: Comply with applicable requirements of NEMA Standards Pub. No. LE-1 and LE-2 pertaining to lighting equipment.
- D. ECCC of NYS Compliance: Comply with applicable requirements of the Energy Conservation Construction Code of NYS, Section 805.
- E. ANSI 132.1.
- F. ANSI C78.379: Electric Lamps Incandescent and High Intensity Discharge Reflector Lamps Classification of Beam Patterns.
- G. ANSI C82.1: Ballasts for Fluorescent Lamps Specifications.
- H. ANSI C82.4: Ballasts for High Intensity Discharge and Low Pressure Sodium Lamps (Multiple Supply Type).
- I. ANSI/UL Compliance: Comply with ANSI/UL standards pertaining to lighting fixtures for hazardous locations.
- J. UL Compliance: Provide lighting fixtures which have been UL listed and labeled.
- K. CBM Labels: Provide fluorescent lamp ballasts which comply with Certified Ballast Manufacturer's Association standards and carry the CBM label.
- L. FCC Part 15
- M. IEEE C62.41: Guide for Surge Voltages in Low-Voltage AC Power Circuits.
- N. NFPA 70: National Electrical Code.

- O. NFPA 101: Life Safety Code.
- P. Testing Standards: IESLM79- 08.
- Q. UL1449 3rd Edition Type 4-Surge Protective Devices.
- R. RoHS Compliant (Restriction of Use of Hazardous Substances).

1.04 SUBMITTALS FOR REVIEW

- A. Provide light fixtures and controls for mocking up each of three typical rooms. Fixtures for these areas will not obtain a final approval until these mock ups receive final approval.
- B. Product Data: Provide dimensions, ratings, and performance data. Information on each fixture shall include:
 - 1. Manufacturer and Catalog Number.
 - 2. Dimensioned Construction Drawing(s).
 - 3. Standard Catalog "Cut" Sheet with options highlighted.
 - 4. Photometric Data.
 - 5. Ballast or Driver specifications.
 - 6. Socket Type.
 - 7. Lamp Type.
 - 8. Energy star compliance.
 - 9. CEE compliance.
- C. Provide cut sheets and wiring schematics for low voltage controls.

1.05 QUALITY ASSURANCE

- A. Lighting fixtures shall be standard products of manufacturers regularly engaged in the manufacture of the specific type lighting fixtures specified and shall be the manufacturer's latest standard design that complies with specification requirements. Firms installing the fixtures shall have a minimum of (5) years of successful installation experience on projects with interior lighting work similar to the requirements of this project.
- B. Verify the availability of all fixtures proposed to be used in the execution of the work prior to submitting for approval. The discontinuance of production of any fixture after such approval has been granted shall not relieve the Contractor from furnishing an approved fixture of comparable quality and design at no additional cost
- C. Lighting fixtures shall be as specified in the "Luminaire Schedule." Fixture types, characteristics, photometrics, finishes, etc., correspond to the first manufacturer, and associated catalog number, listed in the "Luminaire Schedule." Provide a sample fixture from the factory for any products not listed as acceptable for approval. The Owner's Representative reserves the right to disapprove any fixture type submitted which is not equal in quality, appearance or performance to the fixture specified.
- D. Drivers and LED boards: The manufacturer shall provide written warranty against defects in material or workmanship, including replacement, for five years from date of manufacture. Drivers and LED boards shall be manufactured in an ISO 9002 Certified Facility.

1.06 SPARE ATTIC STOCK

- A. Provide (5) LED drivers. For each type of fixture with over 30 fixtures

1.07 CONTROLS AND DRIVERS

- A. The drawings indicate 0-10V LED dimming drivers with power extenders and three wire dimmers (hot, neutral, load) in classrooms, assembly spaces and offices. The contractor may provide variations such as 2 or 3 wire dimming drivers without extenders or 0-10V dimmers without power extenders.
- B. The contractor shall provide all branch/switch circuit and control wiring the approved dimming controls.
- C. Where alternate arrangements are proposed the contractor and his lighting representative shall be responsible for selecting and providing proper driver and dimming combinations subject to the following physical and performance criteria:
 - 1. All fixtures must dim smoothly to a minimum of 10% of total lumen output with no visible flicker.
 - 2. Dimmers must fit in existing back boxes for 1995 renovation areas. This includes two dimmers side by side in two gang box for classrooms and assembly spaces.

PART 2 - PRODUCTS

2.01 LUMINAIRES

- A. Furnish Products from acceptable manufacturers listed in the light fixture schedule.
- B. Wattages for LED fixtures are maximum allowed. Where recently released products have decreased wattage for same lumen output, provide the decreased wattage version.
- C. Lenses as called for on schedule meeting the following applicable requirements:
 - 1. Extruded 100 percent virgin acrylic material with a minimum weight of ten ounces per square foot.
 - 2. Type 12: Clear material with 0.125 inch overall thickness with .080 Inch penetration comprised of 3/16 inch square based female cones aligned 45 degrees to the length and width of the panel.
 - 3. Type 19: Clear material with 0.156 inch overall thickness with 0.080 inch penetration comprised of 3/16 inch square based male cones aligned parallel and perpendicular to the length and width of the panel.
 - 4. White Matte: White material with 0.125 inch overall thickness.
 - 5. While Overlay: White material with 0.040 inch overall thickness.
 - 6. The maximum deflection at the center of a 2 foot x 4 foot lens shall be no greater than 0.250 inch. Arched or warped lenses will not be accepted.
- E. Housings:
 - 1. Provide steel, extruded aluminum or spun aluminum as called for on the fixture schedule.

2.02 EXIT SIGNS

- A. Manufacturers:
 - 1. Refer to lighting fixture schedule on the drawings for manufacturer and specifications.
 - 2. Unless otherwise noted on drawings or panel schedules, circuit fixture to nearest un-switched power source. Update panel directory in cover of panel.
- B. Electrical Characteristics:
 - 1. LED electroluminescent type for 120/277 volt supply.
 - 2. Use two LED strips for indirect illumination of the face electroluminescent lamp for direct illumination of the face. Meet or exceed illumination requirements of NFPA-101, and all of the requirements of UL924.

2.03 EMERGENCY LIGHTS

- A. Manufacturers: Refer to lighting fixture schedule on the drawings for manufacturer and specifications.
- B. Unless otherwise noted on drawings or panel schedules, circuit fixture to nearest un-switched power source. Update panel directory in cover of panel.
- C. Premium sealed maintenance free, 6V lithium ion batteries with sufficient capacity to operate the lamps for 1-1/2 hours to an end voltage of 87-1/2% of nominal battery voltage. Three stage charger (constant current, equalize and float charge), relay, low voltage battery disconnect and brownout protection circuits.

2.04 LED DRIVERS AND LIGHT ENGINES

- A. Acceptable Manufacturers:
 - 1. Philips.
 - 2. Lutron.
 - 3. Microsemi.
 - 4. Approved Equal.
- B. General Requirements:
 - 1. The LED driver and board shall have a (5) year warranty.
 - 2. LED lamps shall have a minimum rated life 50,000 hours.
 - 3. LED driver board combinations shall deliver a minimum of 90 lumens/watt.
 - 4. Shall be rated dual voltage 120/277V.
 - 5. Must have surge suppression protection suitable for use in permanently connected products meeting UL1449 3rd Edition Type 4.
 - 6. Must meet ANSI C62.41 Category A surge protection standards up to and including 4 kV.

7. Light engine shall provide 4,000K color temperature.

C. General LED Driver Requirements:

1. LED Driver shall be installed inside an electrical enclosure.
2. Wiring inside electrical enclosure shall have a 600V/105°C rating or higher.
3. Must tolerate sustained open circuit and short circuit output conditions without damage.
4. Maximum allowable case temperature of 70°C.
5. Must comply with the requirements of UL, FCC, ENEC, CE, CQC.
6. The input and output connections shall be factory wiring only. Connection to supply mains shall be determined in the end product.
7. Temperature tested in a 55°C ambient, with the maximum temperatures on the enclosure of 73.1°C.
8. Suitable for use in dry and damp locations.
9. Installed as a built-in component of the end product. The unit shall be installed in compliance with the enclosure, mounting, spacing, casualty, temperature, and segregation requirements of the end product application.
10. The transformer shall employ a Class 130(B) insulation system.
11. Spacing in accordance with the requirements of the Standard for Light Emitting Diode (LED) Equipment for Use in Lighting Products, UL 8750, First Edition, Clause 7.8.3 and Table 7.4.

D. 0-10V Dimming Drivers:

1. Physical Characteristics:
 - a. LED Driver shall be installed inside an electrical enclosure.
 - b. Wiring inside electrical enclosure shall comply with 600V/105°C rating or higher.
2. Performance:
 - a. Certified by UL Class2 for use in a dry or damp location.
 - b. Class A sound rating.
 - c. Minimum operating ambient temperature of -40°C.
 - d. Life expectancy of 50,000 hours at Tcase of $\leq 70^{\circ}\text{C}$.
 - e. Life expectancy of 100,000 hours at Tcase of $\leq 62^{\circ}\text{C}$.
 - f. Maximum self rise of 25°C in open air without heat sink.
 - g. Maximum allowable case temperature is 75°C.
 - h. Failure rate $\leq 0.01\%$ per 1,000 hours at Tcase $\leq 70^{\circ}\text{C}$.
 - i. Failure rate of 0.01% - 0.02% per 1,000 hours at Tcase of 70°C - 80°C.
 - j. Must tolerate sustained open circuit and short circuit output conditions without damage.
 - k. Comply with FCC rules and regulations, as per Title 47 CFR Part 15 Non-Consumer (Class A).
 - l. Minimum Dimming range 100-10% or 100-1% as called for.

E. Three (3) Wire Dimming Drivers:

1. Minimum Dimming Range: 100% to 10%.
2. Operating Voltage: 120 – 277 V~ at 50/60 Hz.
3. Rated lifetime of 50,000 hours @ $t_c = 65^\circ\text{C}$.
4. LEDs turn on to any dimmed level without going to full brightness.
5. Nonvolatile memory to restore all driver settings after power failure.
6. Power Factor: > 0.90 at 40 W.
7. Standby Power Consumption: < 1.0 W.
8. Total Harmonic Distortion (THD): $< 20\%$ at 40 W.
9. Inrush Current: < 2 A.
10. Inrush current limiting circuitry to eliminate circuit breaker tripping, switch arcing and relay failure.
11. Turn-on Time: ≤ 1 second.
12. PWM Dimming Frequency: 550 Hz.

F. Two (2) Wire Dimming Drivers:

1. Dimming Range: 100% to 1%.
2. Operating Voltage: 120 V~ at 50/60 Hz (2-Wire Forward Phase Control).
3. Rated lifetime of 50,000 hours @ $t_c = 65^\circ\text{C}$.
4. LEDs turn on to any dimmed level without going to full brightness.
5. Nonvolatile memory restores all driver settings after power failure.
6. Power Factor: > 0.90 at 40 W.
7. Total Harmonic Distortion (THD): $< 20\%$ at 40 W.
8. Inrush Current: < 2 A
9. Inrush current limiting circuitry to eliminate circuit breaker tripping, switch arcing and relay failure.
10. Turn-on time: ≤ 1 second.
11. PWM Dimming Frequency: 550 Hz.

2.05 GENERATOR TRANSFER DEVICE

- A. Compliance with Underwriters Laboratories in accordance with the standards set forth in UL 924, "Emergency Lighting and Power Equipment," and UL Listed for factory or field installation.
- B. Able to convert and control up to (20) regular light fixtures to approved emergency lights.
- C. Automatic Diagnostic Feature that tests fixtures regularly.
- D. Electrical Characteristics:
1. 120/277
 2. 120V or 277V Sensing Input.
 3. 120V or 277V Load.
 4. 20 Amp Ballast Load Rating.
 5. 1800W Load Rating at 120V.
 6. 1500W Load Rating at 277V.
 7. N.C. Contact.
 8. 0-10V Dimming compatibility

E. Mechanical Characteristics:

1. Mounts in 4-11/16" Junction Box with single gang plaster ring.
2. UL94-5VA Rated
3. Temperature: 32°F - 140°F.
4. Color - White.

F. Design Make: LVS Controls EPC-1-D Series

G. Acceptable Manufacturers:

1. LVS Controls.
2. Bodine.
3. DualLite.

2.06 POWER EXTENDER

A. Provide with low-voltage 0-10V dimmable LED drivers and electronic ballasts, to emulate the characteristics of the dimmer that it is connected to in terms of dimming range and resolution.

B. Electric Characteristics:

1. Input Voltage: 108VAC to 305VAC, 60Hz.
2. Load Rating: 20A-2400VA @120VAC, 5500VA @277VAC fluorescent.
3. Power Consumption: 6W @120VAC max, 18W @277VAC max.
4. Dimmer Input: 120V 60Hz.
5. Output Ballast Control: 0-10VDC.
6. Testing/Code Compliance: UL Listed, CSA Certified and FCC Part 15.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Locate recessed ceiling luminaires as indicated on reflected ceiling plan.
- B. Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other. Secure to prevent movement.
- C. Exposed Grid Ceilings: Fasten surface mounted luminaires to ceiling grid members using existing hardware.
- D. Install recessed luminaires to permit removal from below.
- E. Install recessed luminaires using accessories and fire stopping materials to meet regulatory requirements for fire rating.
- F. Install clips to secure recessed grid-supported luminaires in place.
- G. Install accessories furnished with each luminaire.
- H. Connect luminaires, emergency lighting units, and exit signs to branch circuit outlets provided under section 260519 using flexible conduit.
- I. Bond products and metal accessories to branch circuit equipment grounding conductor.

- J. Install specified lamps in each exit sign, and luminaire.
- K. General:
1. Install interior lighting fixtures at locations and heights as indicated, in accordance with fixture manufacturer's written instructions, applicable requirements of NEC, NECA's 'Standard of Installation', NEMA standards, and with recognized industry practices.
 2. Provide fixtures and/or fixture outlet boxes with hangers to properly support fixture weight. Submit design of hangers, method of fastening, other than indicated or specified herein, for review by Engineer.
 3. Make installation such that the fixture is free of finger marks, flaws, scratches, dents or other imperfections.
 4. Arrangement:
 - a. Align edges of fixtures with walls or other building elements. Where indicated by dimensions or indicated on drawings, maintain indicated arrangement.
 - b. For wall to wall installed light fixtures, field measure length required after completion of the wall construction and prior to ordering the light fixtures. Fabricate in largest lengths allowable.
 5. Recessed Mounting:
 - a. Verify ceiling construction and material prior to ordering light fixtures. Provide plaster frames for plaster ceilings and flanged frames for drywall ceiling. Provide necessary mounting hardware and accessories to adapt fixture to ceiling construction. Provide gaskets, trims, flanges, etc. as required to prevent light leaks around trim. Where installing 'lay-in' type fixtures, provide galvanized supports to the building structure, independent of the ceiling system, at all four corners of the fixture. Each support shall be capable of supporting 100 pounds and each wire shall be a minimum of 12 AWG mild steel. Provide saddle hangers or tie bars attached to runners or between crossbars of ceiling systems as a safety measure. Provide mounting splines or other positive means of maintaining alignment and rigidity. Use a minimum of (2) supports independent of the ceiling for each point source type fixture.
 6. Stem Mounting:
 - a. Use self-aligning hangers in canopies for hanging fixtures true to vertical. Do not deface ceiling or walls. Locate hangers at intersections of joints or at centers of blocks in rooms with patterned type ceiling materials such as acoustic tile. Use hangers capable of supporting four times fixture weight. Align continuous rows of fixtures maintaining fixtures level without rotation about the longitudinal axis. Rigidly support outlet box independent of ceiling system from building structure. Where obstructions prevent direct support of outlet, provide offset or trapeze hangers of outlet box. Stem shall be supported directly from building structure on centers as called for by the manufacturer. There shall be a minimum of (2) stems per individual four-foot light fixture, and (3) stems per individual eight foot light fixture for steel fixtures. Extruded aluminum fixtures shall have hangers as called for by the manufacturer.

7. Surface Ceiling Mounting:
 - a. Mount surface fixtures tight to surface without distorting surface. Space fixtures in continuous rows to correspond to ceiling joint intersections. Continuous row fixtures may be fed by a single outlet where fixtures contain approved wireways and suitable wiring is used. Provide hangers for each fixture, each rated to support four times the fixture weight. Provide offset or trapeze hangers where required. Supports shall be provided on a maximum of 4 foot centers with a minimum of (2) hangers per individual four foot light fixture and (3) hangers per individual eight foot light fixture. Hangers shall be supported from the building structure and independently from ceiling system or other building services.
 - b. Fasten fixtures securely to structural supports.

3.02 FIELD QUALITY CONTROL

- A. Operate each luminaire after installation and connection. Inspect for proper connection and operation.
- B. Examine areas and conditions, under which lighting fixtures are to be installed, and substrate for supporting lighting fixtures. Notify Architect in writing of conditions detrimental to proper completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected.
- C. Refer to respective reflected ceiling plan for each area. Reflected ceiling plans indicate proper light fixture location only. Coordinate the proper arrangement with all other ceiling mounted devices. Contract Documents indicate light fixture characteristics (type), quality, quantity, etc. Verify with the ceiling supplier design of actual ceiling installed in each area and coordinate compatible fixture flange.

3.03 ADJUSTING

- A. Aim and adjust luminaires.
- B. Position exit sign directional arrows as indicated.

3.04 CLEANING

- A. Clean electrical parts to remove conductive and deleterious materials.
- B. Remove dirt and debris from enclosures.
- C. Clean photometric control surfaces as recommended by manufacturer.
- D. Clean finishes and touch up damage.

3.05 REMOVAL OF BALLAST IN EXISTING LIGHT FIXTURES

- A. Assume ballast contains PCB or DEHP materials unless labeled otherwise, or test samples to show materials are not PCB or DEHP; submit test report. Remove all ballast from existing light fixtures indicated on contract documents. Dispose of all ballast which do not have non-PCB or DEHP labels in approved containers and pay all costs to have containers taken to EPA approved incinerators and disposed of per all EPA and OSHA regulations. Follow all EPA and OSHA regulations for transporting containers and materials. If ballast has leaked in existing fixture, remove material deposited in fixture and dispose of those material as listed above. Provide Certificate of Disposal and all associated paperwork to Owner's representative.

3.06 REMOVAL OF LAMPS IN EXISTING LIGHT FIXTURES

- A. Assume all fluorescent lamps contain Mercury materials unless labeled otherwise, or test samples to show materials do not contain Mercury and submit test report. Remove all lamps from existing light fixtures indicated on contract documents. Dispose of all lamps which do not have non-Mercury labels in compliance with the requirements of the New York State Department of Environmental Conservation and all applicable Federal Laws. Follow all regulations for transporting materials. Provide Certificate of Disposal and all associated paperwork to Owner's representative.

END OF SECTION 26 5010

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including all General Conditions, Supplementary Conditions, Division 1 specification sections as well as Information to Bidders requirements that are included in the project documents, apply to the work of this Contract.

1.02 SCOPE OF WORK

- A. Provide the following Horizontal cabling as called for on the E500 series drawings. Cables shall be multi colored as called for on the drawings. Terminate specific colored cables on dedicated patch panels.
- B. Prior to releasing the cable order obtain approval in writing from the owner's IT director for all cable colors.
- C. Prior to installing any cable meet with the owner's IT director in the field and review each rack lay out with respect to switch, patch panel and wire management placement. Provide a shop drawing showing the agreed upon layout signed off by the owner's IT director.
- D. This section shall include the following
 - 1. Category 6 cable
 - 2. Category 6 Patch Panels
 - 3. Communications Faceplates
 - 4. Termination Jacks

1.03 REFERENCES

- A. The products and work herein specified shall comply with the current additions of the following publications and standards.
 - 1. UL - Underwriter Laboratory
 - 2. NEC – National Electric Code
 - a. Article 725
 - b. Article 770
 - c. Article 800
 - 3. NFPA – National Fire Protection Association
 - 4. NECA - Standard of Installation
 - 5. ANSI – American National Standards Institute
 - 6. NEMA – National Electrical Manufactures Association Article 250

7. EIA – Electronic Industries Alliance
 - a. ANSI/TIA/EIA-568-C.2.
 - b. ANSI/EIA/TIA 569B
 - c. ANSI/EIA/TIA 606A
 - d. ANSI-J-STD-607-A
 - e. ANSI/TIA/EIA-606-A
 8. TIA – Telecommunications Industry Association
 9. IEEE C2 National Electrical Safety Code
 10. FCC - Federal Communications Commission
 - a. CFR 68
 11. BICSI – Building Industry Consulting Services International
 - a. Distribution Methods Manual
 - b. ANSK/NECA/BICSI 568
 12. ISO/IEC 11801
- B. If this document and any of the documents listed above are in conflict, then the more stringent requirement shall apply. All documents listed are believed to be the most current releases of the documents. The Contractor has the responsibility to determine and adhere to the most recent release when developing the proposal for installation.

1.04 QUALITY ASSURANCE

- A. All work shall be provided in a neat and workmanlike manner. All methods of construction that are not specifically described or indicated in the contract documents, shall be provided in accordance with industry standards and shall be subject to the control and approval of the Owners representative.
- B. Equipment and materials shall be of the quality and manufactures indicated. The equipment specified is based on the acceptable manufacturers listed. Where "approved equal" is stated, equipment shall be equivalent in every way to that of the equipment specified, and subject to the approval of the Engineer.
- C. Strictly adhere to all Category 6 (BICSI and TIA) and manufacturer recommended installation practices when installing high performance cabling.
- D. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.
- E. The contractor shall furnish a list of (3) installations of equivalent or larger systems that have been installed within the past (2) years and have been operating satisfactorily for a minimum of one year. (Include names and phone numbers of references) with bid.

1.05 SUBMITTALS

- A. Provide manufacturers cutsheets, specifications, and installation instructions for the products herein specified.
 - 1. Category 6 Cable.
 - 2. Patch Panels.
 - 3. Communications Faceplates.
 - 4. Termination Jacks.

PART 2 – PRODUCTS

2.01 CATEGORY 6 100 OHM UNSHIELDED TWISTED PAIR CABLE

- A. Category 6/Class E Unshielded Twisted-Pair (UTP) Cable.
- B. All Cables shall be of round construction.
- C. Each cable shall contain 4 color coded pairs.
- D. Cable shall be listed for the environment where it will be installed (Plenum, Riser, LSZH, etc.)
- E. Category 6 horizontal cabling shall meet or exceed the following specifications:
 - 1. Construction Materials
 - a. Jacket Material PVC
 - b. Conductor Material Bare copper
 - c. Insulation Material Polyolefin
 - d. Separator Material Polyolefin
 - e. Dimensions
 - f. Cable Length 305m | 1000 ft
 - g. Cable Weight 24.62 lb/kft
 - h. Diameter Over Jacket 5.842 mm | 0.230 in
 - i. Jacket Thickness 0.508 mm | 0.020 in
 - 2. Electrical Specifications
 - a. ANSI/TIA Category 6
 - b. Characteristic Impedance 100 ohm
 - c. Dc Resistance Unbalance, maximum 5%
 - d. Delay Skew, maximum 45 ns
 - e. Mutual Capacitance 5.4 nF/100 m @ 1kHz
 - f. Nominal Velocity of Propagation (NVP) 69%
 - g. Operating Frequency, maximum 400 MHz
 - h. Transmission Standards ANSI/TIA-568-C.2 | CENELEC EN 50288-6-1 | ISO/IEC 11801 Class E
 - i. Safety Voltage Rating 300 V
 - j. Dielectric Strength, minimum 1500 Vac | 2500 Vdc
 - k. Note: All electrical transmission tests include swept frequency measurements.

3. Environmental Specifications
 - a. Environmental Space Non-plenum/Plenum
 - b. Flame Test Method CMR/CMP
 - c. Installation Temperature 0 C to +60 C (+32 F to +140 F)
 - d. Operating Temperature -20 C to +60 C (-4 F to +140 F)
 - e. UL Temperature Rating 75 C | 167 F
4. General Specifications:
 - a. Cable Type U/UTP (unshielded).
 - b. Pairs, quantity 4.
 - c. Cable Component Type Horizontal.
 - d. Packaging Type box.
 - e. Conductor Gauge, singles 23 AWG
 - f. Conductor Type, singles Solid

F. Category 6 horizontal cabling shall meet or exceed the performance specifications listed in the following table.

Freq. MHz	IL			NEXT			ACR			PSNEXT			PSACR			ACRF			PSACRF			RL			TCL		ELTCTL	
	CS	Std	Typ	CS	Std	Typ	CS	Std	Typ	CS	Std	Typ	CS	Std	Typ	CS	Std	Typ	CS	Std	Typ	CS	Std	Typ	CS	Std	CS	Std
1	2.0	2.0	2.1	77.3	74.3	92.6	75.3	72.3	90.5	75.3	72.3	90.7	73.3	70.3	88.6	68.8	67.8	85.1	65.8	64.8	83.8	20.0	20.0	34.5	40.0	40.0	35.0	35.0
4	3.8	3.8	3.9	68.3	65.3	85.0	64.5	61.5	81.1	66.3	63.3	82.9	62.5	59.5	79.0	56.8	55.8	73.3	53.8	52.8	72.1	23.6	23.0	33.1	40.0	40.0	23.0	23.0
8	5.3	5.3	5.3	63.8	60.8	80.8	58.5	55.4	75.5	61.8	58.8	78.7	56.5	53.4	73.3	50.7	49.7	67.5	47.7	46.7	66.3	25.4	24.5	34.4	40.0	40.0	16.9	16.9
10	5.9	6.0	6.0	62.3	59.3	79.2	56.4	53.3	73.2	60.3	57.3	77.1	54.4	51.3	71.1	48.8	47.8	65.5	45.8	44.8	64.3	26.0	25.0	35.7	40.0	40.0	15.0	15.0
16	7.5	7.6	7.5	59.2	56.2	76.3	51.7	48.7	68.8	57.2	54.2	74.0	49.7	46.7	66.5	44.7	43.7	61.5	41.7	40.7	60.2	26.0	25.0	35.7	38.0	38.0	10.9	10.9
20	8.4	8.5	8.4	57.8	54.8	74.6	49.4	46.3	66.2	55.8	52.8	72.4	47.4	44.3	64.1	42.8	41.8	59.6	39.8	38.8	58.3	26.0	25.0	37.0	37.0	37.0	9.0	9.0
25	9.4	9.5	9.4	56.3	53.3	73.0	46.9	43.8	63.7	54.3	51.3	70.9	44.9	41.8	61.5	40.8	39.8	57.6	37.8	36.8	56.3	25.3	24.3	38.1	36.0	36.0	7.0	7.0
31.25	10.6	10.7	10.5	54.9	51.9	71.7	44.3	41.2	61.2	52.9	49.9	69.6	42.3	39.2	59.1	38.9	37.9	55.6	35.9	34.9	54.3	24.6	23.6	38.2	35.1	35.1		
62.5	15.3	15.4	14.9	50.4	47.4	66.2	35.1	32.0	51.3	48.4	45.4	64.1	33.1	30.0	49.2	32.9	31.9	49.3	29.9	28.9	48.1	22.5	21.5	36.6	32.0	32.0		
100	19.7	19.8	19.0	47.3	44.3	63.5	27.6	24.5	44.5	45.3	42.3	61.3	25.6	22.5	42.4	28.8	27.8	44.9	25.8	24.8	43.8	21.1	20.1	33.6	30.0	30.0		
155	25.0	25.2	23.9	44.4	41.4	61.3	19.5	16.3	37.4	42.4	39.4	58.8	17.5	14.3	35.0	25.0	24.0	40.8	22.0	21.0	39.7	19.8	18.8	32.0	28.1	28.1		
200	28.8	29.0	27.3	42.8	39.8	58.9	14.0	10.8	31.6	40.8	37.8	56.9	12.0	8.8	29.6	22.8	21.8	38.6	19.8	18.8	37.5	19.0	18.0	31.1	27.0	27.0		
250	32.6	32.8	30.7	41.3	38.3	56.8	8.7	5.5	26.1	39.3	36.3	54.8	6.7	3.5	24.1	20.8	19.8	36.6	17.8	16.8	35.5	18.3	17.3	30.6	26.0	26.0		
300	36.2		33.9	40.1		55.4	4.0		21.5	38.1		53.5	2.0		19.6	19.3		34.8	16.3		33.7	17.8		30.7				
350	39.5		36.8	39.1		54.3	-0.4		17.5	37.1		52.3	-2.4		15.5	17.9		33.4	14.9		32.1	17.3		31.1				
400	42.7		39.4	38.3		53.0	-4.4		13.5	36.3		51.1	-6.4		11.6	16.8		32.1	13.8		30.8	16.9		32.5				
500			44.7			50.7			6.0			48.7			4.0			28.9			27.6			33.8				
550			44.9			50.9			6.0			48.8			3.9			28.7			27.3			33.6				
650			51.5			47.0			4.4			45.0			16.4			24.4			21.9			26.2				

5. The table provides reference values only. All parameters comply with the governing equations over the entire frequency range.

6. All values and equations apply to worst-case channels utilizing four-pair cables with full cross-connects, consolidation points and work area outlets (4 connectors in a channel) for any channel lengths up to 100 meters.

G. Design Make: Belden Data Twist 4800 non-bonded

H. Acceptable Manufacturers:

1. Commscope
2. Berktek
3. Amp

2.02 CATEGORY 6 CONNECTING HARDWARE

- A. Category 6 compliant modular jacks
- B. Performance terminated on a 100M length of cable shall match requirements listed for Category 6 cable
- C. Physical Characteristics
 - 1. Jacks shall be 8 position un-keyed
 - 2. Each jack shall be an individually constructed unit and shall snap mount in an industry standard keystone opening (.760" x .580")
 - 3. Jack housings shall be high impact 94 V-0 rated thermoplastic
 - 4. Jacks shall have a temperature rating of -10 °C (14°F) to 60°C (140 °F) in conformance with ANSI/TIA/EIA-568-A
 - 5. Jacks shall utilize a 2-layer printed circuit board to control NEXT
 - 6. Jack housings shall fully encase and protect printed circuit boards and IDC fields.
 - 7. Housing shall be ultrasonically welded for tamper resistance.
 - 8. Modular jack contacts shall accept a minimum of 2500 mating cycles without degradation of electrical or mechanical performance.
 - 9. Contacts will maintain a minimum vertical deflection force of 100 grams over deflection window.
 - 10. Modular jack contact wires shall be formed flat for increased surface contact with mated plugs.
 - 11. Contacts shall be arranged on the PC board in 2 staggered arrays, one array has 6 contacts and the other array has 2 contacts.
 - 12. Modular jack contacts shall be constructed of Beryllium copper for maximum spring force and resilience.
 - 13. Contact Plating shall be a minimum of 50 micro inches of hard gold in the contact area over 50 micro-inch of nickel.
 - 14. Jack termination shall follow the industry standard 110 IDC.
 - 15. IDC contact termination towers shall be paired and angled at 29.5 degrees.
 - 16. IDC contacts shall be laid out in staggered arrays of 4 sets of 2 contacts.
 - 17. Jacks shall have a designation indicating Category 6 on the nose which can be plainly seen from the front of the faceplate. Bottom of jack shall have date code and an abbreviated catalog number.

18. Jacks shall utilize a paired punch down sequence. Cable pair twists shall be maintained up to the IDC, terminating all conductors adjacent to its pair mate to better maintain pair characteristics designed by the cable manufacturer.
19. 110 IDC shall utilize 100 micro-inch tin lead plated (60% tin/40%lead) over phosphor bronze over nickel.
20. Jacks shall terminate 22-26 AWG stranded or solid conductors.
21. Jacks shall terminate insulated conductors with outside diameters up to .050"
22. Jacks shall be compatible with single conductor 110 impact termination tools.
23. Jacks shall include translucent wire retention stuffer cap, that hold terminated wires in place and allow the conductors to be visually inspected in the IDC housing.
24. Stuffer cap shall have a positive locking latch to provide conductor strain relief.
25. Stuffer cap used for wire termination with channel lock style pliers.
26. Jacks shall be compatible with TIA/EIA 606 color code labeling
27. Jacks shall accept snap on icons for identification or designation of applications.
28. Jacks shall be available in 6 colors for identification or designation of applications at the workstation or telecommunication room.
29. Jacks shall have universal wiring designation.
30. Jacks shall be marked with the T-568A wiring scheme.
31. Jacks shall have an attached color coded wiring instruction label housed between the IDC termination towers.
32. Jacks shall be manufactured in the USA
33. Jacks shall be designed for 100 Ohm UTP cable termination
34. Jacks shall be UL LISTED 1863 and CSA certified.
35. Jacks shall be made by an ISO 9002 Certified Manufacturer.

D. Design Make: Belden Cat6+

2.06 UTP PATCH PANELS

A. Physical Characteristics

1. Panels shall be made of 16ga cold rolled steel with a black powder coat finish in 48 port configurations.
2. Panels shall be manufactured with a rolled-edge at the top and bottom for stiffness.
3. Panels shall have 48 modular openings

4. Panels shall have Flame retardant UL 94 V-0 modular jacks with high performance copper alloy contacts and precious metal plating.
5. Panels shall be equipped with 110-style termination made of fire retardant UL 94V0 rated thermoplastic and tin lead solder plated IDC.
6. Panels shall have port identification numbers on both the front and rear of the panel. Front port identification on the 48 port panels shall be located between the rows of jacks.
7. Panels shall have rear cable support bar for strain relief. Cable support bar shall attach to the rear of the patch panel itself without the use of additional fasteners or screws.
8. Panels shall feature vertical panel ID label holders. Provide laser printed adhesive labels.

B. Design Make: Belden Cat6+

PART 3 – INSTALLATION

3.01 COORDINATION

- A. Prior to terminating horizontal cables in rack mounted patch panels meet with the owner's IT staff and service providers to determine exact rack layout.

3.02 GENERAL

- A. Firestop conduit openings after the cable installation is complete.

- B. Separation from Electromagnetic Interference

Condition	Minimum Separation Distance
Unshielded power lines or electrical equipment in proximity to open or nonmetal pathways.	610 mm (24 in)
Unshielded power lines or electrical equipment in proximity to a grounded metal conduit pathway.	305 mm (12 in)
Power lines enclosed in a grounded metal conduit (or equivalent shielding) in proximity to a grounded metal pathway.	152 mm (6 in)
Electrical motors and transformers.	1194 mm (47 in)

- C. Installing cables above suspended ceilings

1. Pull or place cables into the zone pathway.
2. Leave sufficient slack in the ceiling to reach any telecommunications outlet/connector within the zone.

3. Where zone pathways are not provided, divide the floor area into direct-run telecommunications zones.
 4. Run all the cables to the center point of their zones.
 5. From the center point of each zone, distribute the cables to work areas within that zone.
 6. At the center point of each telecommunications zone, support all cables with a cable tie or similar device. Tightly cinched cable ties may have a detrimental effect on transmission performance and should be avoided.
 7. Coil in a figure eight any cable that is not in service back to the end of the zone pathway. When required, cable-tie these coiled cables.
 8. Label the cables and pathways for easy recognition and establish a working database for ongoing identification and maintenance of horizontal cables and pathways.
 9. If a J-hook or trapeze system is used to support cable bundles all horizontal cables shall be supported at a maximum of 48 inch intervals. At no point shall cable(s) rest on acoustic ceiling grids or panels.
- D. Cable raceways shall not be filled greater than the ANSI/TIA/EIA-569-B maximum fill for the particular raceway type.
- E. Riser rated cable shall be installed in metallic conduit when installed in a plenum space.
- F. Cables shall be dressed and terminated in accordance with the recommendations made in the ANSI/TIA/EIA-568-C.2 document, manufacturer's recommendations and best industry practices.

3.03 UTP CABLE

- A. Cables shall be dressed and terminated in accordance with the recommendations made in the ANSI/TIA/EIA-568-C.2 document, manufacturer's recommendations and best industry practices.
- B. All wiring concealed in new walls or soffits shall be installed in metal conduits.
- C. Wiring in existing walls with hollow cavities may be installed loose.
- D. All exposed wiring shall be installed in surface metal raceway.
- E. All wiring above ceilings shall be installed in cable tray or open top cable hangers and brackets.
- F. Cable hangers above accessible ceilings shall be installed 4' on center attached to building structure. If cables have more than 12" of sag, install more hangers.
- G. Do not untwist cable pairs more than 0.5 in. when terminating.
- H. The Contractor shall be responsible for replacing all cables that do not pass required bandwidth and throughput tests.
- I. Maximum length shall be 90 meters. (295 ft)
- J. Maximum patch cable shall be 5 meters (16 ft)

- K. Provide 10 ft service loop in the communications equipment room. Provide 3-foot service loop in ceiling above outlet. Slack should not be stored in bundled loops. Cable loops have had a degrading effect on cabling performance. Cable slack should be stored in an extended loop or in a figure-eight configuration to alleviate stress.
- L. Cable shall have no physical defects such as cuts, tears or bulges in the outer jacket. Cables with defects shall be replaced.
- M. Install cable in neat and workmanlike manner. Neatly bundle and tie all cable in closets. Leave sufficient cable for 90o sweeps at all vertical drops.
- N. Do not tie-rap cable to a perpendicular support. Tie-raps shall be used to secure cables to other like cables or to an approved tie mount. Do not over tighten cable ties.
- O. Install category 6 cable in a separate open cable hanger segment. Do not install with coaxial, optical fiber cable or any other cable type. If cables have more than 12" of sag, install more hangers.
- P. Do not install UTP cable with more than 110N (25 lbs) pull force, as specified in EIA/TIA and BICSI TDDM practices. Utilize appropriate cable lubricant in sufficient quantity to reduce pulling friction to acceptable levels on: long pulls inside conduit, pulls of multiple cables into a single small bore conduit, on conduit runs greater than 100 lineal feet with bends of opposing directions, and in conduit runs that exceed 180 degrees of accumulated bends. Use of tensile rated cords (i.e. fishing line) should be used for difficult or questionable pulls - to judge to go/no-go condition of the conduit and pulling setup.
- Q. Care must be taken so that the cable does not bend at any location to a radius less than ten times the diameter of the cable. A cable feeder guide of suitable dimensions should be used between the cable reel and the face of the duct to protect the cable and guide it into the duct as it is payed off the reel.
- R. As the cable is payed off the reel, it should be carefully watched and inspected for sheath defects. If defects are noticed, the pulling operation should be stopped immediately and the Engineer promptly notified of the defect. Kinks and/or other irregularities in the cable sheath should be removed or corrected as directed by the engineer.
- S. A plastic or nylon pull cord with a minimum test rating of 90 Kg (200 lb.) shall be co-installed with all cable installed in any conduit.
- T. Horizontal distribution cables shall be bundled in groups of no more than 50 cables. Cable bundle quantities in excess of 50 cables may cause deformation of the bottom cables within the bundle and degrade cable performance.
- U. Cable shall be installed above fire-sprinkler systems and shall not be attached to the system or any ancillary equipment or hardware. The cable system and support hardware shall be installed so that it does not obscure any valves, fire alarm conduit, boxes, or other control devices.
- V. Cables shall not be attached to ceiling grid or lighting fixture wires. Where support for horizontal cable is required, the Contractor shall install appropriate carriers to support the cabling.
- W. Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the Contractor prior to final acceptance at no cost to the Owner.
- X. Leave a minimum of 12" of slack for twisted pair cables at the outlet. Cables shall be coiled in the in-wall box, surface-mount box or modular furniture raceway if adequate space is present to house the cable coil without exceeding the manufacturers bend radius. In hollow-wall installations where box-

eliminators are used, excess wire can be stored in the wall. Excess slack shall be loosely coiled and stored in the ceiling above each drop location when there is not enough space present in the outlet box to store slack cable.

- Y. Cables shall be neatly bundled and dressed to their respective termination device. Each terminating device shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame.
- Z. Each cable shall be clearly labeled on the cable jacket behind the termination device at a location that can be viewed without removing the bundle support ties. Cables labeled within the bundle, where the label is obscured from view shall not be acceptable.

3.04 UTP MODULAR JACKS

- A. All cables shall be terminated with modular jacks that snap into a faceplate mounted on a wall outlet box, surface raceways or power pole.
- B. Outlet boxes shall be secured to building with mechanical fasteners. Adhesive fasteners are not allowed.
- C. Jacks shall be installed to provide minimal signal impairment by preserving wire pair twists as close as possible to the point of mechanical termination. The amount of untwisted in a pair as a result of termination to the jack shall be no greater than 0.5 inches (13mm).
- D. Jacks shall be installed according to manufacturer's instructions and properly mounted in plates, frames, housings or other appropriate mounting device.
- E. Jacks shall be installed such that cables terminated to the jacks maintain minimum bend radius of at least 4 times the cable diameter into the IDC contacts. Cables shall be terminated on jacks such that there is no tension on the conductors in the termination contacts.
- F. All extra openings to be filled with blank inserts.
- G. Terminate cable per EIA/TIA T-568B standard pin assignments.
- H. Remove only as much cable jacket as is required for termination and trimming. Follow the manufacturer's instructions for mounting, termination, and cable management. Minimize the amount of untwisting in a pair as a result of termination to connecting hardware. For untwisting cabling, maintain pair twists as close as possible to the termination point. The amount of untwisting must not exceed 12.7 mm (0.5 in) for category 5e and higher cables.

3.05 TESTING

- A. Refer to Section 271600.

3.06 COMPLETION AND ACCEPTANCE

- A. In all spaces that have had floor or wall penetrations, hammer drilling, or core boring activities - a through brooming, vacuuming, and wet mopping/sponging shall be preformed. Cleaning shall include floors, walls, ladder trays, tops of cabinets/racks, existing/new passive and active components, per manufacturer recommendations.

- B. Submit copies of the following:
 - 1. Cable Test Reports (at substantial completion).
 - 2. Cable tension reports for optical fiber pulls backbone pulls over 200'.

3.07 PATCH PANELS.

- A. Panels shall be installed to provide minimal signal impairment by preserving wire pair twists as closely as possible to the point of mechanical termination. The amount of untwisting in a pair as a result of termination to the patch panel shall be no greater than 0.5 inches (13 mm)
- B. Panels shall be installed according to manufacturer's instructions and properly mounted to a rack, cabinet, bracket or other appropriate mounting device.
- C. Panels shall be installed such that cables terminated to the panel can maintain minimum bend radius of at least 4 times the cable diameter into the IDC contacts.
- D. Cables shall be terminated on the panels such that there is no tension on the conductors in the termination contacts. Panels shall be properly labeled on front and back with the cable number and port connections for each port, as per cable schedule drawings.
- E. All cables shall be neatly "dressed out" in equipment rooms. Cables to be neatly bundled and dressed to their respective panels or blocks. Each panel or block shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame.
- F. Each cable shall be clearly labeled on the cable jacket behind the patch panel at a location that can be viewed without removing the bundle support ties. Cables labeled within a bundle, where the label is obscured from view shall not be acceptable.
- G. Install factory supplied patch panel labels, in the corresponding T568B configuration, in all UTP patch panels, BEFORE beginning to terminate cables. Cables terminated onto a patch panel without said port label strip shall not be acceptable.
- H. The cable jacket shall be maintained as close as possible to the termination point.

3.08 CEILING TILES

- A. The contractor shall replace all ceiling tiles that are damaged due to cable installation. Tiles shall match the existing.
- B. Prior to beginning work walk the proposed cable routes and document any existing damage with the construction manager.

END OF SECTION 27 1500

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including all General Conditions, Supplementary Conditions, Division 1 specification sections as well as Information to Bidders requirements that are included in the project documents, apply to the work of this Contract

1.02 SCOPE OF WORK

- A. Provide labor, materials, equipment, and services to perform the work required for a complete installation as required in the Contract Documents.
- B. This section includes the minimum requirements for the testing, certification administration and identification of backbone and horizontal cabling, including;
 - 1. Tester Calibrations / Factory Requirements.
 - 2. UTP testing and testers.
 - 3. Fiber Optic testing and Testers
 - 4. Labels and labeling.
 - 5. Reports.
 - 6. Documentation.
 - 7. Record Copy and As-Built.
 - 8. Test Acceptance.
 - 9. Warranty.

1.03 REFERENCES

- A. The products and work herein specified shall comply with the current additions of the following publications and standards.
 - 1. UL - Underwriter Laboratory
 - 2. NEC – National Electric Code
 - a. Article 725
 - b. Article 770
 - c. Article 800
 - 3. NFPA – National Fire Protection Association
 - 4. NECA - Standard of Installation
 - 5. ANSI – American National Standards Institute
 - 6. NEMA – National Electrical Manufactures Association
 - a. Article 250
 - 7. EIA – Electronic Industries Alliance
 - a. ANSI/EIA/TIA 568B.X
 - b. ANSI/EIA/TIA 569A
 - c. ANSI/EIA/TIA 606A
 - d. TIA/EIA-J-STD-037

8. TIA – Telecommunications Industry Association
 9. IEEE C2 National Electrical Safety Code
 10. FCC - Federal Communications Commission
 - a. CFR 68
 11. BICSI – Building Industry Consulting Services International
 - a. Distribution Methods Manual
 - b. ANSK/NECA/BICSI 568
 12. ISO/IEC 11801
- B. If this document and any of the documents listed above are in conflict, then the more stringent requirement shall apply. All documents listed are believed to be the most current releases of the documents. The Contractor has the responsibility to determine and adhere to the most recent release when developing the proposal for installation.

1.04 QUALITY ASSURANCE

- A. All work shall be provided in a neat and workmanlike manner. All methods of construction that are not specifically described or indicated in the contract documents, shall be provided in accordance with industry standards and shall be subject to the control and approval of the Owners representative.
- B. Equipment and materials shall be of the quality and manufactures indicated. The equipment specified is based on the acceptable manufacturers listed. Where "approved equal" is stated, equipment shall be equivalent in everyway to that of the equipment specified, and subject to the approval of the Engineer.
- C. Strictly adhere to all Category 6 (BICSI and TIA) and manufacturer recommended installation practices when installing high performance cabling.
- D. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.
- E. The contractor shall furnish a list of three (3) installations of equivalent or larger systems that have been installed within the past two (2) years and have been operating satisfactorily for a minimum of one year. (Include names and phone numbers of references) with bid.

1.05 SUBMITTALS

- A. Provide manufactures cut sheets, specifications, and installation instructions for the products herein specified.
- B. Cable testers.
- C. Test heads.
- D. Adapter cords.
- E. Latest version of software applicable for each tester planned for use.

- F. Provide written factory calibration recommendation letter and factory recommended field calibration intervals with bid.
- G. Provide signed manufacturer factory calibration certification for each copper and fiber tester owned at time of bid response as a submittal. Certification shall have serial number, date and version of software of each tester.
- H. For each tester planned for use on this project, provide a letter from the tester manufacturer indicating the correct interface adapters and test cords, and set-up procedures required to test perform the Category 6 permanent link and the Category 6, channel tests with the products identified for use on this project and the warranty requirements called for.
- I. Sample documentation from previous job for administration, test results and as-built drawings.
- J. At time of testing, provide a factory calibration certificate for each tester used and include these in each test report binder at the completion of the project.
- K. Test reports (submit prior to substantial completion punch list is performed)
- L. Two copies in binder format and 4 copies on compact disks containing all summary reports, full plot data test results, tester software tools required to view and inspect and print any selection of the test reports, spreadsheets, end to end reports and as built drawings called for at the completion of job.. The database for the completed job shall be stored and delivered on CD including the software tools required to view, inspect, and print any selection of test reports.
- M. Technician certificates for successful completion of training for each of the field testers proposed to be used in this project.
- N. One copy of a binder and two copies on compact disks containing all digital photographs called for at the completion of the job.

PART 2 – PRODUCTS

2.01 UTP TEST EQUIPMENT

- A. Field test instruments shall meet the requirements of ANSI/TIA/EIA-568-C.2.1.
- B. Test equipment used under this contract shall be from manufacturers that have a minimum of 5 years experience in producing field test equipment.
- C. Manufacturers must be ISO 9001 certified.
- D. All test tools of a given type shall be from the same manufacturer, and have compatible electronic results output.
- E. Test adapter cables/test heads must be approved by the manufacturer of the test equipment, for the specific cable and connectivity product used on this project. Adapters from other sources are not acceptable. Obtain written confirmation that the test heads and adapter planned for use are proper and also obtain a written confirmation from the wire and connectivity manufacturers that they also agree with the test heads and adapter selection chosen by the tester manufacturer.
- F. Baseline accuracy of the test equipment must exceed TIA Level III, as indicated by independent laboratory testing.

- G. A level III test unit is required to verify category 6 performance for both Category 6 permanent link and channel performance.
- H. Test equipment must be capable of certifying Category 5, 5e, and 6 links.
- I. Test equipment must have a dynamic range of at least 100 dB to minimize measurement uncertainty.
- J. Test equipment must be capable of storing full frequency sweep data for all tests and printing color graphical reports for all swept measurements.
- K. Test equipment must include S-Band time domain diagnostics for NEXT and return loss (TDNXT and TDRL) for accurate and efficient troubleshooting.
- L. Test equipment must be capable of running individual NEXT, return loss, etc measurements in addition to autotests. Individual tests increase productivity when diagnosing faults.
- M. Test equipment must include a library of cable types by major manufacturer.
- N. Test equipment must store at least 1000 Category 6 or 6 autotests in internal memory.
- O. Test equipment must be able to internally group autotests and cables in project folders for good records management.
- P. Test equipment must include technology for support of advanced measurements.
- Q. Test equipment must make swept frequency measurements in compliance with TIA standards.
- R. The measurement reference plane of the test equipment shall start immediately at the output of the test equipment interface connector. There shall not be a time domain dead zone of any distance that excludes any part of the link from the measurement.
- S. The basic tests required are:
 - 1. Wire Map
 - 2. Length
 - 3. Attenuation
 - 4. NEXT (Near end crosstalk)
 - 5. Return Loss
 - 6. ELFEXT Loss
 - 7. Propagation Delay
 - 8. Delay skew
 - 9. PSNEXT (Power sum near-end crosstalk loss)
 - 10. PSELFEXT (Power sum equal level far-end crosstalk loss)
- T. Shall test cable for compliance with the following applicable standards:
 - 1. TIA Category 6: Permanent Link and Channel
 - 2. TIA Category 3 and 5 per TIA TSB-67: Basic Link or Channel
 - 3. ISO/IEC 11801 and EN 50173 Class C and D: Link
 - 4. ISO/IEC 11801 and EN 50173 Class C and D (new): Permanent Link or Channel
 - 5. Aus/NZ Class C and D: Basic Link or Channel
 - 6. STP cabling, (IBM Type 1, 150 Ω)
 - 7. ANSI TP-PMD IEEE 802.3 10BASE5, 10BASE2: Ethernet with coaxial cabling

8. IEEE 802.3 10BASE-T, 100BASE-TX, 1000BASE-T: Ethernet with twisted pair cabling IEEE 802.5: Token Ring, 4 Mbps or 16 Mbps
- U. Shall perform the following tests as a minimum:
1. NEXT, NEXT @ Remote
 2. Wire Map
 3. Characteristic Impedance
 4. Length
 5. DC Loop Resistance
 6. Propagation Delay Return Loss (RL), RL @ Remote
 7. Delay Skew
 8. Attenuation
 9. Attenuation-to-Crosstalk Ratio (ACR), ACR @ Remote
 10. Power Sum ACR, PSACR @ Remote
 11. ELFEXT, ELFEXT @ Remote
 12. Power Sum ELFEXT, PSELFEXT @ Remote
 13. Power Sum NEXT, PSNEXT @ Remote
- V. Shall use injector for complete wire mapping and TDR for determining cable length.
- W. Shall measure NEXT for all six pair combinations and Attenuation on all four pairs from 1.0 to 350 MHz.
- X. Design Make: Fluke "DSP 4000 or 4300 series"
- Y. Acceptable Manufacturers:
1. Agilent
 2. WaveTek
 3. Lantek
 4. Wirescope

2.02 FIBER OPTIC CABLE

- A. Field test instruments for multimode fiber cabling shall meet the requirements of ANSI/TIA/EIA-526-14-A.
- B. Field test instruments for multimode fiber cabling shall meet the requirements of ANSI/TIA/EIA-526-7.
- C. Multimode optical fiber light source
 1. Provide 850nm and 1300nm +/- 20 nm wavelength LED light sources
 2. Spectral width of sources shall be <= 50nm for 850nm wavelengths and <= 140nm for 1300nm wavelengths.
 3. The output of the light source shall be 8 MW for 62.5um core optical fiber
 4. Output Stability +/- 0.40 dB from 0 to 50 degrees C
 5. Long Term output stability +/- 0.10dB at 25 degrees C
 6. Power shall be from rechargeable Ni-Cad batteries
 7. Connector types shall include: SMA, FC, ST and SC
 8. Design make: Siecor Light source

9. Acceptable Manufacturers:
 - a. Fluke
 - b. Wavetek
 - c. Lantek
 - d. Amp

- D. Single mode optical fiber light source
 1. Provide 1300nm and 1500nm +/- 20 nm wavelength Laser light sources
 2. Output Stability +/- 0.40 dB from 0 to 50 degrees C
 3. Long Term output stability +/- 0.10dB at 25 degrees C
 4. Power shall be from rechargeable Ni-Cad batteries
 5. Connector types shall include: SMA, FC, ST and SC
 6. Design make: Siecor OS-200D
 7. Acceptable Manufacturers:
 - a. Fluke
 - b. Meson
 - c. Amp

- E. Optical Power Meter
 1. Calibrates against the National Institute of Standards and Technology (NIST) standard.
 2. Provide 850nm, 1300nm and 1500nm +/- 20 nm wavelength test capability
 3. Measurement range shall be from 10 to -60 dBm
 4. Accuracy shall be +/- 5% at 0 to -50dBm and +/- 10% 10 to 0dBm and -50 to -60 dBm.
 5. Resolution shall be 0.1 dB
 6. Connector types shall include: SMA, FC, ST and SC
 7. Acceptable Manufacturers:
 - a. Fluke
 - b. Meson
 - c. Amp

- F. Optical Time Domain Reflectometer (OTDR) Only if required troubleshooting existing or newly installed cable.
 1. Dual selectable wavelength: 850/1300 nm for multimode
 2. Dual selectable wavelength: 1310/1550 nm for singlemode
 3. Selectable cable index of refraction.
 4. Visual fault locator for continuity checks and dead zone fault protection.
 5. Display and printer connection for hard-copy documentation
 6. Equipped with launch jumper cable of sufficient length to offset entry" deadzone".
 7. Design make: Siecor
 8. Acceptable Manufacturers:
 - a. Fluke
 - b. Meson
 - c. Amp

2.03 LABELS

- A. Shall meet the legibility, defacement, exposure and adhesion requirements of UL 969.
- B. Shall be preprinted or laser printed type. Handwritten labels are not acceptable.

- C. Where used for cable marking provide vinyl substrate with a white printing area and a clear “tail” that self laminates the printed area when wrapped around the cable. If cable jacket is white, provide cable label with printing area that is any other color than white, preferably orange or yellow – so that the labels are easily distinguishable.
- D. Where insert type labels are used provide clear plastic cover over label.
- E. Provide plastic tape 6 inches wide continuously printed and bright colored 18” above all direct buried services.
- F. Provide engraved plastic laminated labels, signs and instruction plates. Labels shall be made of engraving stock melamine plastic laminate. Use 1/16” minimum for signs up to 20 square inches or 8 inches in length. Use 1/8” thick for larger sizes. All labels shall be punched for mechanical fastening.
- G. Acceptable Manufacturers:
 - 1. W.H. Brady
 - 2. Panduit
 - 3. Ideal

PART 3 – EXECUTION

3.01 GENERAL

- A. Upon completion of the installation, the telecommunications contractor should provide three (3) full documentation sets to the Engineer for approval.
- B. Documentation should be submitted within ten (10) working days of the completion of each testing phase (e.g. subsystem, cable type, area, floor, etc.). This is inclusive of all test results and draft as-built drawings. Draft drawings may include annotations done by hand. Machine-generated (final) copies of all drawings should be submitted within 30 working days of the completion of each testing phase. At the request of the Engineer, the telecommunications contractor should provide copies of the original test results.
- C. The Engineer may request that a 10% random field re-test be conducted on the cable system, at no additional cost, to verify documented findings. Tests should be a repeat of those defined above. If findings contradict the documentation submitted by the telecommunications contractor, additional testing can be requested to the extent determined necessary by the Engineer, including a 100% re-test. This re-test should be at no additional cost to the Owner
- D. Test documentation should be provided on disk within three (3) weeks after the completion of the project. The disk should be clearly marked on the outside front cover with the words “Project Test Documentation”, the project name, and the date of completion (month and year). The results should include a record of test frequencies, cable type, conductor pair and cable (or outlet) I.D., measurement direction, reference setup, and crew member name(s). The test equipment name, manufacturer, model number, serial number, software version and last calibration date will also be provided at the end of the document. Unless the manufacturer specifies a more frequent calibration cycle, an annual calibration cycle is anticipated on all test equipment used for this installation. The test document should detail the test method used and the specific settings of the equipment during the test as well as the software version being used in the field test equipment

3.02 COPPER CABLE TEST

- A. A level III test unit is required to verify category 6 performance, shall be updated with the latest version of tester software at time of testing and shall be factory tested/calibrated within one of time of testing. At time of testing, provide a factory calibration certificate for tester used and include these in each test report binder at the completion of the project.
- B. Visually inspect all cables, cable reels, and shipping cartons to detect possible cable damage incurred during shipping and transport. Visibly damaged goods are to be returned to the supplier and replaced at no additional cost to the Owner.
- C. If post-manufacture performance data has been supplied by the manufacturer of cables or connecting hardware, copies of such data are to be kept for inclusion in the Documentation for final Record Copy deliverables and made available to the Owner upon request
- D. Test 100% of installed backbone copper cabling for
 - 1. Wire Map
 - 2. Length

3.03 100 OHM UTP CABLE TESTING

- A. All cables and termination hardware shall be 100% tested for defects in installation and to verify cabling system performance under installed conditions according to the requirements of ANSI/TIA/EIA-568-B.
- B. All pairs of each installed cable shall be verified prior to system acceptance. Any defect in the cabling system installation including but not limited to cable, connectors, feed through couplers, patch panels, and connector blocks shall be repaired or replaced in order to ensure 100% useable conductors in all cables installed.
- C. The testing parameters called for in this section shall apply for up to 90 meters of horizontal cable, a work area equipment cord, an RJ45 outlet and 2 cross connect connections in the closet.
- D. Wire Map
 - 1. The wire map test shall verify pair to pin termination at each end and check for connectivity errors. The wire map shall indicate the following for each of the eight conductors:
 - a. Continuity to the remote end
 - b. Shorts between any two or more conductors
 - c. Crossed pairs or Reversed Pairs
 - d. Split Pairs
 - e. Any other miswiring
- E. Performance
 - 1. Cables shall be tested for conformance called for in Section 271500.

F. Data reporting and accuracy

1. General: a Pass or Fail result for each parameter shall be determined by the allowable limits for each parameter. If the test result of a parameter is closer to the test limit than the accuracy of the tester it shall be marked with an asterisk. Data at all measured points shall be uploaded to a P.C. and printed on a laser printer.
2. Wire Map: Wire map tests shall be marked "Pass" if wiring is determined correct.
3. Length: Test results shall be provided in meters and marked "Pass or Fail" based on the length vs. allowable length.
4. Attenuation: Report the attenuation value and the frequency at point of failure or the highest frequency passed. Measured attenuation values lower than 3dB used for a pass/fail determination. Report the attenuation per unit length for links longer than 15 meters. Attenuation shall be measured from 1 MHz to 16 Mhz (Category 3) or 100 Mhz (Category 5) in 1 MHz steps.
5. NEXT: Report the NEXT value and "pass or fail" for samples based on the following

Frequency Range (MHz)	Maximum Step Size (MHz)
1-31.35	0.15
>31.25-100	0.25
6. Submit copies in binder format and 4 copies on compact disks containing all summary reports, full plot data test results, tester software tools required to view and inspect and print any selection of the test reports, spreadsheets, end to end reports and as built drawings called for at the completion of job.

3.04 OPTICAL FIBER CABLE TESTING

- A. All fiber testing shall be performed on all fibers in the completed end to end system.
- B. Comply with Tier-two testing as defined in TSB-140. which included loss and length testing with an optical loss test set (OLTS) and also an OTDR trace of the installed cable plant. By incorporating the proposed two-tier testing method, installers have the most complete picture of the fiber installation and network owners have proof of a quality installation
- C. Testing shall consist of an end to end power meter test performed per EIA/TIA-455-53A. The system loss measurements shall be provided at 850 and/or 1300 nanometers for multimode fibers and 1310 and/or 1550 nanometers for single mode fibers. These tests also include continuity checking of each fiber.
- D. There shall be no splices unless clearly called for.
- E. Test all fibers with launch and far end cable of sufficient length for the OTDR to be able to see through all installed connectors.
- F. Localized attenuation shall not exceed 0.5 dB at any point.
- G. Backbone multimode fiber shall be tested in both directions at both 850nm and 1300 nm in accordance with ANSI/EIA/TIA-526-14A method B.

- H. Backbone single mode fiber shall be tested in both directions at both 1310nm and 1550.
- I. Backbone multimode fiber cabling shall be tested at both 850 nm and 1300 nm (or 1310 and 1550 nm for single mode) in both directions.
- J. Test set-up and performance shall be conducted in accordance with ANSI/EIA/TIA-526-14 Standard, Method B.
- K. Where links are combined to complete a circuit between devices, the Contractor shall test each link from end to end to ensure the performance of the system. ONLY BASIC LINK TEST IS REQUIRED. The contractor can optionally install patch cords to complete the circuit and then test the entire channel. The test method shall be the same used for the test described above. The values for calculating loss shall be those defined in the ANSI/TIA/EIA Standard.
- L. Attenuation testing shall be performed with a stable launch condition using two-meter jumpers to attach the test equipment to the cable plant. The light source shall be left in place after calibration and the power meter moved to the far end to take measurements.
- M. Backbone Cable
 - 1. Test the cable on the reel for continuity before installing it, to insure no damage was done in shipment from the manufacturer to the job site.
 - 2. After installation and termination, test each segment of the cable plant individually as it is installed, to insure each connector and cable is good.
 - 3. Link attenuation is the only required field test except for the patched runs in the campus backbone system where an OTDR test will be required. Use launch cables at each end and provide print outs showing all connectors. OTDR will also be required to determine bad connections or damage when the link attenuation test fails.
 - 4. Maximum localized attenuation allowed is 2dB.
 - 5. Backbone multimode fiber shall be tested in both directions at both 850nm and 1300 nm in accordance with ANSI/EIA/TIA-526-14A method B.
 - 6. Backbone single mode fiber shall be tested in both directions at both 1310nm and 1550 nm in accordance with ANSI/EIA/TIA-526-14A method A.1.

7. Multimode fiber shall conform to the following:

850 nm:

Length (meters)	Attenuation (dB)
500	3.5
1000	5.5
1500	7.5
2000	9.0

1300 nm:

Length (meters)	Attenuation (dB)
500	2.2
1000	3.0
1500	3.8
2000	4.5

8. Single Mode Fiber shall conform to the following (note: taken at

Length (meters)	Attenuation (dB)
500	2.0
1000	2.5
1500	3.0
2000	3.5
2500	4.0
3000	4.5

Outside:

Length (meters)	Attenuation (dB)
500	1.8
1000	2.0
1500	2.2
2000	2.5
2500	2.8
3000	3.0

- N. Provide attenuation and cable length test results for all installed cable pairs.

3.05 TEST DOCUMENTATION

- A. Test report documentation shall be provided in a three ring binder(s) and CD's within 1 week after the completion of the project. The binder and disks shall be clearly marked on the outside front cover and spine with the words "Test Results", the project name, and the date of completion (month and year).
- B. The binder and electronic folder/files shall be divided by major heading tabs (or in the case of electronic files, be placed into a folders structure similar to the hardcopy tests of this section).
- C. Major heading tabs (folders) shall be divided into Horizontal and Backbone. Each shall be further sectioned by test type and by CER and rack. Additional tabs for summary reports by CER shall also be provided.

3.06 IDENTIFICATION & RECORDS

A. Pathways

1. Cable hanger runs – provide an as built drawing indicating cable hanger routing throughout the facility.

B. Cables

1. Cables shall be marked at each endpoint and at all intermediate pull or junction boxes. Label cables as called for on drawings.
2. Provide written records in computer generated, table format for all cables, with the as-built drawings. The table shall include the following information:
 - a. Cable Identifier
 - b. Cable type
 - c. Length
 - d. Room number

C. Station Outlets

1. Provide 606 insert with clear plastic label cover on faceplates.
2. Provide a laser printed label in the insert.
3. Provide laser printed adhesive labels on station outlets in surface metal raceway.
4. Label shall have the following designation: IDF-Patch Panel- Port Number eg. 1B24
5. Write the cable identifier of each cable in permanent marker on the inside of each faceplate.

D. Patch Panels

1. Label patch panels with laser printed adhesive markers
2. Each panel shall be labeled using a Letter designation Access Point A, B etc.
3. Each patch panel port shall be identified with the room number that the station outlet is located in.

3.07 AS-BUILT DRAWINGS

- A. Provide as-built drawings showing all pathways, Station outlets, equipment rooms and entrance facilities on 1/8 scale floor plans.
- B. AutoCAD plans with original cable locations will be furnished for use with as built drawings.

END OF SECTION 27 1600

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.
- B. The work covered by this section is to be coordinated with related work as specified elsewhere in the specifications. Requirements of the following sections apply:
 - 1. 26.00 Electrical
 - 2. 26.05 Common Work Results for Electrical
 - 3. 21.10 Water-Based Fire-Suppression System
 - 4. 21.22 Clean Agent Fire Extinguishing Systems
 - 5. 23.00 Heating, Ventilating, and Air-Conditioning (HVAC)
 - 6. 25.00 Integrated Automation
- C. The system and all associated operations shall be in accordance with the following:
 - 1. 2020 New York State Building and Fire Codes
 - 2. NFPA 72, National Fire Alarm Code
 - 3. NFPA 70, National Electrical Code
 - 4. NFPA 101, Life Safety Code,
 - 5. NFPA 90A, Standard for the Installation of Air Conditioning and Ventilating Systems
 - 6. ANSI/ASME A17.1 / CSA B44, Safety Code for Elevators and Escalators
 - 7. ICC/ANSI A117.1 Accessible and Useable Buildings and Facilities,
 - 8. Local Jurisdictional Adopted Codes and Standards
 - 9. ADA Accessibility Guidelines

1.02 SUMMARY

- A. This Section covers fire alarm systems, including initiating devices, notification appliances, controls, and supervisory devices.
- B. All equipment must be from JCI/Simplex and integrated into the existing Simplex 9100ES fire alarm system. Contact Mr. Karl Bach 1399 Vischer Ferry Rd, Clifton Park, NY 12065 USA; Tel: 518-952-6040 | Direct: 518-952-6043
- C. Work covered by this section includes the furnishing of labor, equipment, and materials for modification of the fire alarm system as indicated on the drawings and specifications.

1.03 DEFINITIONS

- A. ADA: Americans with Disabilities Act
- B. AHJ: Authority Having Jurisdiction
- C. ANSI: American National Standards Institute
- D. ASME: American Society of Mechanical Engineers
- E. FACP: Fire Alarm Control Unit
- F. FM: Factory Mutual
- G. IBC: International Building Code

- H. ICC: International Code Council
- I. IDC: Initiating Device Circuit
- J. IEEE: Institute of Electrical and Electronic Engineers
- K. IFC: International Fire Code
- L. IMC: International Mechanical Code
- M. IRI: Industrial Risk Insurers
- N. LED: Light-emitting diode.
- O. NAC: Notification Appliance Circuit
- P. NFPA: National Fire Protection Association
- Q. NICET: National Institute for Certification in Engineering Technologies.
- R. RAC: Releasing Appliance Circuit
- S. SLC: Signaling Line Circuit
- T. UL: Underwriters Laboratories
- U. ULC: Underwriters Laboratories, Canada

1.04 SCOPE OF WORK

- A. Provide modifications to the existing Simplex 4100ES fire alarm system per the electrical drawings.

1.05 SYSTEM DESCRIPTION

- A. General: Provide initiating devices, notification appliances, and monitoring and control devices as indicated on the drawings and as specified herein.
- B. Wiring/Signal Transmission:
 - 1. Transmission shall be hard-wired using separate individual circuits for each zone of alarm operation, as required or addressable signal transmission, dedicated to fire alarm service only.
 - 2. System connections for initiating device circuits shall be B, Style D, signaling line circuits shall be Class B, Style 4 and notification appliance circuits shall be Class B, Style Y.

1.06 SUBMITTALS

- A. General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.
- B. Product data sheets for system components highlighted to indicate the specific products, features, or functions required to meet this specification. Alternate or as-equal products submitted under this contract must provide a detailed line-by-line comparison of how the submitted product meets, exceeds, or does not comply with this specification.
- C. Wiring diagrams from manufacturer.
- D. Shop drawings showing system details including location of FACP, all devices, circuiting and details of graphic annunciator.
- E. System operation description including method of operation and supervision of each type of circuit and sequence of operations for all manually and automatically initiated system inputs and outputs. A list of all input and output points in the system shall be provided with a label indicating location or use of IDC, SLC, NAC, relay, sensor, and auxiliary control circuits.

- F. Operation and maintenance data for inclusion in Operating and Maintenance Manual. Include data for each type product, including all features and operating sequences, both automatic and manual. Provide the names, addresses, and telephone numbers of service organizations.
- G. Product certification signed by a certified representative of the manufacturer of the fire alarm system components certifying that their products comply with indicated requirements.
- H. Record of field tests of system.

1.07 QUALITY ASSURANCE

- A. Installer Qualifications: A factory authorized installer is to perform the work of this section.
- B. Each and every item of the Fire Alarm System shall be listed under the appropriate category by a Nationally Recognized Testing Laboratory and shall bear the respective "NRTL" label.

1.08 PROJECT CONDITIONS

- A. Interruption of Existing Fire-Alarm Service: Do not interrupt fire-alarm service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary guard service according to requirements indicated:
- B. Notify Architect no fewer than two days in advance of proposed interruption of fire-alarm service.
- C. Do not proceed with interruption of fire-alarm service without Architect's written permission.

1.09 SEQUENCING AND SCHEDULING

- A. Existing Fire-Alarm Equipment: Maintain existing equipment fully operational until new equipment has been tested and accepted. As new equipment is installed, label it "NOT IN SERVICE" until it is accepted. Remove labels from new equipment when put into service and label existing fire-alarm equipment "NOT IN SERVICE" until removed from the building.
- B. Equipment Removal: After acceptance of new fire-alarm system, remove existing disconnected fire-alarm equipment and wiring.

PART 2 - PRODUCTS

2.01 ACCEPTABLE EQUIPMENT AND SERVICE PROVIDERS

- A. Manufacturers: The equipment and service described in this specification are those supplied and supported by Johnson Controls and represent the base bid for the equipment.
- B. Subject to compliance with the requirements of this specification, provide products by one of the following:
 - 1. Simplex, a Johnson Controls Company

2.02

SYSTEMS OPERATIONAL DESCRIPTION

- A. Fire-alarm signal initiation shall be by one or more of the following devices and systems:
1. Manual stations.
 2. Heat detectors.
 3. Smoke detectors.
 4. Duct smoke detectors.
 5. Verified automatic alarm operation of smoke detectors.
 6. Automatic sprinkler system water flow.
 7. Fire-extinguishing system operation.
- B. Fire-alarm signal shall initiate the following actions as required:
1. Continuously operate alarm notification appliances.
 2. Identify alarm at fire-alarm control unit and remote annunciators.
 3. Transmit an alarm signal to the remote alarm receiving station.
 4. Unlock electric door locks in designated egress paths.
 5. Release fire and smoke doors held open by magnetic door holders.
 6. Activate voice/alarm communication system.
 7. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
 8. Activate smoke-control system (smoke management) at firefighter smoke-control system panel.
 9. Close smoke dampers in air ducts of designated air-conditioning duct systems.
 10. Recall elevators to primary or alternate recall floors.
 11. Activate emergency lighting control.
 12. Activate emergency shutoffs for gas and fuel supplies.
 13. Record events in the system memory.
 14. Record events by the system printer.
- C. Supervisory signal initiation shall be by one or more of the following devices and actions:
1. Valve supervisory switch.
 2. Low-air-pressure switch of a dry-pipe sprinkler system.
- D. System trouble signal initiation shall be by one or more of the following devices and actions:
1. Open circuits, shorts, and grounds in designated circuits.
 2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
 3. Loss of primary power at fire-alarm control unit.
 4. Ground or a single break in fire-alarm control unit internal circuits.
 5. Abnormal AC voltage at fire-alarm control unit.
 6. Break in standby battery circuitry.
 7. Failure of battery charging.
 8. Abnormal position of any switch at fire-alarm control unit or annunciator.
 9. Fire-pump power failure, including a dead-phase or phase-reversal condition.
- E. System Trouble and Supervisory Signal Actions: Initiate notification appliance and annunciate at fire-alarm control unit and remote annunciators. Record the event on system printer where provided.

2.03 ADDRESSABLE INITIATING

A. ADDRESSABLE MANUAL PULL STATIONS

1. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.
2. Description: Addressable single action type, red LEXAN. Station shall mechanically latch upon operation and remain so until manually reset by opening with a key common with the control units. Station shall be pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit. Where double-action stations are provided, the mechanism shall require two actions push top activation door to initiate an alarm.
3. Provide with a front showing red LED showing that will flash each time it is scanned by the Control Unit (once every 4 seconds). In alarm condition, the station LED shall be on steady.
4. Indoor Protective Shield: Where required, or as indicated on the drawings, provide a factory-fabricated, tamperproof, clear LEXAN enclosure shield and red frame that easily fits over manual pull stations which shall be hinged at the top to permit lifting for access to initiate a local alarm. Unit shall be NRTL listed.

B. ADDRESSABLE ANALOG SMOKE SENSORS

1. General Requirements for System Smoke Detectors:
 - a. Comply with UL 268, "Smoke Detectors for Fire Protective Signaling Systems." Include the following features:
 - b. Factory Nameplate: Serial number and type identification.
 - c. Operating Voltage: 24 VDC, nominal and shall be two-wire type.
 - d. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore normal operation.
 - e. Each sensor base shall contain a magnetically actuated test switch to provide for easy pre-certification alarm testing at the sensor location.
 - f. Each sensor shall be scanned by the Control Unit for its type identification to prevent inadvertent substitution of another sensor type. Upon detection of a "wrong device", the control unit shall operate with the installed device at the default alarm settings for that sensor; 2.5% obscuration for photoelectric sensor, 135-deg F and 15-deg F rate-of-rise for the heat sensor, but shall indicate a "Wrong Device" trouble condition.
 - g. Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at fire-alarm control unit for calibration, sensitivity, and alarm condition and individually adjustable for sensitivity by fire-alarm control unit. Provide multiple levels of detection sensitivity for each sensor.
 - h. Environmental compensation, programmable sensitivity settings, status testing, and monitoring of sensor dirt accumulation for the duct smoke sensor shall be provided by the FACP.
 - i. The sensor's electronics shall be immune from nuisance alarms caused by EMI and RFI. Removal of the sensor head for cleaning shall not require the setting of addresses.
 - j. Bases: CO Sensor, relay output, sounder and isolator bases shall be supported alternatives to the standard base.

2. Addressable Sensor Bases
 - a. Standard base - Twist lock addressable base with address selection DIP switch accessible from front with sensor removed. Integral red LED for power-on (pulsing), or alarm or trouble (steady on). Locking anti-tamper design mounts on standard outlet box.
 - b. Sensor Base with remote device connection - All standard base features with wired connection for either a Remote LED alarm indicator or remote relay (relay is unsupervised and requires separate 24VDC)
 - c. Supervised Relay Bases - All standard base features and shall be available in either a 4-Wire Sensor Base to use with remote or locally mounted relay; requires separate 24 VDC, or as a 2-Wire Sensor Base to use with remote or locally mounted relay; no separate power required. Supervised relay operation shall be programmable and shall be manually operated from control panel.
 - d. Sensor base with built-in electronic alarm sounder - All standard base features and piezoelectric sounder shall provide high output (88 dBA) with low current requirements (20 mA). Sounder shall be synchronized via SLC communications or by the NAC if NAC powered, sounder shall operation shall be programmable and shall be manually operated from control panel.
 - e. 520 Hz Sensor base with built-in electronic low frequency sounder - All standard base features and piezoelectric sounder shall provide a low frequency 520 Hz Square Wave (85 dBA) with nominal current requirements (115 mA). Sounder shall be synchronized via SLC communications or by the NAC if NAC powered, sounder operation shall be programmable and shall be manually operated from control panel.
 1. Emitted tone shall be a 520Hz Square Wave signal in compliance with the requirements of the 2010 edition of NFPA 72 for sleeping areas.
 2. The 520Hz Sounder base shall be listed to UL 268 and UL464, Audible Signal Appliances.

C. ADDRESSABLE DUCT SMOKE SENSOR

1. Standard Addressable Duct Smoke Sensor Unit. Photoelectric type, with sampling tube of design and dimensions as recommended by the manufacturer for the specific duct size and installation conditions where applied. Duct housing shall include relay or relay driver as required for fan shutdown.
 - a. Environmental compensation, programmable sensitivity settings, status testing, and monitoring of sensor dirt accumulation for the duct smoke sensor shall be provided by the FACP.
 - b. The Duct Housing shall provide a supervised relay driver circuit for driving up to 15 relays with a single "Form C" contact rated at 7A@ 28VDC or 10A@ 120VAC. This auxiliary relay output shall be fully programmable independent of the sensor head for activation by other alarm initiating devices within the fire alarm system. Relay shall be mounted within 3 feet of HVAC control circuit.
 - c. Duct Housing shall provide a magnetic test area and Red sensor status LED and Duct Housing shall provide a relay control Yellow LED trouble indicator.
 - d. Duct Housing shall have a transparent cover to monitor for the presence of smoke. Cover shall secure to housing by means of four (4) captive fastening screws.
 - e. Duct Housing shall provide two (2) Test Ports for measuring airflow and for testing. These ports will allow aerosol injection in order to test the activation of the duct smoke sensor.
 - f. For maintenance purposes, it shall be possible to clean the duct housing sampling tubes by accessing them through the duct housing front cover.

- g. Each duct smoke sensor shall be provided with a Remote Test Station with an alarm LED and test switch.
 - h. Where indicated provide a NEMA 4X weatherproof duct housing enclosure that shall provide for the circulation of conditioned air around the internally mounted addressable duct sensor housing to maintain the sensor housing at its rated temperature range. The housing shall be UL Listed to Standard 268A.
2. Addressable In-Duct Mounted Smoke Sensors. Photoelectric type, for applications with controlled dust and humidity providing HVAC duct smoke sensing where sampling tube designs are not appropriate. In-Duct housing shall include relay or relay driver as required for fan shutdown.
- a. Shall accommodate duct airflow from 0 to 4000 ft/min (0 to 1220 m/min), and provide environmental compensation, programmable sensitivity settings, status testing, and monitoring of sensor dirt accumulation for the duct smoke sensor by the FACP.
 - b. The In-Duct Housing shall provide a supervised relay driver circuit for driving up to 15 relays with a single "Form C" contact rated at 7A@ 28VDC or 10A@ 120VAC. This auxiliary relay output shall be fully programmable independent of the sensor head for activation by other alarm initiating devices within the fire alarm system. Relay shall be mounted within 3 feet of HVAC control circuit.
 - c. Standard models shall be for rectangular ducts from 6" (152 mm) square to 36" (914 mm) square with optional adapters available to allow use with round ducts of 6", 8" (203 mm), 10" (254 mm) or 12" (305 mm) in diameter.
 - d. In-Duct Housing shall provide a magnetic test area and Red sensor status LED and In-Duct Housing shall provide a relay control Yellow LED trouble indicator.
 - e. Duct Housing shall have a transparent cover to monitor for the presence of smoke. Cover shall secure to housing by means of four (4) captive fastening screws.
 - f. Each duct smoke sensor shall be provided with a Remote Test Station with an alarm LED and test switch.
3. Addressable Air Aspirating Duct Smoke Sensors. Photoelectric type smoke detection with an aspirating system shall provide remote sensor location for ducts with difficult service access. Detectors shall support remote housing up to 82ft with 1.05" OD rigid pipe; detectors shall support remote housing up to 50ft with 3/4" OD flexible tubing. Sampling tubes shall be provided per design and dimensions as recommended by the manufacturer for the specific duct size and installation conditions where applied. Duct Detection system shall be UL listed to Standards 268A, and ULC listed to Standard S529.
- a. Environmental compensation, programmable sensitivity settings, status testing and monitoring of sensor dirt accumulation for the duct smoke sensor shall be provided by the FACP.
 - b. The Air Aspirating duct detection system shall supervise air flow through the duct housing and shall communicate trouble to the fire alarm control unit on a high or low air flow condition.
 - c. The Air Aspirating Duct Housing shall provide a supervised relay driver circuit for driving up to 15 relays with a single Form C contact rated at 7A@ 28VDC and 120VAC. This auxiliary relay output shall be fully programmable. Relay shall be mounted within 3 feet of HVAC control circuit.
 - d. Air Aspirating Duct Housing shall provide a magnetic test area and Red sensor status LED.
 - e. Each duct smoke sensor shall have a Remote Test Station with an alarm LED and test switch.
 - f. Each duct housing shall have remote functional smoke testing capability.
 - g. Each duct housing shall be supplied with a replacement air inlet filter.

- h. Each duct housing shall have an optional water trap with a ball valve for draining to eliminate moisture buildup.
- i. The Air Aspirating Detection system shall have an operating air velocity range of 0 to 4000 linear ft/minute) 0 to 1220 meters/minute.
- j. The Addressable Air Aspirating Detection system shall be capable of use in other areas as open area detection where point type detectors are not practical, such as; prison cells in correctional facilities, transformer vaults, cable tunnels and MRI rooms.

D. ADDRESSABLE HEAT SENSORS

1. General Requirements for Heat Detectors: Comply with UL 521.
2. Thermal Sensor Combination type: Fixed-temperature and rate-of-rise unit with plug-in base and alarm indication lamp; Actuated by either a selected fixed temperature or a rate of rise that exceeds a preset amount per minute unless otherwise indicated.
3. Thermal sensor shall be of the epoxy encapsulated electronic design. It shall be thermistor-based, rate-compensated, self-restoring and shall not be affected by thermal lag. Selectable rate compensated, fixed temperature sensing with or without rate-of-rise operation.
4. Mounting: Twist-lock base interchangeable with smoke-sensor heads.
5. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
6. Sensor fixed temperature sensing shall be independent of rate-of-rise sensing and programmable to operate at 135-deg F or 155-deg F Sensor rate-of-rise temperature detection shall be selectable at the FACP for either 15-deg F or 20-deg F per minute.
7. Sensor shall have the capability to be programmed as a utility monitoring device to monitor for temperature extremes in the range from 32-deg F to 155-deg F.
8. Unless otherwise indicated, sensors shall be analog-addressable type, individually monitored at fire-alarm control unit for calibration, sensitivity, and alarm condition and individually adjustable for temperature by fire-alarm control unit.
 - a. Rate-of-rise temperature characteristic shall be selectable at fire-alarm control unit for 15 or 20 deg F (8 or 11 deg C) per minute.
 - b. Fixed-temperature sensing shall be independent of rate-of-rise sensing and shall be settable at fire-alarm control unit
 - c. The CO Sensor shall be an addressable carbon monoxide (CO) sensing module providing both CO toxic gas detection and enhanced fire detection, and shall be listed to UL 268, Smoke Detectors for Fire Alarm Signaling Systems and UL 2075, Gas and Vapor Detectors and Sensors; allowing systems to be listed to UL 2034, Single and Multiple Station Carbon Monoxide Alarms.
 - d. The CO Sensor shall include CO sensor element mounted in the sensor base which can be easily replaced without replacing the complete sensor base assembly.
 - e. The CO Sensor base shall provide address selection in the base allowing the address to remain with its location when the sensor is removed for service or type change.
 - f. The CO Sensor base shall include an integral red LED to indicate the power-on, trouble, test mode or alarm status.

- g. CO sensor shall provide enhanced fire detection with the addition of two selectable modes of operation: Nuisance Alarm Reduction Mode and Faster Fire Detection.
 - h. The CO Sensor shall provide a 10-year life expectancy before replacement is necessary or required.
 - i. The CO Sensor base shall report the following CO Sensor troubles: Communication loss, Disabled, Almost Expired 12 Months, Almost Expired 6 Months, Expired (End of Life), and Sensor Missing/Failed.
9. Addressable CO Sensor Sounder Base
- a. The CO Sensing element shall support operation with a Sounder base; the CO Sensor Sounder base shall provide temporal code 3 (TC3) for fire, or temporal code 4 (TC4) for toxic carbon monoxide alarms.
 - b. The CO Sensor Sounder base shall be listed to UL464, Audible Signal Appliances.
 - c. CO sensor shall provide enhanced fire detection with the addition of two selectable modes of operation: Nuisance Alarm Reduction Mode and Faster Fire Detection.
 - d. The CO Sensor Sounder Base shall include CO sensor element mounted in the sounder base which can be easily replaced without replacing the complete sensor base assembly.
 - e. The CO Sensor Sounder base shall provide address selection in the base allowing the address to remain with its location when the sensor is removed for service or type change.
 - f. The CO Sensor Sounder Sensor base shall include an integral red LED to indicate the power-on, trouble, test mode or alarm status.
 - g. The CO Sensor Sounder base shall report the following CO Sensor troubles: Communication loss, Disabled, Almost Expired 12 Months, Almost Expired 6 Months, Expired (End of Life), and Sensor Missing/Failed.
 - h. The CO Sensor Sounder Base shall be interchangeable with the CO Sensor 520 Hz Sounder Base.
10. Addressable CO Sensor 520 Hz Sounder Base
- a. The CO Sensing element shall support operation with a 520 Hz Sounder base; the 520 Hz CO Sounder base shall provide temporal code 3 (TC3) for fire, or temporal code 4 (TC4) for toxic carbon monoxide alarms.
 - b. Emitted tone shall be a 520Hz Square Wave signal in compliance with the requirements of the 2010 edition of NFPA 72 for sleeping areas.
 - c. The CO Sensor 520Hz Sounder base shall be listed to UL 268 and UL464, Audible Signal Appliances.
 - d. CO sensor shall provide enhanced fire detection with the addition of two selectable modes of operation: Nuisance Alarm Reduction Mode and Faster Fire Detection.
 - e. The CO Sensor 520 Hz Sounder Base shall include CO sensor element mounted in the sounder base which can be easily replaced without replacing the complete sensor base assembly.
 - f. The CO Sensor 520 Hz Sounder base shall provide address selection in the base allowing the address to remain with its location when the sensor is removed for service or type change.
 - g. The CO Sensor 520 Hz Sounder base shall include an integral red LED to indicate the power-on, trouble, test mode or alarm status.
 - h. The CO Sensor 520 Hz Sounder base shall report the following CO Sensor troubles: Communication loss, Disabled, Almost Expired 12 Months, Almost Expired 6 Months, Expired (End of Life), and Sensor Missing/Failed.
 - i. The CO Sensor 520 Hz Sounder Base shall be interchangeable with the standard CO Sensor Sounder Base.

E. ADDRESSABLE MULTI-POINT/MULTI-SENSOR/MULTI-CRITERIA SENSOR

1. Smoke and heat sensing shall be available to be combined in a single housing to provide smoke activity accurately monitored by photoelectric sensing technology and thermal activity accurately monitored by thermistor sensing technology.
2. A correlation algorithm of smoke activity and thermal activity shall be provided for intelligent fire detection earlier than with either technology activity alone but shall provide software and programming capabilities to help reduce nuisance alarms.
3. Individual sensor information shall be processed by the host fire alarm control unit to determine sensor status and to determine whether conditions are normal, off-normal, or alarm.
4. Analog information from each sensor type shall be digitally communicated to the control panel where it is to be analyzed. Photoelectric sensor input is to be stored and tracked as an average value with an alarm or abnormal condition being determined by comparing the sensor's present value against its average value. Thermal data is to be processed to look for absolute or rate-of-rise temperature as desired.
5. Monitoring each photoelectric sensor's average value shall provide a software filtering process that compensates for environmental factors (dust, dirt, etc.) and component aging, which shall provide an accurate reference for evaluating new activity. The intent of this process is to be a significant reduction in the probability of false or nuisance alarms caused by shifts in sensitivity, either up or down. Status indications of dirty and excessively dirty shall be automatically generated allowing maintenance to be performed on a per device basis.
6. Peak activity per sensor shall be stored by the host fire alarm control unit to assist in evaluating specific locations where the alarm set point for each sensor shall be capable of being determined at the control panel, and selectable as more or less sensitive as the individual application requires.
7. Alarm set points shall be programmed for timed automatic sensitivity selection (such as more sensitive at night, less sensitive during day). Control panel programming shall also provide multi-stage operation per sensor, for example a 0.2% level may cause a warning to prompt investigation while a 2.5% level may initiate an alarm.
8. Combination smoke and heat sensors Rate-of-rise temperature characteristic shall be selectable at fire-alarm control unit for 15 or 20 deg F (8 or 11 deg C) per minute. The fixed-temperature sensing shall be independent of rate-of-rise sensing and shall be settable at fire-alarm control unit to operate at 135 or 155 deg F (57 or 68 deg C).
9. Bases: CO Sensor, relay output, sounder, 520 Hz Sounder, and isolator bases shall be supported alternatives to the standard base.
 - a. Air Sampling Pipe Network: Shall consist of a ¾ inch nominal inside diameter pipe arranged to provide optimal efficiency and air transport times which shall not exceed 60 seconds from the furthest point on the network. Sampling points shall be separated at intervals specified in NFPA 72; not more than 30 feet and typically in the range of 13 to 26-foot intervals along the path of the piping network. Air sampling calculations shall be provided from a registered VESDA sampling pipe aspiration modeling program ASPIRE rev.2.04 or later.

10. High Level Interface: Where VESDAnet is used, provide compatible fire alarm control unit interface module integral to the Fire Alarm Control Unit with connection to the High-Level Interface Module and installed in the VESDAnet equipment rack assembly.

2.04 NOTIFICATION

- A. Strobe lights shall meet the requirements of the ADA, UL Standard 1971, be fully synchronized, and shall meet the following criteria:
 1. The maximum pulse duration shall be 2/10 of one second.
 2. Strobe intensity shall meet the requirements of UL 1971.
 3. The flash rate shall meet the requirements of UL 1971.
- B. Horn/Strobes:
 1. Operate on 24 VDC.
 2. Have (2) selectable tone options of temporal (3) and non-temporal continuous pattern.
 3. Have at least (2) audibility options.
 4. Maximum Pulse Duration: 0.2 second.
 5. Strobe Intensity: UL 1971.
 6. Flash Rate: UL 1971
 7. Strobe Candela Rating: Determine by positioning selector switch on back of device.

2.05 MAGNETIC DOOR HOLDERS

- A. Description: Units shall be listed to UL 228. Units are equipped for wall or floor mounting as indicated and are complete with matching door plate. Unit shall operate from a 120VAC, a 24VAC or a 24VDC source, and develop a minimum of 25 lbs. holding force.
- B. Material and Finish: Match door hardware.

2.06 DEVICE GUARDS

- A. Description: Welded wire mesh of size and shape for the manual station, smoke detector, gong, or other device requiring protection.
 1. Factory fabricated and furnished by manufacturer of device.
 2. Finish: Paint of color to match the protected device.

PART 3 – EXECUTION

3.01 INSTALLATION, GENERAL

- A. Install system components and all associated devices in accordance with applicable NFPA Standards and manufacturer's recommendations.

- B. Installation personnel shall be supervised by persons who are qualified and experienced in the installation, inspection, and testing of fire alarm systems. Examples of qualified personnel shall include, but not be limited to, the following:
 - 1. Factory trained and certified personnel.
 - 2. National Institute of Certification in Engineering Technologies (NICET) fire alarm level II certified personnel.
 - 3. Personnel licensed or certified by state or local authority.

3.02 EQUIPMENT INSTALLATION

- A. Furnish and install a complete Fire Alarm System as described herein and as shown on the plans. Include sufficient manual stations, automatic fire detectors, smoke detectors, audible and visible notification appliances, wiring, terminations, electrical boxes, Ethernet drops, and all other necessary material for a complete operating system.
- B. Existing Fire Alarm Equipment shall be maintained fully operational until the new equipment has been tested and accepted.
- C. Equipment Removal: After acceptance of the new fire alarm system, disconnect and remove the existing fire alarm equipment and restore damaged surfaces. Package operational fire alarm and detection equipment that has been removed and deliver to the Owner. Remove from the site and legally dispose of the remainder of the existing material.
- D. Install manual station with operating handle 48 inches (1.22 m) above floor. Install wall mounted audible and visual notification appliances not less than 80 inches (2.03 m) above floor to bottom of lens and not greater than 96 inches (2.44 m) above floor to bottom of lens.
- E. Mount outlet box for electric door holder to withstand 80 pounds pulling force.
- F. Make conduit and wiring connections to door release devices, sprinkler flow switches, sprinkler valve tamper switches, fire suppression system control units, duct smoke detectors .
- G. Automatic Detector Installation: Conform to NFPA 72.

3.03 CONNECTIONS

- A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Division 08 Section "Door Hardware." Connect hardware and devices to fire-alarm system.
 - 1. Verify that hardware and devices are NRTL listed for use with fire-alarm system in this Section before making connections.
- B. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 3 feet (1 m) from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
 - 1. Alarm-initiating connection to smoke-control system (smoke management) at firefighter smoke-control system panel.
 - 2. Alarm-initiating connection to stairwell and elevator-shaft pressurization systems.
 - 3. Smoke dampers in air ducts of designated air-conditioning duct systems.

4. Alarm-initiating connection to elevator recall system and components.
5. Alarm-initiating connection to activate emergency lighting control.
6. Alarm-initiating connection to activate emergency shutoffs for gas and fuel supplies.
7. Supervisory connections at valve supervisory switches.
8. Supervisory connections at low-air-pressure switch of each dry-pipe sprinkler system.
9. Supervisory connections at elevator shunt trip breaker.
10. Supervisory connections at fire-pump power failure including a dead-phase or phase-reversal condition.
11. Supervisory connections at fire-pump engine control panel.

3.04 WIRING INSTALLATION

- A. System Wiring: Wire and cable shall be a type listed for its intended use by an approval agency acceptable to the Authority Having Jurisdiction and shall be installed in accordance with the appropriate articles from the current approved edition of NFPA 70: National Electric Code (NEC).
- B. Contractor shall obtain from the Fire Alarm System Manufacturer written instruction regarding the appropriate wire/cable to be used for this installation. No deviation from the written instruction shall be made by the Contractor without the prior written approval of the Fire Alarm System Manufacturer.
- C. Color Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color code for alarm initiating device circuits wiring and a different color code for supervisory circuits. Color-code notification appliance circuits differently from alarm-initiating circuits. Paint fire alarm system junction boxes and covers red.

3.05 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."
- B. Install framed instructions in a location visible from fire-alarm control unit.

3.06 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: Provide services of a factory-authorized service representative to supervise the field assembly and connection of components and the pretesting, testing, and adjustment of the system.
- B. Service personnel shall be qualified and experienced in the inspection, testing, and maintenance of fire alarm systems. Examples of qualified personnel shall be permitted to include, but shall not be limited to, individuals with the following qualifications:
 1. Factory trained and certified.
 2. National Institute for Certification in Engineering Technologies (NICET) fire alarm certified.
 3. International Municipal Signal Association (IMSA) fire alarm certified.
 4. Certified by a state or local authority.
 5. Trained and qualified personnel employed by an organization listed by a national testing laboratory for the servicing of fire alarm systems.
- C. Pretesting: Determine, through pretesting, the conformance of the system to the requirements of the Drawings and Specifications. Correct deficiencies observed in pretesting. Replace malfunctioning or damaged items with new and retest until satisfactory performance and conditions are achieved.

- D. Inspection:
1. Inspect equipment installation, interconnection with system devices, mounting locations, and mounting methods.
 2. Verify that units and controls are properly installed, connected, and labeled and that interconnecting wires and terminals are identified.
- E. Acceptance Operational Tests:
1. Perform operational system tests to verify conformance with specifications:
 - a. Each alarm initiating device installed shall be operationally tested. Each device shall be tested for alarm and trouble conditions. Contractor shall submit a written certification that the Fire Alarm System installation is complete including all punch-list items. Test battery operated emergency power supply. Test emergency power supply to minimum durations specified. Test Supervising Station Signal Transmitter. Coordinate testing with Supervising Station monitoring firm/entity.
 - b. Test each Notification Appliance installed for proper operation. Submit written report indicating sound pressure levels at specified distances.
 - c. Test Fire Alarm Control Unit and Remote Annunciator.
 2. Provide minimum 10 days notice of acceptance test performance schedule to Owner, and local Authority Having Jurisdiction.
- F. Retesting: Correct deficiencies indicated by tests and completely retest work affected by such deficiencies. Verify by the system test that the total system meets the Specifications and complies with applicable standards.
- G. Report of Tests and Inspections: Provide a written record of inspections, tests, and detailed test results in the form of a test log. Use NFPA 72 Forms for documentation.
- H. Final Test, Record of Completion, and Certificate of Occupancy:
1. Test the system as required by the Authority Having Jurisdiction in order to obtain a certificate of occupancy. Provide completed NFPA 72 Record of Completion form to Owner and AHJ.

3.07 CLEANING AND ADJUSTING

- A. Cleaning: Remove paint splatters and other spots, dirt, and debris. Clean unit internally using methods and materials recommended by manufacturer.
- B. Occupancy Adjustments: When requested within one year of date of Substantial Completion, provide on-site assistance in adjusting sound pressure levels and adjusting controls and sensitivities to suit actual occupied conditions. Provide up to three visits to the site for this purpose.

END OF SECTION 28 3111

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections apply to this section.

1.2 GENERAL

- A. Security Systems include IP security cameras.
- B. The Owner will purchase all equipment directly from Securitas, Securitas will furnish approved submittals to the contractor.
- C. The contractor shall provide power and category 5E and other backbone cables for the systems.
- D. The contractor shall provide all back boxes and raceways required for the systems.
- E. Securitas will provide all system programming and head end hardware.
- F. The contractor shall assist Securitas and their certified installer with testing and commissioning the system.
- G. The certified installer shall make all terminations and mount devices on backboxes provided by the contractor.
- H. The contractor shall coordinate all work with:
Mr. Andy O'Reilly
518-376-6604
Andy.OReilly@securitas.com

1.3 SCOPE OF WORK

- A. The contractor shall provide the following:
 - 1. Remove the existing security equipment, box and turn over to Securitas for storage.
 - 2. Provide category 5E cables from the closest IDF to each security camera. Provide a lightning arrestor for all exterior cameras.
 - 3. Maintain record drawing of any wiring installation that deviates from shop drawing submittal. The contractor shall assist Securitas technicians with testing and certifying the security systems.

1.4 REFERENCES

- A. Underwriter's Laboratories UL-1069 current release
- B. NFPA – National Fire Protection Association
- C. NEC – National Electrical Code - NFPA 70 and 99
- D. ADA – Americans with Disabilities Act
- E. EIA – Electronic Industry Association
- F. NEMA – National Electrical Manufacturers Association – Installation Standards
- G. U.S. Dept. of Labor / Occupational Safety and Health Administration
- H. State Hospital Code / Joint Commission of Hospitals – Nurse Call
- I. Canadian Standards Association

1.5 SUBMITTALS

- A. Securitas will submit the following to the contractor and the engineer. The submittals will be furnished according to Conditions of Contract and Division 1 Specification Sections
 - 1. Product Data for each type of device and all equipment.
 - 2. Riser diagrams showing all devices and equipment.
 - 3. Single-line block diagrams showing cabling interconnection of all components for this specific equipment. Include cable type for each interconnection.
 - 4. Wiring Diagrams: Power, signal, and control wiring.
 - 5. Station Installation Details: For built-in equipment; dimensioned and to scale.
 - 6. Equipment Cabinet Drawings: Dimensioned and to scale.
 - 7. Manufacturer Certificates: Signed by manufacturers certifying that nurse call equipment complies with requirements.
 - 8. Manufacturer's Warranty Statement.
 - 9. Field Tests Reports and Observations: Include record of final adjustments certified by Installer.
 - 10. Operation and Maintenance Data:
 - a. Operating instructions.
 - b. Troubleshooting guide.
 - c. Wiring diagrams and terminal identification.
 - d. Equipment parts list.
 - e. Product data for types and sizes of wires and cables used.

- B. The contractor shall provide the following submittals. The submittals will be furnished according to Conditions of Contract and Division 1 Specification Sections
 - 1. Provide certification that all submittals have been received from Securitas and that they are complete and there are no questions

1.6 WARRANTY

- A. The installing manufacturer's representative shall guarantee all labor, parts, and installation for a period of 1 year from substantial completion or first beneficial use of the system.
- B. The contractor shall warrantee all Category 5 cable for a period of 1 year.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Securitas will furnish products from the Manufacturers:
- B. IP Security Cameras and servers – Axis Communications

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Wiring Method: Install wiring in raceway at door location and in open top cable hangers above accessible ceilings.
 - 1. Pull cables simultaneously if more than one is being installed in same raceway.
 - 2. Use pulling compound or lubricant if necessary. Use compounds that will not damage conductor or insulation.
 - 3. Use pulling means, including fish tape, cable, rope, and basket-weave wire or cable grips that will not damage media or raceway. Install exposed raceways and cables parallel and perpendicular to surfaces or exposed structural members, and follow surface contours. Secure and support cables by straps, staples, or similar fittings designed and installed so as not to damage cables. Secure cable at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, or fittings.
- B. Wiring within Enclosures: Provide adequate length of conductors.
- C. Separation of Wires: Run in separate raceways or, if exposed or in same enclosure, provide 12-inch minimum separation between conductors and adjacent parallel power and telephone wiring. Provide separation as recommended by equipment manufacturer for other conductors.
- D. Identification of Conductors and Cables: Retain color-coding of conductors and apply wire and cable marking tape to designate wires and cables so all media are identified in coordination with system wiring diagrams. Label stations, controls, and indications using approved consistent nomenclature.

- E. Category-5 or better wire termination will be connectorized according to ANSI Standard T568A. Grounding Provisions: Comply with requirements in Division 26 Section "Grounding and Bonding for Electrical Systems."

3.2 FIELD QUALITY CONTROL

- A. A factory-authorized service representative will inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.
- B. Test Procedure: Comply with the following:
 - 1. Schedule tests a minimum of seven (7) days in advance of performance of tests.
 - 2. Report: Submit a written record of test results.
 - 3. Operational Test: Perform an operational system test, and demonstrate proper operations, adjustment, and sensitivity of each station. Perform tests that include originating station-to-station and all-call messages and pages at each nurse call station. Verify proper call-in routing and volume levels for each intercom station.

3.3 DRAWINGS

- A. Provide as built drawings of all installed network components and associated wiring on building plans. Final payment for work will not be authorized unless these drawings are supplied.

END OF SECTION 284112