

Clarksville School Building Assessment
ALBANY COUNTY SHERIFF'S OFFICE



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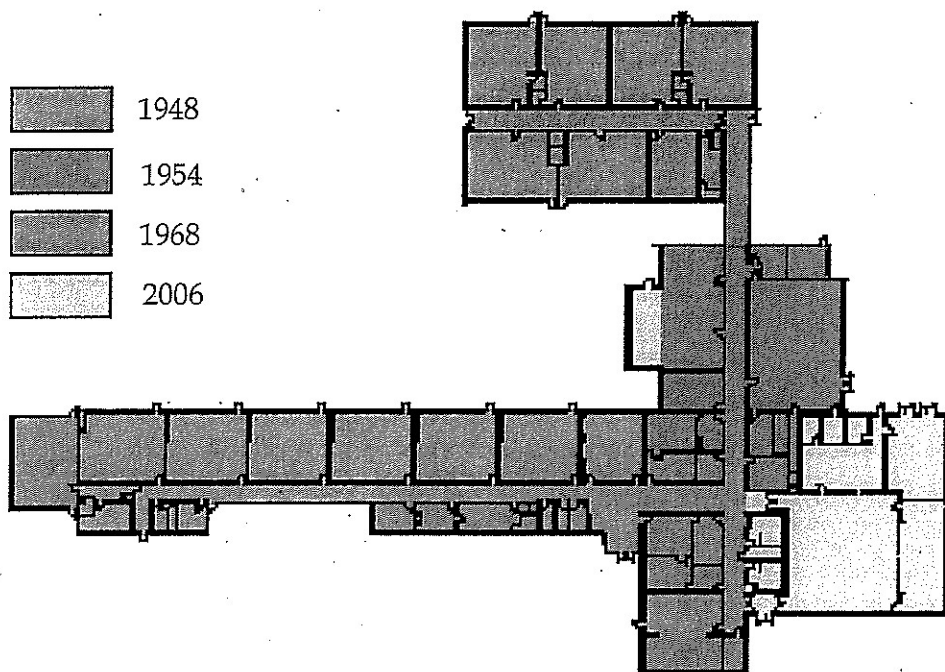
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1. INTRODUCTION

The County of Albany has commissioned WCGS Architects, Huston Engineering and WEB Engineering to perform an Assessment of the former Clarksville Elementary School located at 58 Verda Avenue in Clarksville, New York. The purpose of the Assessment is to provide the Albany County Sheriff's Office with a description of the condition of the building and its systems prior to the Sheriff's Office purchase of the facility from the Bethlehem Central School District. The Assessment has investigated conditions in the following categories:

- Architecture (Building Envelope and Interior)
- Building Code and Regulatory Compliance
- Building Structure
- Mechanical Systems
- Electrical Systems
- Plumbing Systems
- Fire Protection Systems
- Telecommunications Systems
- Security Systems
- Kitchen Equipment
- Furniture

The Clarksville Elementary School was originally constructed in 1948 and has since undergone several additions and renovations to reach its present state.



1. INTRODUCTION

The building ceased operations as a school in 2012 and has been occupied by the Albany County Sheriff since then through a lease agreement with the School District. Currently the building accommodates Sheriff patrol, Town of New Scotland Justice Court and community activity functions.

This Assessment Report is based upon our Project Team's review of drawings and documents obtained from the Bethlehem School District and our site visit on May 4, 2018 to observe existing conditions. Documents such as the "2015 Five-Year Capital Facilities Plan" cited throughout this Report can be found in the Reference Documents section of the Report. Room numbers cited are found on the floor plan in the Reference Documents section.

Note: The Assessment represents a professional opinion based upon the information indicated within and upon past experience with similar conditions. This report is not intended to be a complete or comprehensive review of the structure and only addresses the readily apparent conditions observed during our visit. Unknown and/or hidden conditions may exist. The work has been performed in accordance with generally accepted principles and practices of architecture and engineering. No either expressed or implied warranty is provided.

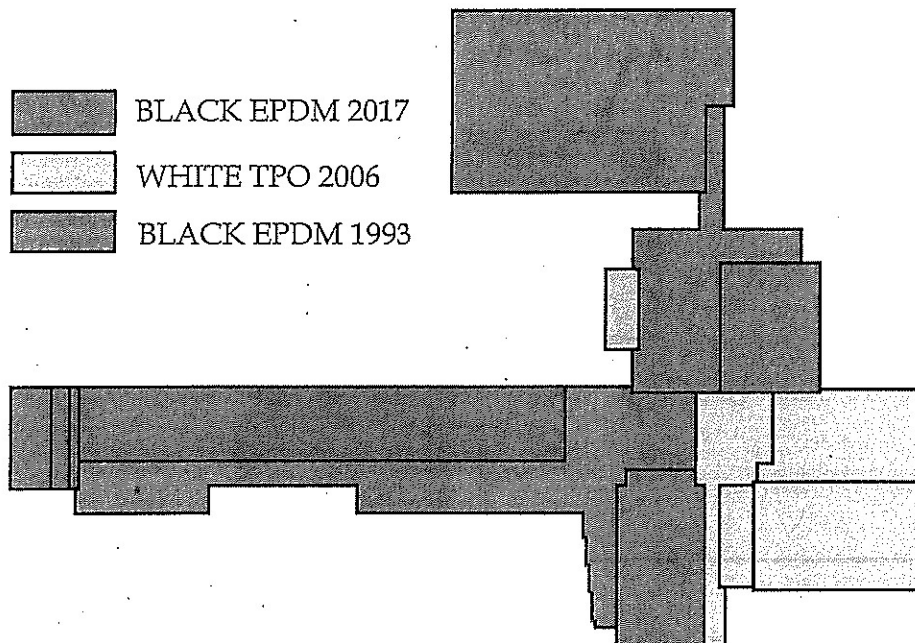
The Sections on the following pages describe our findings.

2. ARCHITECTURE (BUILDING ENVELOPE AND INTERIOR)

2.1 Building Envelope

.1 Roof

The roof surfaces consist of multiple different roof covering materials applied at different stages of the building's history, as shown below:

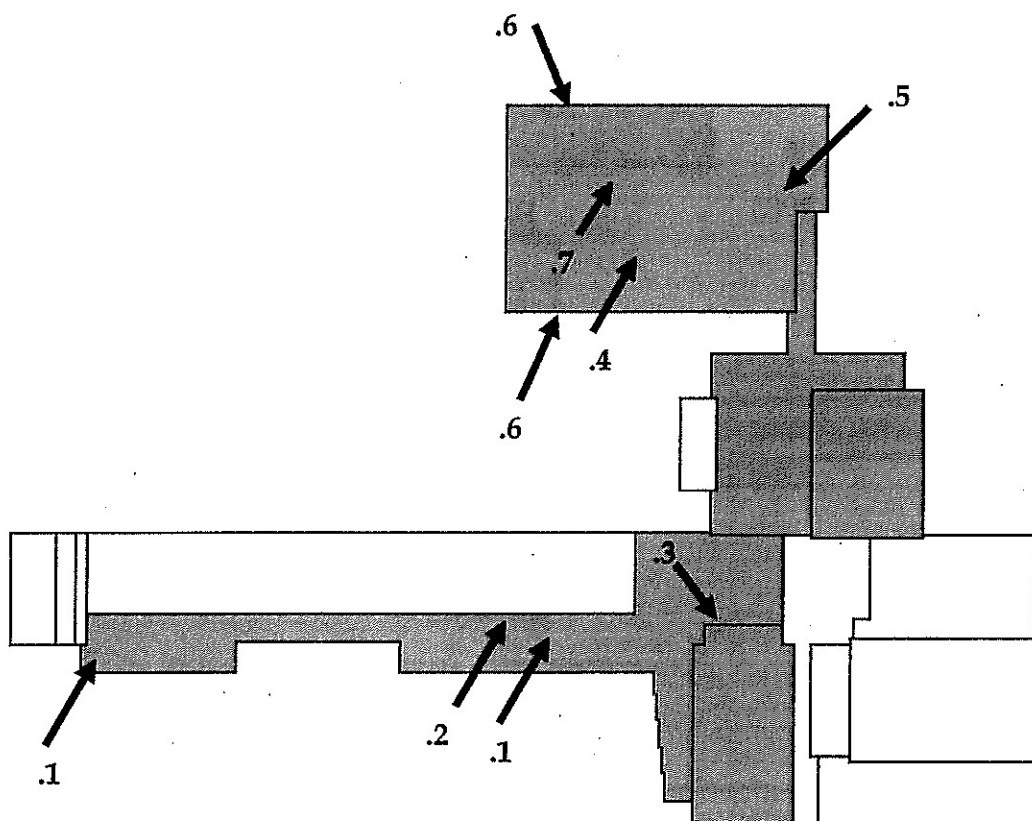


2. ARCHITECTURE (BUILDING ENVELOPE AND INTERIOR)

1993 Roof Installation

This black EPDM roofing installation extends over portions of the 1948 building, the 1954 addition and the 1968 addition and comprises approximately 20,900 square feet of roof area.

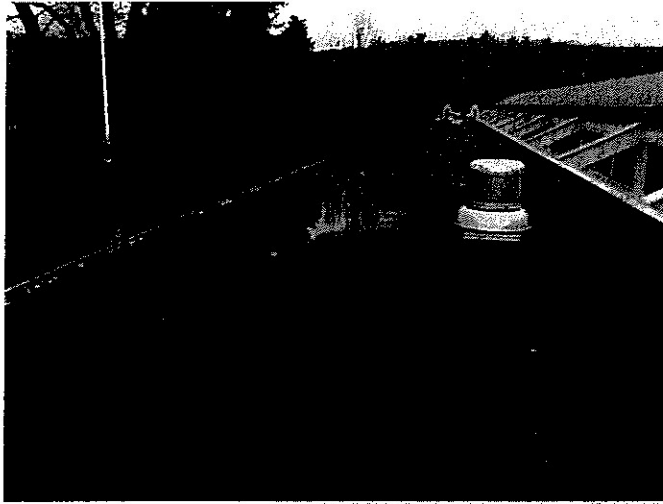
Generally, the 1993 portions of the roof have reached or are reaching the end of their useful life. These roof areas were identified as a high priority for replacement in the 2015 Facilities Plan.



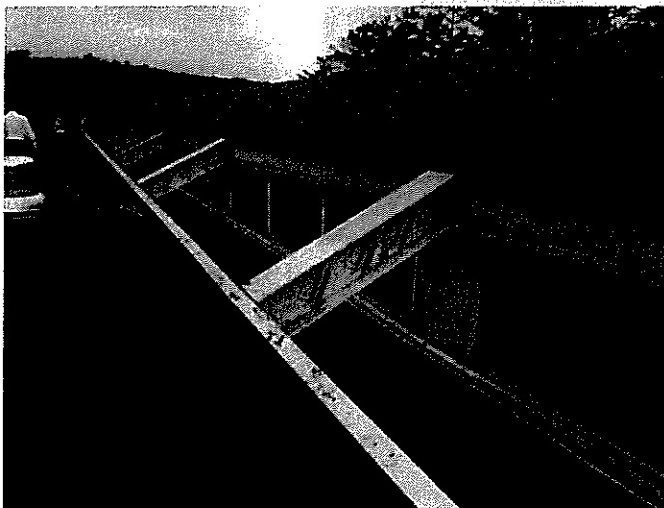
Numbers shown above correspond to items identified on the following pages.

2. ARCHITECTURE (BUILDING ENVELOPE AND INTERIOR)

- .1 Multiple instances of ponding were observed, indicating insufficient slope to drains or scupper outlets. Separation of the roof membrane from the substrate was observed, in the form of areas of loose membrane bubbling from the substrate. Occupants described recurring leaks in Room 15, which contains telecommunications equipment for the town court. Insulation above the ceiling /below the roof in this area has been removed, which may result in additional heat loss and cause additional water infiltration.

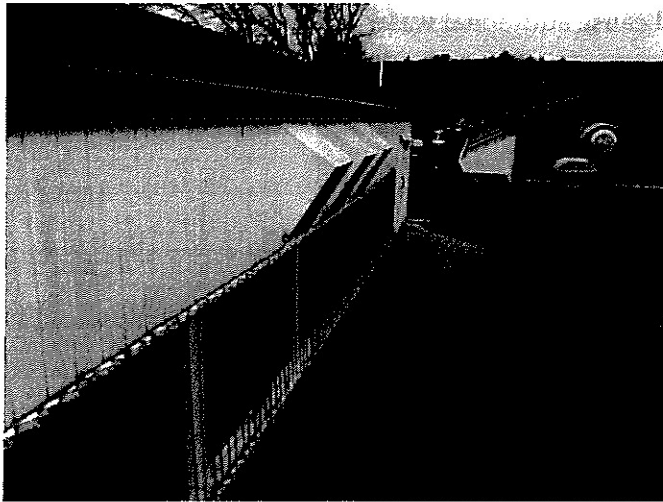


- .2 The roof membrane at the clerestory windows on the south side of Rooms 8, 9, 10, 11, 12 and 13 has a very short (approximately 3 inch) vertical return below the windows. Building occupants report that snow from the roof above the clerestories slides down on the roof below, piling up and causing water infiltration through the windows if the snow is not manually cleared.



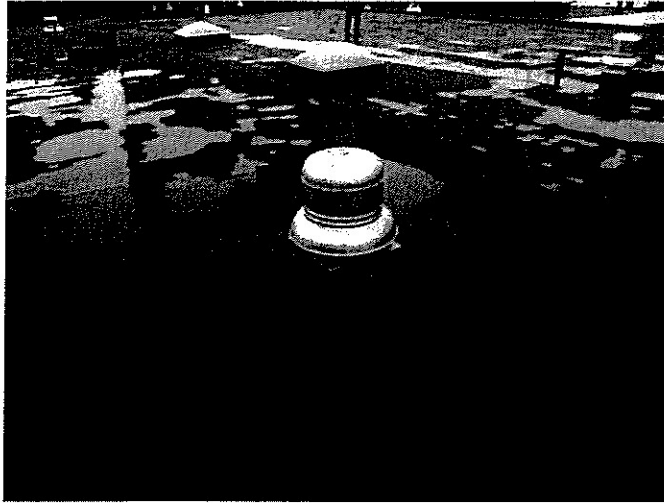
2. ARCHITECTURE (BUILDING ENVELOPE AND INTERIOR)

- .3 Building occupants report repeated instances of leaks around the skylight in the passage space adjacent to Room 30. This is possibly another area with insufficient vertical return of the roof surface, which allows snow against the wall to infiltrate as water.



2. ARCHITECTURE (BUILDING ENVELOPE AND INTERIOR)

- .4 On the 1968 wing there were multiple shallow areas of ponding, indicating insufficient slope to the drain. The membrane appears to have maintained its bond to the substrate on this portion of the building.

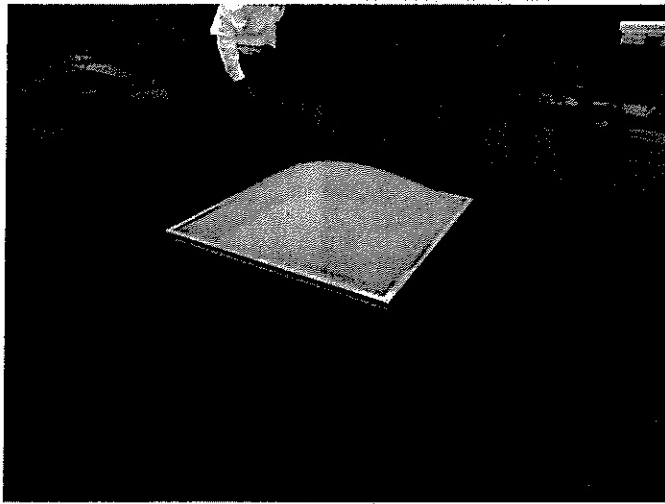


- .5 This roof area is served by only one roof drain, making it susceptible to overflow or leaks if the drain becomes clogged and is not maintained. Building occupants reported that multiple adjacent tall pine trees dropping their needles on to the roof have caused drain blockages previously, and the 2015 Facilities Plan recommended annual clearing of the roof drain. When this roof is replaced, consideration should be given to providing at least one additional roof drain.



2. ARCHITECTURE (BUILDING ENVELOPE AND INTERIOR)

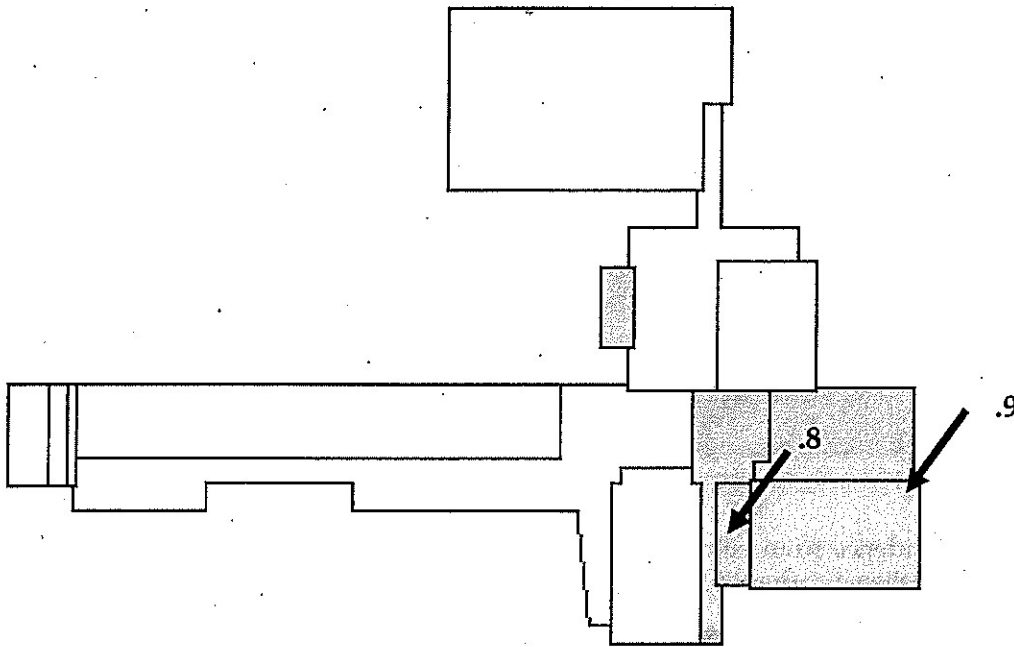
- .6 There are two overflows scuppers along the north and south edges of the roof. However, these are located so far to the west of (and much higher than) the drain that the roof is more likely to overflow onto the adjacent lower roof than through the relief scuppers. When this roof is replaced, scuppers should be located to adequately protect the roof.
- .7 This roof area contains two skylights, which building occupants indicate have been an occasional source of leaks. Observation of the skylights found water visible below the glazing at the top of the curb, indicating that there is no path for escape from the assembly once it has infiltrated.



2. ARCHITECTURE (BUILDING ENVELOPE AND INTERIOR)

2006 Roof Installation

This white TPO roofing installation extends over the 2006 addition and portions of the 1954 addition and comprises approximately 8,200 square feet of roof area.



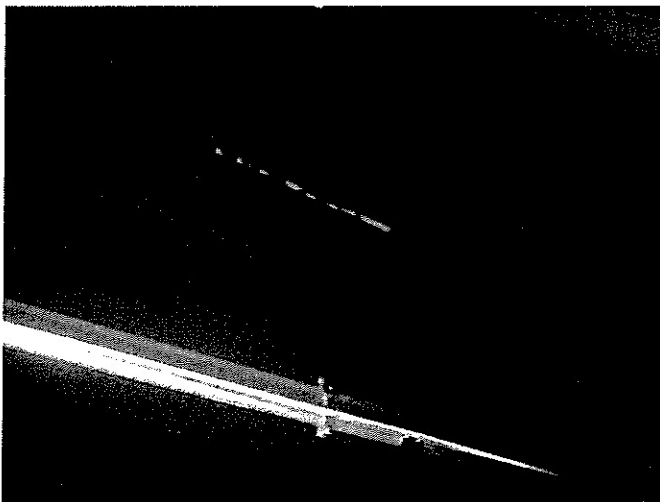
Numbers shown above correspond to items identified on the following pages.

2. ARCHITECTURE (BUILDING ENVELOPE AND INTERIOR)

- .8 There are areas of significant ponding, indicating insufficient slope to the roof drains above Rooms 27 and 28 and the adjacent passages. The roof surface is spongy in several location, indicating that the substrate below has been degraded due to water infiltration.



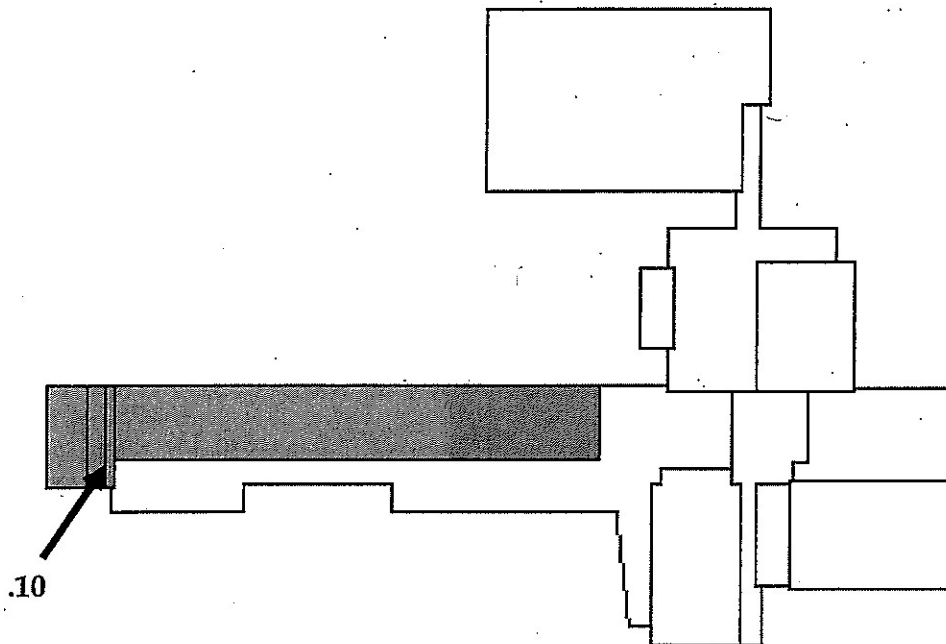
- .9 There is evidence from below of an active roof leak above the northeast corner of Room 42 and the southeast corner of Room 41.



2. ARCHITECTURE (BUILDING ENVELOPE AND INTERIOR)

2017 Roof Installation

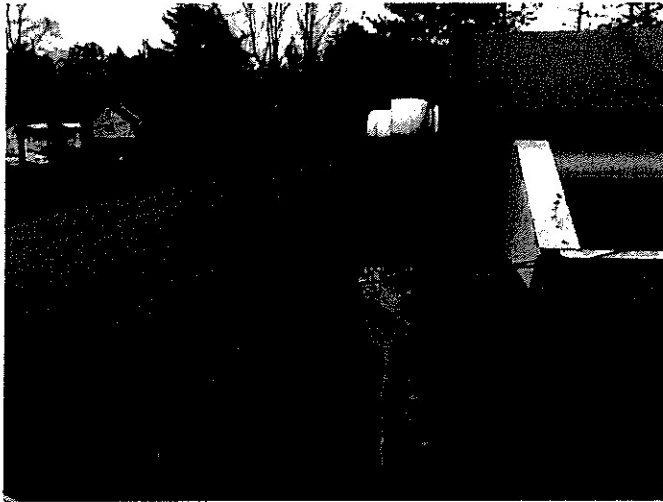
This black EPDM roofing installation extends over portions of the 1948 building and the 1954 addition and comprises approximately 7,200 square feet of roof area.



Numbers shown above correspond to items identified on the following pages.

2. ARCHITECTURE (BUILDING ENVELOPE AND INTERIOR)

- .10 Building occupants reported recurring leaks above Room 14 at the intersection with the 1948 wing. Where the sloped roof intersects with the flat roof the membrane has detached from the substrate, preventing water from reaching the drain, which may be causing ponding and allowing for water infiltration.



2. ARCHITECTURE (BUILDING ENVELOPE AND INTERIOR)

2.2 Exterior Walls

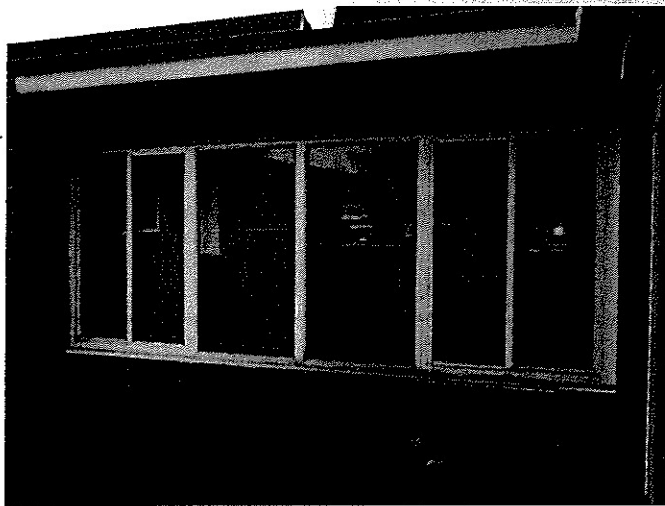
- .1 Numerous instances of deteriorated brick and mortar on the 1948 and 1954 sections were identified. Brick and mortar in these areas will require replacement for at least several courses above the ground. This deterioration was listed in the 2015 Facilities Plan, and appears to be caused by three conditions:

Salting of adjacent walking and driving surfaces:



2. ARCHITECTURE (BUILDING ENVELOPE AND INTERIOR)

Water from roof drains or scuppers falling uncontrolled onto ground mounted splash blocks and splashing onto the adjacent brick wall surfaces. Erosion from the splashing and freeze / thaw action of the splashed water is likely responsible for the resulting deterioration. Brick in these areas may be salvageable if cleaned. The mortar will at a minimum require repair.

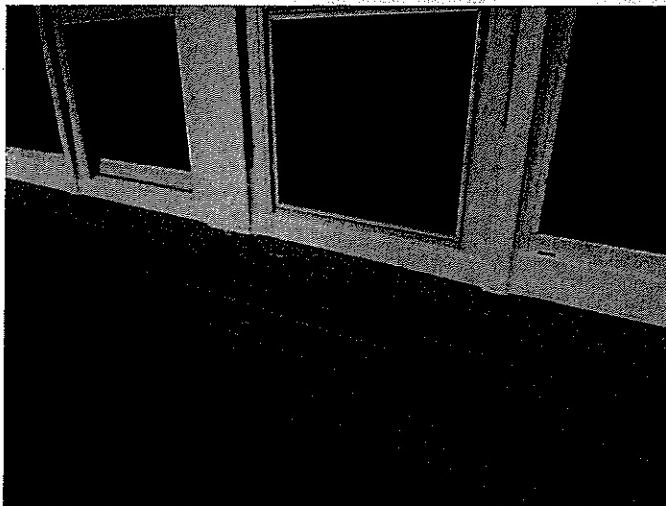


2. ARCHITECTURE (BUILDING ENVELOPE AND INTERIOR)

Incorrect slope of the concrete walkway below the main entrance directs water toward the brick wall, allowing it to pool against the brick and cause damage from freeze / thaw action. Brick and mortar in these areas will require replacement for at least several courses above the ground.

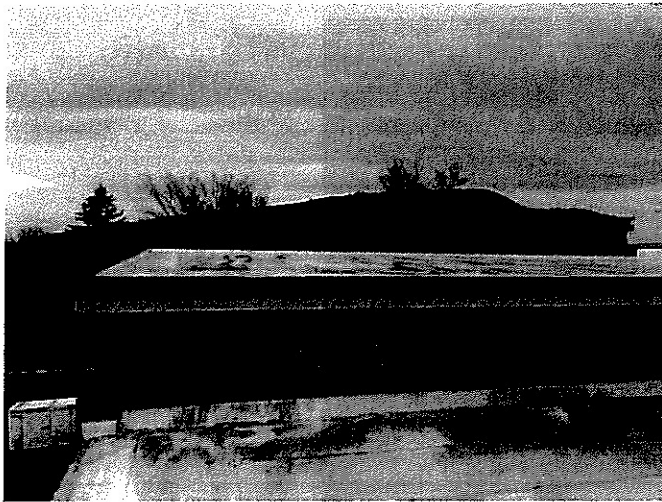


- .2 Precast concrete sills below numerous windows on the 1948 wing are cracking and breaking apart, with fracturing of one sill exposing the steel reinforcing bar. This damage is referenced in the 2015 Facilities Plan. Replacement of the damaged concrete sills will be required at these locations.



2. ARCHITECTURE (BUILDING ENVELOPE AND INTERIOR)

- .3 The EIFS wall surface on the north wall of the 2006 addition above the adjacent roof is stained and may have mold growth present. This may be due to the lack of sun on this exposure combined with moisture from snow accumulating on the roof below. This is the area of the roof leak identified in 2.1.9.

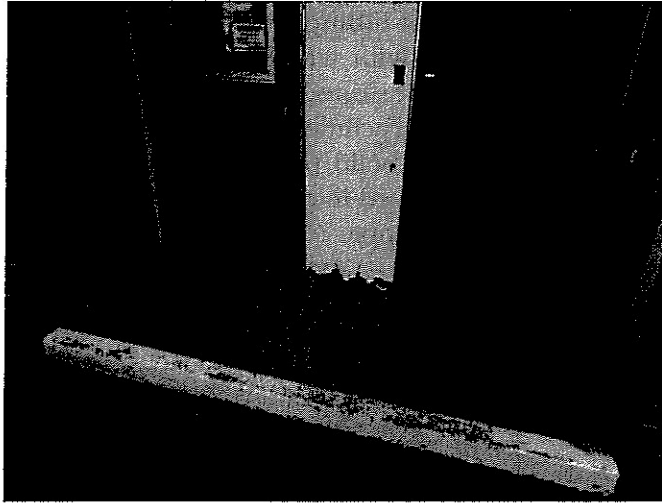


- .4 Finish grade outside of Room 25A/25B/24A/22/20 extends above finished floor height. This condition may allow for moisture infiltration through the exterior masonry wall.



2. ARCHITECTURE (BUILDING ENVELOPE AND INTERIOR)

- .5 Metal panel between exterior doors on the west side of the 1968 addition is corroded at grade, and will likely need replacement.



2. ARCHITECTURE (BUILDING ENVELOPE AND INTERIOR)

2.3 Openings

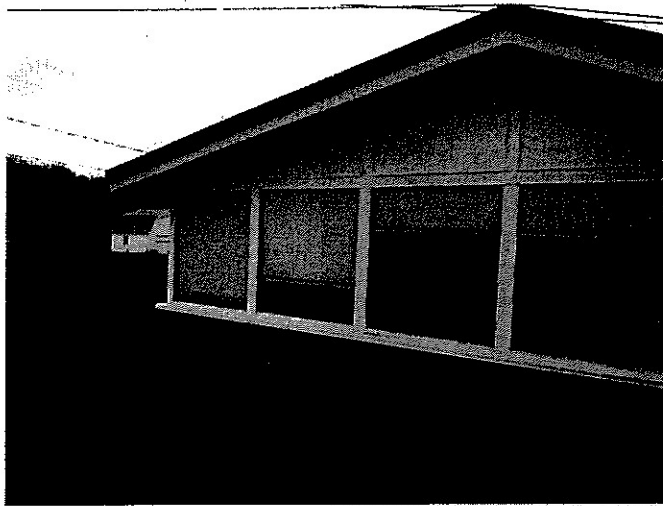
- .1 Metal doors to the exterior from Rooms 8, 9, 10, 11, 12 and 13 are corroded at their base. This may be partly a function of uncontrolled water hitting the ground from the roof edge above. Building occupants report no current issues with water infiltration at the doors. Ground mounted concrete pads at these locations have shifted to slope toward the building at these doors. These issues were identified in the 2015 Facilities Plan. If doors are no longer required from these rooms, consider replacement with solid panels. If doors are required consider replacement with FRP doors similar to those used in other locations of the building, and the installation of new concrete pads with proper slope.



- .2 Building occupants reported air leakage from the northern most grouping of windows in Room 20. These windows should be investigated to determine if repairs to sealant joints are sufficient or if window replacement is required.

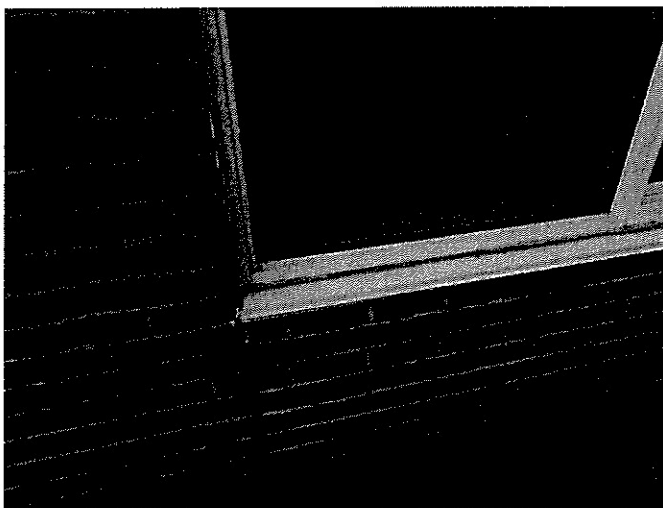
2. ARCHITECTURE (BUILDING ENVELOPE AND INTERIOR)

- .3 Some exterior windows at Room 14 are original single pane glass units, which provide poor thermal performance. A portion of the windows have had new insulated glass units set into the existing frames with sealant. Thermal performance of the non-thermally-broken frames will continue to be poor. Exterior steel frames have been painted, and paint has begun to peel from the frames.



2.4 Sealant Joints

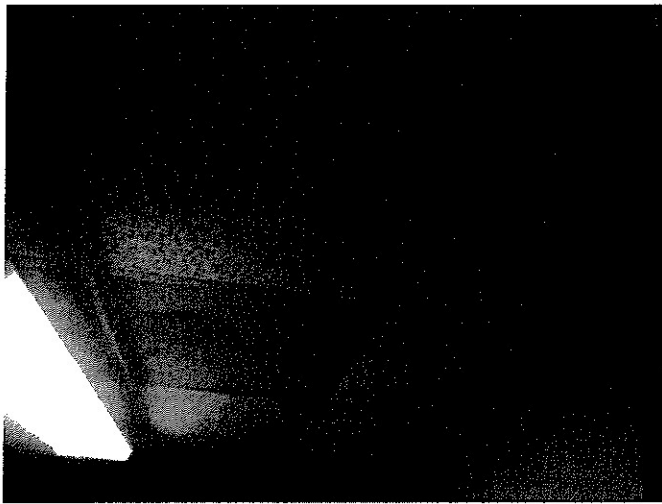
- .1 Sealant joints at opening perimeters and control joints show evidence of deterioration. Consider recaulking of all exterior joints to prevent moisture infiltration. Analysis of existing caulking material must be performed prior to removal to determine the presence of hazardous materials.



2. ARCHITECTURE (BUILDING ENVELOPE AND INTERIOR)

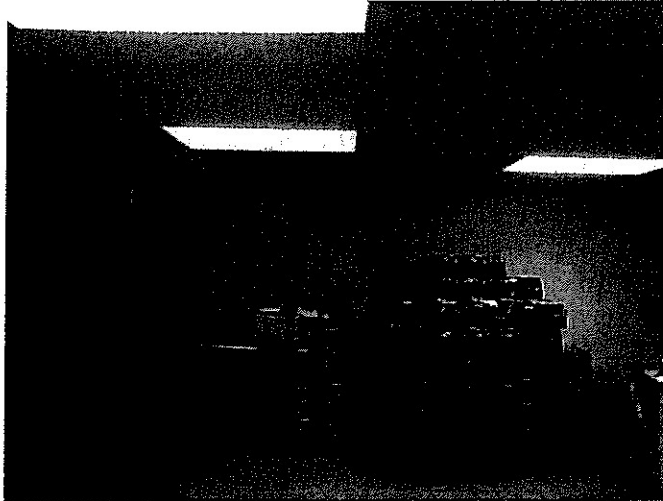
2.5 Building Interior

- .1 Floor tiles have come loose in several spaces of the 1968 addition. This is potentially the result of moisture coming through the concrete floor slab. It is recommended that thorough testing of the slab moisture content be performed prior to any floor finish replacement.
- .2 The ceiling tile and grid in Room 15 is stained / damaged due to recurring roof leaks. Ceiling tile should continue to be replaced as needed, with consideration for replacing corroded areas of grid when roof leaks have been resolved.



2. ARCHITECTURE (BUILDING ENVELOPE AND INTERIOR)

- .3 Ceiling grid and tile are missing in Room 44 (Kitchen). This area of ceiling had accommodated dishwashing equipment during school operations, and should be replaced if the space is to be further used as a kitchen.



2.6 Hazardous Materials

- .1 Asbestos is present in building materials located in several sections of the building. In 1988 the Bethlehem Central School District completed an Asbestos Management Plan that identified asbestos containing materials and began the process of abatement, which has occurred in areas undergoing renovation since the Management Plan went into effect.

The School District has also performed regular monitoring of the remaining asbestos containing material on site to verify that conditions have not become more hazardous. The original Asbestos Management Plan and subsequent monitoring documentation is available from the School District, and this information must be taken into account in the planning and budgeting for potential renovations to the building.

3. BUILDING CODE AND REGULATORY COMPLIANCE

3.1 Building Code

- .1 Renovations to the facility will be governed by the current version of the International Existing Building Code. The IEBC sets different compliance requirements for different levels of alteration or addition to the building, and these requirements must be analyzed for each potential alteration or addition to determine the level of compliance required.
- .2 Use of the building for Sheriff's patrol (Business B occupancy) and Town Court (Assembly A-3 occupancy) may result in different application of the building codes than the facility's previous use as an Education occupancy.
- .3 The 2006 addition provides for the required two hour fire barrier occupancy separation between a Business and an Assembly occupancy.
- .4 Under the current IEBC, the change of occupancy from Education to Assembly requires that a fire sprinkler system be provided for the Assembly occupancy.

3.2 Accessibility Code

- .1 Compliance with accessibility code requirements is also governed by the IEBC, which will have different thresholds for compliance depending upon which areas of the building are altered and the extent of the alterations.
- .2 In general, access to building spaces (width of travel pathways, sloping surfaces, door swings) is already provided throughout the building. Accessible toilet rooms are also provided in Rooms 27 and 28.
- .3 Improvements to door hardware and accessible signage should be considered in older portions of the building. The area of the 2006 addition includes these features today.

3. BUILDING CODE AND REGULATORY COMPLIANCE

3.3. Historic Building Regulations

- .1 The Clarksville School building was added to the National Register of Historic Places in 2008 for its architectural significance as an example of modern architectural school design, based upon the original 1948 building. This listing means that any modifications made to the building that make use of federal funding must abide by the preservation guidance provided by the local authority having jurisdiction, which in New York State is the State Historic Preservation Office (SHPO). Conversely, building modifications made with funding from other than federal sources are exempt from compliance with preservation guidance. The Sheriff's office will have the option of voluntarily seeking guidance from SHPO when modifying the building.

4. BUILDING STRUCTURE

4.1 Exterior

.1 Roof and Exterior Walls Above Low Roofs:

The several additions that have occurred since construction of the original 1948 building have resulted in many different roof levels and exterior brick wall surfaces between lower and higher roof levels. The following items were observed from the roof levels.

- .1 Deterioration in the form of cracks, offsets, loose units, and eroded mortar joints were observed at the top (all sides) of the masonry chimney located in the original 1948 building. This damage allows moisture to penetrate the exterior surface, will continue to deteriorate, and should be repaired.

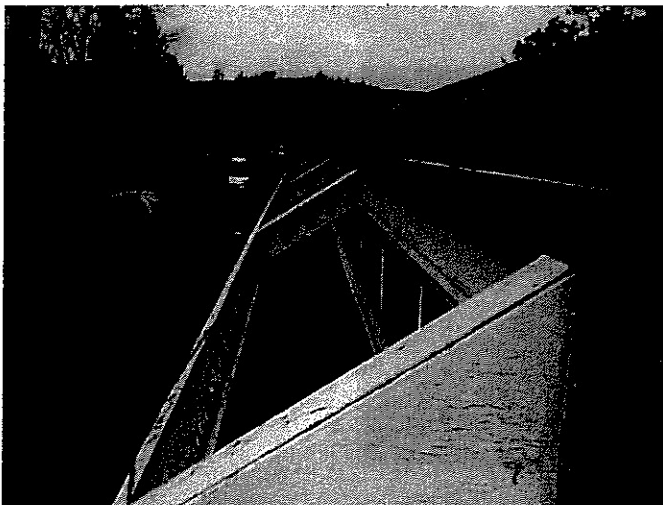


4. BUILDING STRUCTURE

- .2 A few cracks were observed in the exterior brick surfaces of the two gable ends of the pitched roof sections of the original 1948 building. This allows moisture to penetrate the exterior surface, causing continuing deterioration, and should be repaired.

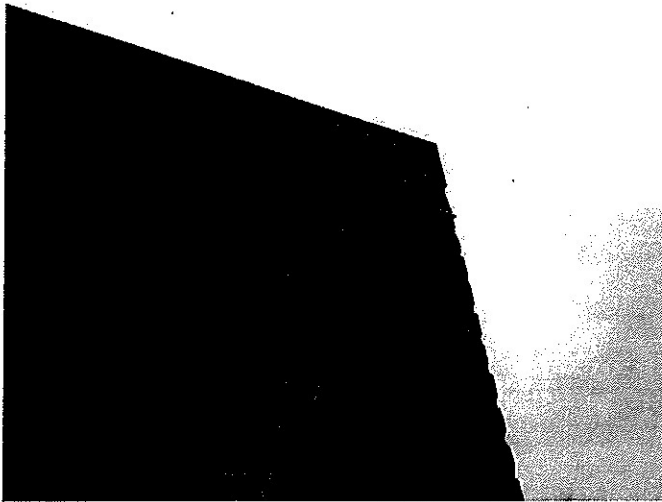


- .3 Rust and peeling paint was observed on the exterior steel surfaces of the 1948 Building clerestory sunshade framing. Deterioration appears minor but will continue to progress. Scraping and repainting is recommended.

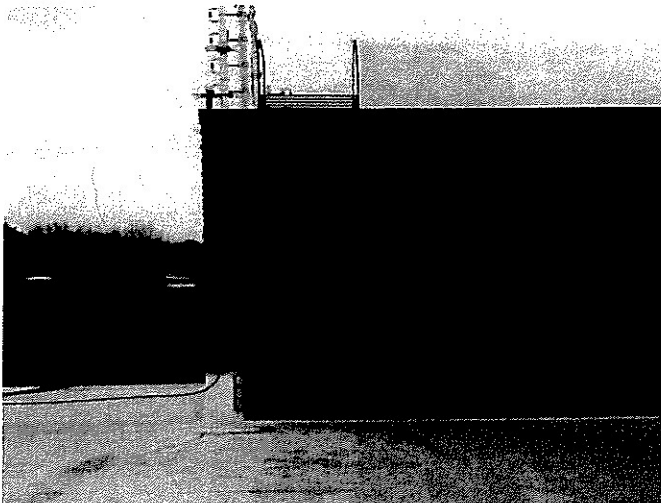


4. BUILDING STRUCTURE

- .4 Minor cracks in the mortar joints were observed at the upper corners of the 1954 Addition Play Room (Gymnasium Room 21). These should be repaired to prevent water infiltration.



- .5 peeling and missing paint and rust is present on the steel ladder and ladder anchors extending from the low to high roof at the 1954 Addition Gymnasium. Current conditions do not appear to represent a significant structural concern, but deterioration will continue if not addressed.



4. BUILDING STRUCTURE

- .6 The multiple roof levels that exist in the Original 1948 Building and that were created in the additions since, increase the potential for snow drifts to develop on the lower roofs against the walls of the higher levels. While design of roof structures for snow drifts is a current code requirement it was not a specific requirement at the time in which several of these buildings/additions were constructed. While we do see evidence (not appearing to be part of the provided existing building drawings) of some potential roof reinforcing (south side of 1954 Gymnasium), it is likely that portions of the existing roof structures are not capable of supporting a current code required snow drift load. Additional analysis and investigation of the lower roof structures would be required to fully understand the extents of this issue. Unless addressed, snow drift conditions should also be monitored and removed if they become significant.

.2 **Exterior Walls Below Roof**

For the most part the exterior surface of the perimeter walls in all portions of the building is brick masonry. The original building and earlier addition perimeter walls appear to consist of composite (no air space) brick (exterior) and concrete (interior) masonry. The 2006 addition exterior walls appear to consist of brick and concrete masonry cavity (air space) walls. The following items were noted from the ground level.

- .1 What appears to be exposed and rusting horizontal joint reinforcing was observed at a few locations in the west exterior wall of the 1968 Addition. This is likely the result of water infiltrating the wall surface and joint reinforcing being installed too close to the face of the wall. This should be addressed to prevent further deterioration.



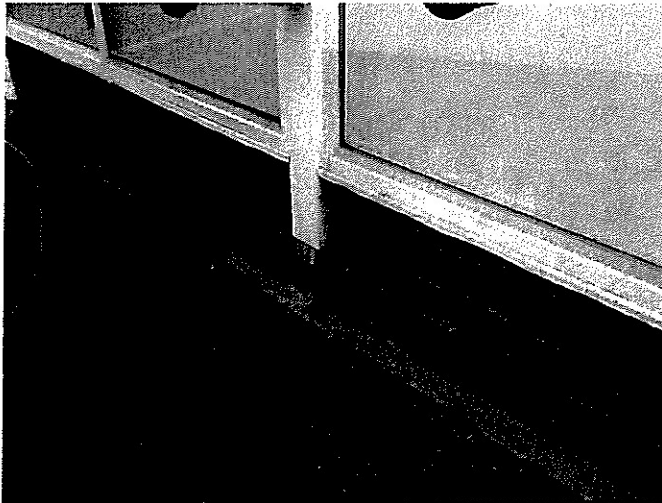
4. BUILDING STRUCTURE

- .2 Mortar is missing at the ends of a few steel lintels located over exterior openings at the Original 1948 Building and the 1954 Addition. Rust has started to form on the lintels in places. The steel surfaces should be treated, and the mortar replaced to slow the deterioration.

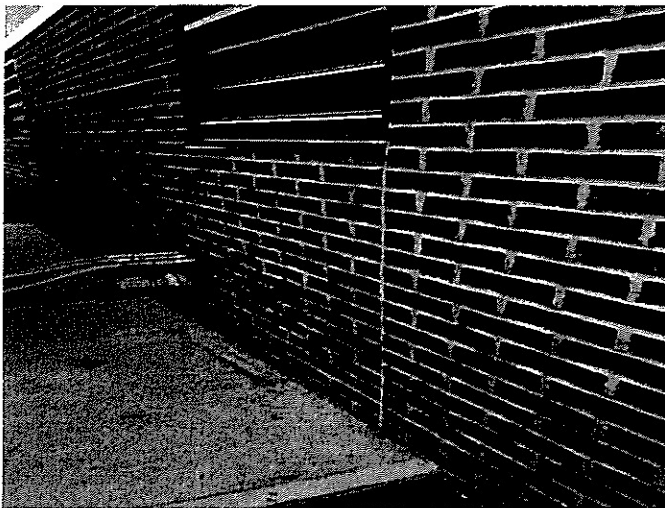


4. BUILDING STRUCTURE

3. Significant deterioration of the lower sections of the west wall of the 1954 Addition Gymnasium is present in the form of eroded mortar joints in the first few courses of brick and what appears to be significant rusting of the outer surface of the structural steel columns which support the roof structure. The full extent of this damage requires further investigation and reinforcement of the steel columns is likely needed. The assessment Project Team is preparing a scope of work to perform removals necessary to better understand the degree of deterioration and development of documents describing any required repairs. Scope of work and estimate provided under separate cover.

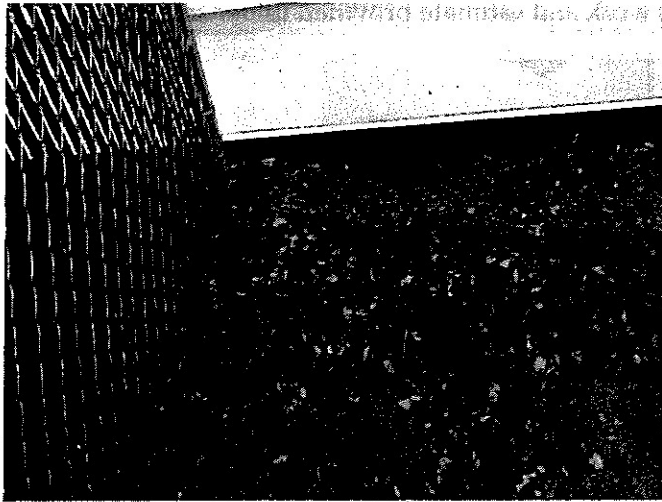


4. A vertical crack in the brick veneer was observed on the west wall of the 2006 Boiler Room Addition. The cause is unknown but appears to be the result of possible impact to the wall. This should be repaired to prevent water infiltration.



4. BUILDING STRUCTURE

5. What appears to be broken foundation masonry allowing water to enter the pipe trench located along the north wall of the classroom wing of the Original 1948 Building was observed at several locations. Additionally, exterior grade along this wall is high and nearly level appearing to direct water towards the building. A continuous stream of water was observed flowing into the boiler room located at the end of this trench. The foundation wall should be repaired and sealed, and water should be directed away from the building.



6. In general grading around the perimeter of the building is flat, in some instances actually directs water towards the building (from roof drains / scuppers and surface runoff). These conditions are causing deterioration of the structure in the form of rusted columns, deteriorated brick and deteriorated foundation walls. Efforts should be made to direct all water away from the building.

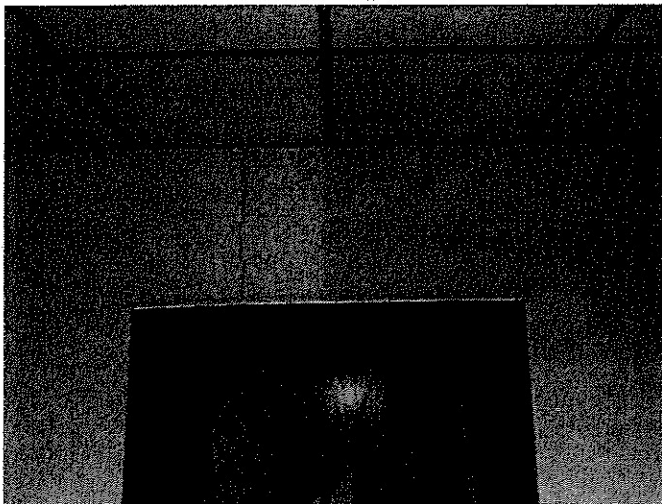
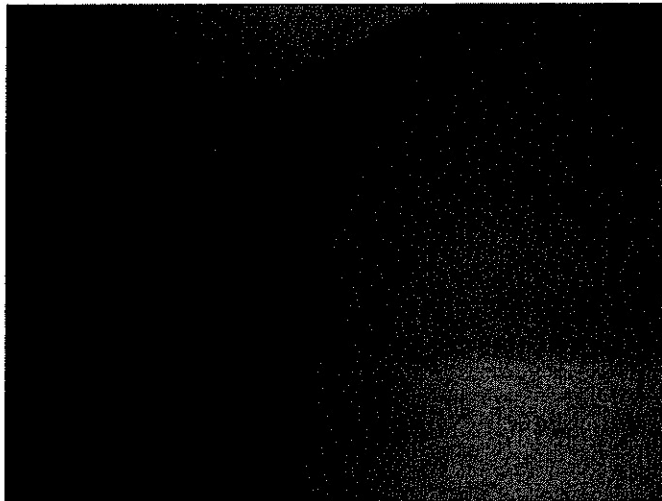
4.2 Interior

.1 Interior Structural Observations:

Generally, with a few exceptions, the building's roof and wall structure are not exposed to view due to interior and exterior finishes. Observations were limited to the condition of these finishes and a few locations where the structure was exposed to view or where viewed from isolated locations where ceiling tiles were removed.

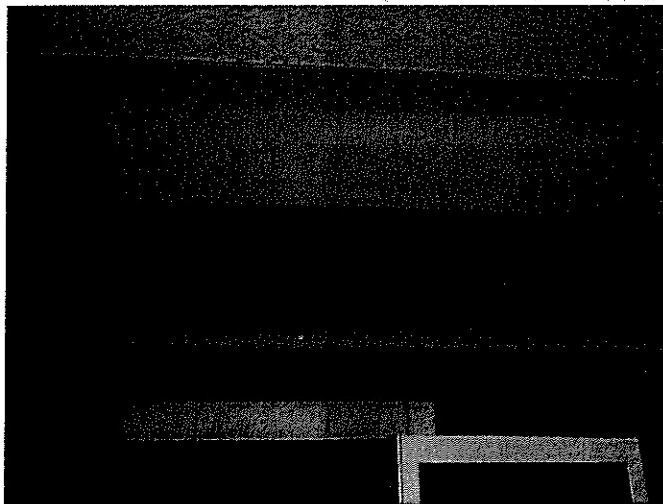
4. BUILDING STRUCTURE

- .1 Cracks or wrinkled interior finishes were observed at the heads of the doorways leading from the main hall to the former classrooms at the Classroom Wing of the Original 1948 Building. While these do not appear to be bearing walls (roof is supported by beams and columns) it may be evidence of some minor foundation or slab movement. Additionally, this wall is directly below the clerestory and has been reported to be the location of ongoing roof leaks which should be addressed. Ceiling tiles were removed at a couple locations where we were able to see small (because of mechanical systems) portions of the wood roof framing. No significant structural deterioration was observed, however hidden conditions could exist. We did note that roof insulation had been removed at a few of these locations which due to heat loss may encourage additional snow melt and water infiltration.



4. BUILDING STRUCTURE

- .3 Evidence of past roof leaks were observed in the ceiling of the 1954 Addition (Room 14) located at the west end of the Original 1948 Building. These were hard ceilings preventing observation of the roof structure. The roof structure in this location pitches back to and directs water and snow towards the Original Building Gable End Wall. We did not note signs of significant structural distress, but hidden conditions may occur. The leaks should be addressed, and the structure investigated during finish replacement.



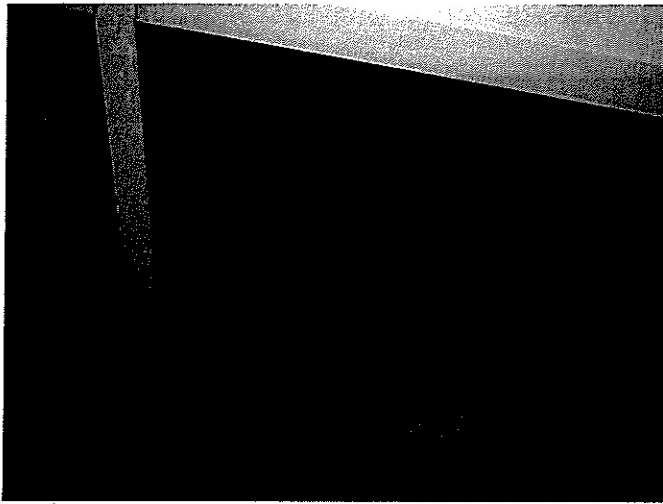
4. BUILDING STRUCTURE

- 4 Evidence of significant water infiltration is present in the Original 1948 Boiler Room Pit. Water was actively entering the building at the time of our visit, and the interior surface of the concrete masonry walls are starting to deteriorate. This is a location where exterior grade is above finished floor and where the previously noted pipe trench ends. This is not currently a significant structural concern but could become more concerning if the water infiltration is not addressed.



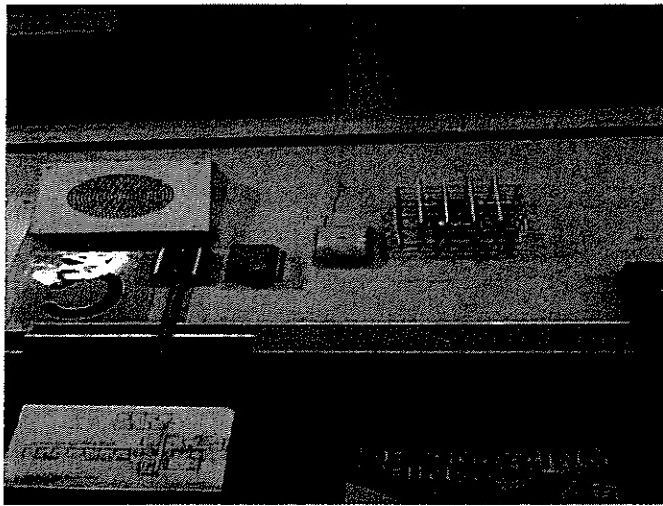
4. BUILDING STRUCTURE

- .5 It appears that modifications to the roof structure in the form of removed blocking and altered joist framing has occurred above the Server Room located at the east end of the Original 1948 Building. These modifications should be investigated further to ensure they have not weakened the roof structure.



4. BUILDING STRUCTURE

- .6 A few vertical cracks were observed on the interior face of the concrete masonry walls of the 1954 Addition Gymnasium. Currently these do not appear to represent significant structural concerns and may be the result of the lack of control joints in these walls (common for this age of structure). These should be monitored and addressed if changes occur in the future.

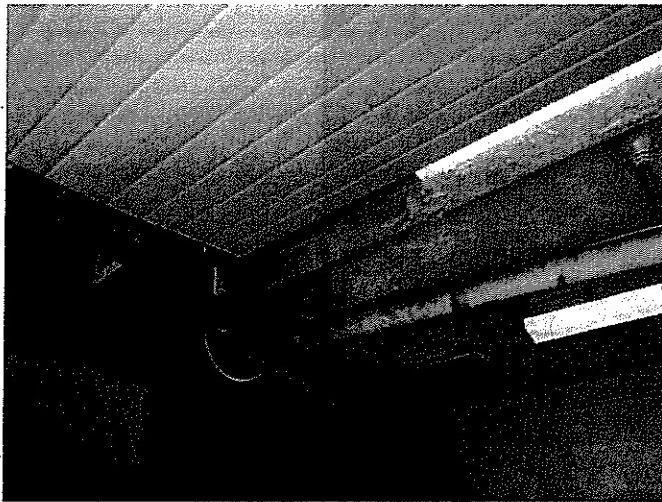


- .7 Two vertical cracks were observed in the concrete masonry wall at the joints between the 1954 Addition and the small 2006 Addition in Room 20. The 2006 Addition drawings call for this to be a soft joint (allowing movement) but it appears a fully mortared joint was installed. While unsightly this does not appear to represent a significant structural concern. Routing out of the mortar and installation of a soft joint would be a cosmetic option.



4. BUILDING STRUCTURE

- .8 Evidence (peeling paint and stains) of past roof leaks possibly from the adjacent roof drain were observed in the ceiling of the 1954 Addition Garage. The structure was not exposed to allow direct observations. Given the type of construction (wood joists and steel beams) and the fact that this location is directly adjacent to a higher roof (Gymnasium) with snow drift potential we suggest additional investigation (ceiling removal) of this area of roof to determine if any of the structural framing has deteriorated.



- .9 A vertical crack is present in masonry wall at the southwest corner of the 1954 Addition Garage (Room 24A). Currently this does not appear to represent significant structural concerns and may be the result of potential foundation movement or differential movement between the buildings. This should be monitored and addressed if changes occur in the future.



5. MECHANICAL SYSTEMS

5.1 Mechanical Systems

.1 Boiler System:

New fire tube, dual fuel fired, boilers were installed during the major renovation that took place in 2006. The two (2) boilers are:

- .1 Burnham Commercial Model 4SW-100.
- .2 Rated 70 BHP output, 21 GPH when fired with #2 Fuel oil, and 2929 MBH input when fired with gas.
- .3 The boilers include Power Flame modulating burners, rated for 2.5 to 21.0 GPH for #2 fuel oil and 428 to 2830 MBH for LP gas.
- .4 The boilers presently fire on fuel oil stored in the 10,000 gallon storage tank installed in 2006 and located at the east side of the parking area east of the boiler room.
- .5 New double wall boiler flués were installed at the time and extend directly through the roof of the boiler room. These appeared to be in good condition and there was no sign of roof leaks at this penetration.
- .6 The boilers include a propane gas train, although this is not presently connected. This was and still is common in public schools to provide flexibility in fuel selection. If natural gas is extended to this area in the future, the boilers could be connected to that source. Or if emergency operation is required, the boilers could be provided with propane tanks as a back-up source.
- .7 One (1) of the boilers was in an alarm during our visit, but this is expected to be just a simple maintenance item rather than a boiler issue.
- .8 These boilers are approximately ten (10) years old and appear to be in excellent condition. Boilers of this style would be expected to have a useful life of thirty to forty (30 - 40) or more years.

5. MECHANICAL SYSTEMS

- .9 Maintenance records should be obtained from the school district. We would expect that combustion testing would have been completed annually by the district, but if not, we would recommend that combustion testing and adjustment be performed.



.2 Fuel Storage:

- .1 A new 10,000 gallon, double wall storage tank was installed during the 2006 renovation.
- .2 The system includes an Omntec leak detection system located in the Boiler Room. At the time of the inspection, the panel was indicating "normal" status.
- .3 A Webster Duplex oil pump set draws oil from the tank, distributes to the two (2) boilers and returns the excess circulated oil back to the storage tank.

5. MECHANICAL SYSTEMS

- .4 Due to the age and limited visual observation of the system, we would not anticipate this fuel storage and delivery system to be a concern for the facility for many years.



.3 **Boiler Plant and System:**

- .1 The boiler plant was replaced in its entirety in the 2006 renovation. This work generally included the boilers, new hot water pumps on variable frequency drives, expansion tanks and distribution piping. All of this appeared to be in good condition as would be expected based on a plant of this age.
- .2 The hot water piping extended to all portions of the building and to all of the new terminal units throughout.

5. MECHANICAL SYSTEMS

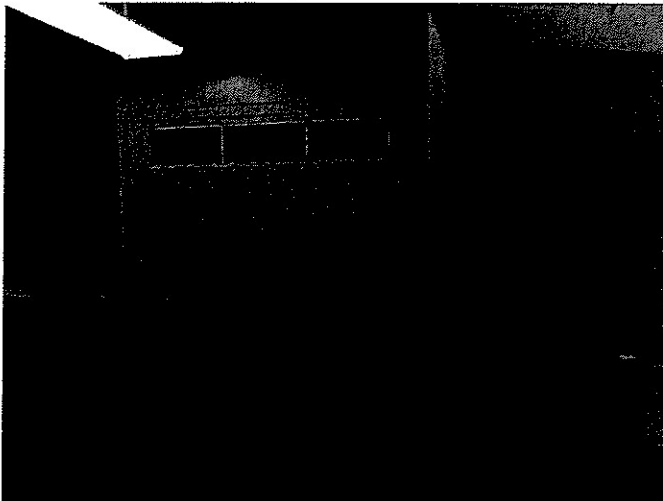
.4 Building Management System (BMS):

- .1 A new BMS was installed during the 2006 renovation and is an Invensys system installed by Technical Building Services (TBS).
- .2 As with the other systems associated with this renovation, this system is a good quality system, and should not be considered a maintenance concern.
- .3 However, occupants indicated the system does not have any means of local control within the building. All interface into the system and control adjustments must be made from the head end equipment at the Bethlehem Central School District. This would obviously need to be corrected to provide local control.
- .4 Based on discussions with TBS, this could include the connection of a local workstation Enterprise Network Server and then access through the internet. TBS felt this would be a relatively simple change to the system and was very willing to work with the occupants when the time came to make the required changes.
- .5 TBS was also willing to perform owners training on the system and was interested in BMS and building maintenance if that was an opportunity.
- .6 Commissioning of a mechanical system is becoming a common function and is required for new buildings by the NYS Energy Code. Commissioning is a process that provides verification at a very detailed level, that the building controls are operating in a state of optimum efficiency. This testing is typically completed during BMS installation and most importantly immediately after the installation is complete. Retro-commissioning, is the process of repeating the commissioning process in an existing building to verify ongoing operating efficiency. This retro-commissioning effort may be applicable here now that the building systems have been in operation for the last ten (10) years.

5. MECHANICAL SYSTEMS

5 Terminal Units:

- .1 As with the remainder of the systems, the Unit Ventilators in the classrooms were installed during the 2006 renovation and generally appear in good condition.
- .2 However, unit ventilators are a very specific terminal unit designed for the very specific demands and layouts of a classroom space. Most of the 1948 wing is furnished with a vertical style unit located in the corner of the classroom as indicated in the left picture. The 1968 wing at the rear of the site uses the more common horizontal unit indicated to the right. These are reasonable units and provide reasonable heat and ventilation, but will not serve the spaces well if they are eventually separated into smaller spaces or offices.



5. MECHANICAL SYSTEMS

- .3 Unit ventilators that serve classroom type spaces required a very high volume of outdoor air ventilation compared with the outdoor air rates for office type occupancies. Once the particular occupancy is determined for each of the classrooms, the outdoor air rate should be determined and adjusted as an energy saving measure.
- .4 The Cafetorium and Gymnasium were both provided with heating only roof top units and are served with hot water from the main boiler plant. These appear to be in good condition although, like the remainder of the building, these units do not presently include air conditioning.

.6 Air Conditioning:

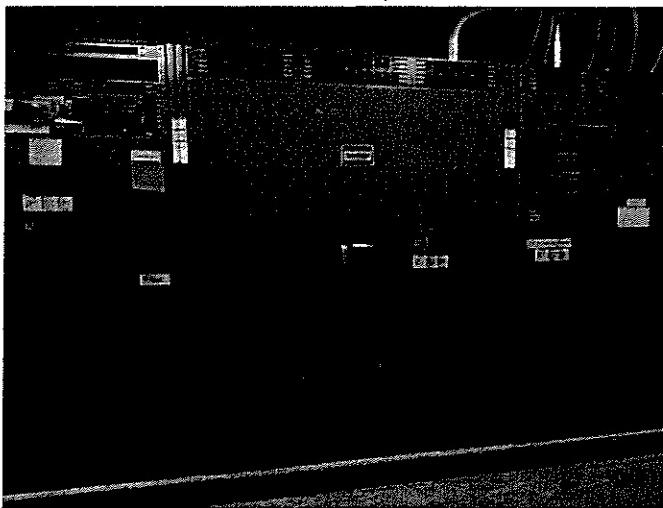
- .1 Presently the building includes window air conditioning units mounted in some of the former classrooms and two (2) split systems in the Administrative Office Area. There is no central air conditioning plant to serve the facility, and building occupants described challenges to keeping spaces adequately cooled. Consideration should be given to installation of a new building-wide air conditioning system to provide greater occupant comfort. Note that this installation would require an upgrade to the electrical distribution system, which is described in the Electrical Systems Section.

6. ELECTRICAL SYSTEMS

6.1 Electrical Systems

.1 Electric Service:

- .1 During the renovation in 2006, a new electric service was extended to the building by the electric utility that includes three (3) 50 kVA pole mounted transformers located on the pole in front of the building on the far side of the street.
- .2 The service conductors drop down the pole and extend below grade to the electric service room located west of the new boiler room.
- .3 The service conduit enters a new switchboard that includes the following:
 - .1 Section #1: 600A, 208v/3ph/4w fused disconnect switch
 - .2 Section #2: Utility Metering section
 - .3 Section #3: Circuit Breaker distribution section
- .4 The original design drawings indicate a 400A disconnect, however, the system installed is rated at 600A. We were not able to open the gear to observe the fuses, but at some point that should be completed to verify the fuse sizes. The drawings also only indicate conductors suitable for 450A and that should be field verified as well. At this point, we assume this is 600A gear with only 400A fuses installed.
- .5 The three (3) pole mounted transformers provide a rating of 150kVA which would be suitable to provide 420A of capacity.



6. ELECTRICAL SYSTEMS

.2 Power Demand:

- .1 We received utility bills for June and July of 2017 to confirm the present utility usage. The bills indicate a peak demand over the past 12 months of approximately 72 kVA (58 kW) or approximately 50 percent of the transformer and gear rating. A normalization of the power demand results in a peak demand of just under 2 watts/ sf of floor area for the 35,000 sf facility.
- .2 For a building with general office use, we would initially estimate the following types of power requirements:
 - .1 Based on normal office type occupancy, with standard workstation and lighting, and air conditioning, a very rough estimate of demand would be approximately 8w/sf. This would equate to a total building load of 350kVA. This is far above the capability of the existing systems.
 - .2 It seems unlikely that this building would ever be used with a standard office level occupancy especially in rooms such as the gymnasium and cafetorium. During the field inspection, it seemed as though many of the classrooms were anticipated for storage. If we make an assumption of 75 percent of a "normal" occupancy, this would be in the range of 250 kVA. This still well exceeds the capacity of the existing service.
 - .3 A normal office building HVAC system would account for approximately 5 w/sf of this total load. Since the majority of this building is not presently air conditioned, that would account for an estimated present demand at approximately 2.5w/sf. This may be comparable to the present demand and serves to rationalize the present demand.
 - .3 We are concerned that, although the power usage of the facility is presently well within capacity of the system, as the building continues to increase in occupancy and air conditioning is added through the building, the electrical distribution will not be suitable for the increased demands on the system.

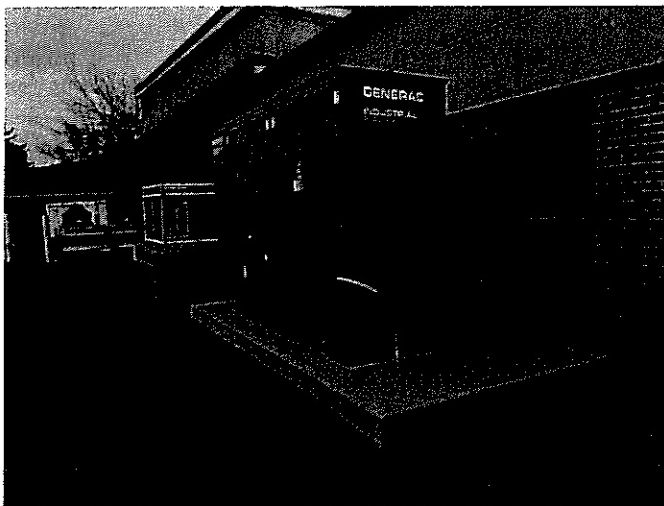
.3 Distribution:

- .1 Most of the distribution power panels were replaced during the 2006 renovation and these are all in good condition.
- .2 However, there are approximately ten (10) panels that were not replaced during that renovation scattered throughout the facility and most of these appeared to be original from whichever era of building they reside. All of these remaining existing panels are too old to be considered reliable for extended continued use and they should all be replaced. This could take place either as an electrical upgrade, or could be done during planned interior renovations.
- .3 Since the rooms in the 2006 renovation were intended as elementary classrooms, there is limited power distribution in each space. Depending on the proposed use of the spaces, significant increases in receptacle power distribution may be required. This will likely involve additional power panels as well to handle the increased number of required circuits.

6. ELECTRICAL SYSTEMS

4 Emergency Generator:

- .1 The Sherriff's Department recently installed a 125 kVA Generac diesel generator located outside just to the east of the new boiler room. The generator includes an integral diesel base tank for fuel storage.
- .2 The emergency feeder from the generator enters the wall of the boiler room above grade, passes through the boiler room to the electric service room and then out to the outdoor automatic transfer switch.
- .3 The automatic transfer switch is located outside on the north wall of the electric room. This device continuously monitors the condition of the "normal" power supply and on failure of that system, starts and then transfers the building load to the generator. It appears the main service conductors in the normal power 600A gear exit the building, pass through the ATS, and then re-feed the existing switchgear with normal power.
- .4 The building staff indicated that the generator has been called on and has successfully operated the building in the past during power failures.
- .5 As indicated in the narrative above, the peak building demand over the past 12 months was 72 kVA, so there is a level of comfort that the generator has the capacity to operate the building in its present condition. As the building occupancy increases, and air conditioning is added, the generator will likely be undersized similar to the remainder of the existing electrical service.
- .6 It is certainly feasible to have a generator power only selected loads in the building. For example, in this climate, general comfort air conditioning which is a large demand, is often not powered by the generator. Conversely, building heating is a relatively minor power demand and would be important in this climate.



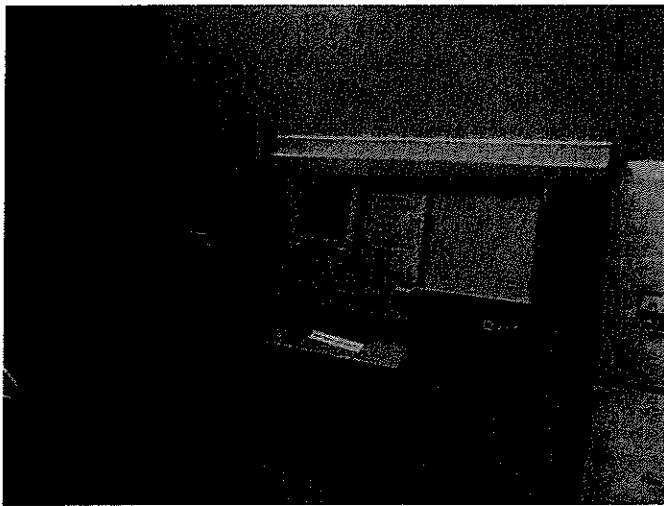
6. ELECTRICAL SYSTEMS

.5 Fire Alarm:

- .1 In 2006 a new EST Fire Alarm system was installed and includes a zoned fire alarm panel, automatic and manual initiation, and horn / strobe annunciation.
 - .1 The automatic detection includes partial smoke detection coverage in the corridors, Cafetorium, storage type rooms, and air handling systems. Notably, there is no smoke detection coverage in the former classrooms. Consideration should be given to installation of smoke detectors in the former classrooms in order to provide timely notification of fire conditions in spaces that may be unoccupied. It appears that the current fire alarm system will support this expansion, with the limitations further described below.
 - .2 There are manual pull stations throughout at each building exit. Since each classroom included a door to the exterior, each of those doors includes a pull station.
 - .3 There is horn / strobe coverage throughout the building.
- .2 We understand the fire alarm system has historically had ongoing issues with intermittent wiring faults. This is apparently still unresolved. This type of intermittent fault is often very difficult to find and may be caused by a wire with a small nick in the insulation, or a wire that occasionally gets wet, or a similar type of intermittent issue that is difficult to track.
- .3 The "zone" style system is a bit of an outdated and limited system and really was even outdated in 2006 when it was installed. In this type of system, the fire alarm panel would only be able to locate a fire in very general terms such as the "1948 wing" and would not be able to provide more precise direction to a responding fire department. An "addressable" system is able to determine an exact head that has been initiated and can report that precise location to the first responders.

6. ELECTRICAL SYSTEMS

- 4 Due to the limited coverage of the smoke detectors, the "zone" style fire alarm, the ongoing wiring issues, the un-sprinklered building, and the nature of the occupancy, we may recommend an upgrade to the fire alarm system. Consideration should be given to installation of an "addressable" style system, with additional smoke detection coverage in each of the former classrooms. This upgrade, however, is a recommendation and would not be code required even for new construction of this building.

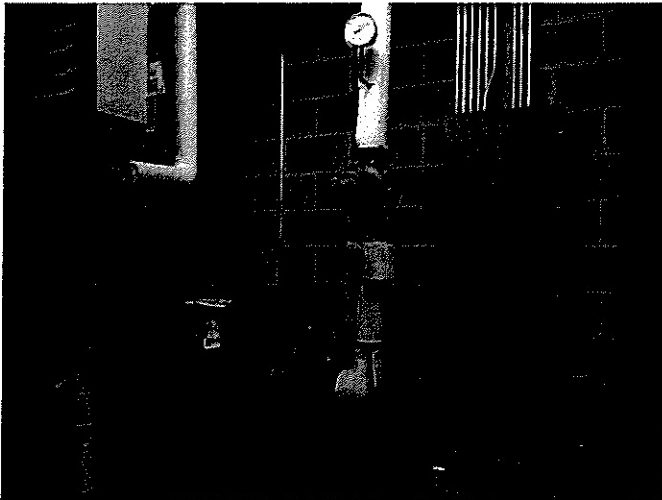


7. PLUMBING SYSTEMS

7.1 Plumbing Systems

.1 Domestic Water:

- .1 The 2006 drawings indicate a new 4 inch water main extended from the southeast corner of the school building around to the east of the new addition and into the boiler room.
- .2 The water main rises through the floor of the boiler room and includes a strainer, water meter, double check backflow preventer and a pressure regulating valve. On the day of the inspection, the upstream pressure was approximately 80 psi and the downstream pressure was approximately 75 psi. These are reasonable pressures for the system.



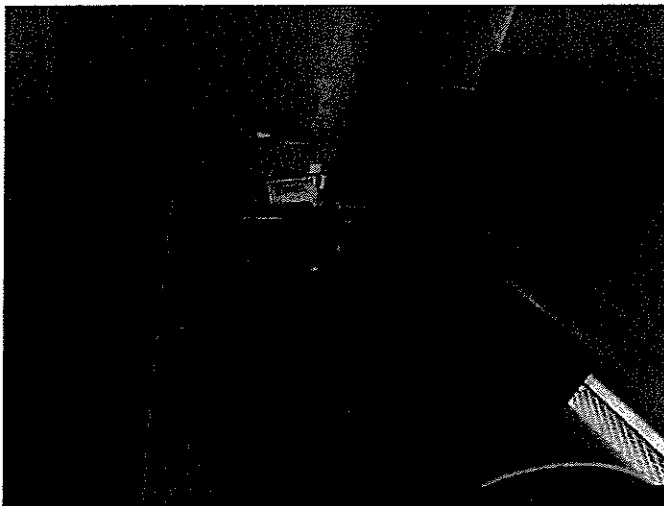
.2 Domestic Hot Water:

- .1 A new PVI, gas fired, domestic water heater was installed in the 2006 renovation. This is considered to be a very high quality heater and it appeared to be in very good condition.
- .2 The heater is fired from two (2) 500# propane tanks located outside on the east wall of the boiler room. These tanks provide propane for the water heater and also provide initial firing for the fuel oil boilers. These tanks are not large enough to provide operation of the boilers as described in the mechanical section of the report.

7. PLUMBING SYSTEMS

.3 Toilet Rooms and Classrooms:

- .1 The 2006 renovation added sinks to each of the six classrooms in the original 1948 building. These sinks are somewhat awkward units mounted on top of the perimeter shelving. The new drainage piping installed during the renovation is installed in a trench below the run of classrooms and eventually discharges into a pump located in the depressed slab that housed the very original boiler plant. The sinks served a purpose in the elementary school, but are less useful in an office environment. The pump could also be prone to failure.



7. PLUMBING SYSTEMS

- .2 The 1968 wing includes a private toilet room in each of the classrooms. Again, this was suitable for the original purpose, but may no longer be useful. We understand there may be locker rooms anticipated in this wing and this below grade plumbing is suitable for re-use for that purpose. Or the toilet rooms appear to be in suitable condition to remain in use if that suits the space program.

.4 Sewage Pump

- .1 Just to the west of the main entrance there is a below grade manhole with what appears to be an above grade pump controller and alarm light. Inside the building adjacent to this location is a Weil Pump Submersible Sewage Ejector control panel and we assume this in controlling the duplex pump set in the manhole.
- .2 The ejector is not addressed in the 2006 renovation so it is not clear when it was installed.
- .3 It appears this ejector manhole collects the sewage drain from each of the buildings:
 - .1 There is a drain indicated at the east end of the 1948 building that exits the south (front) face of the building near the manhole.
 - .2 The drain from the 1968 addition appears to exit the east side of that addition and then passes under the 2006 addition.
 - .3 The 2006 addition appears to connect to the drain from the 1968 addition.
- .4 It appears the pumped discharge is directed to the existing septic field adjacent to Olive Street.
- .5 This system serves the entire building so it serves a critical function and we are not able to verify its capacity or condition. The occupants did not report any issues with the system. At this point, we recommend further investigation into the operation of this system.



8. FIRE PROTECTION SYSTEMS

8.1 Fire Protection Systems

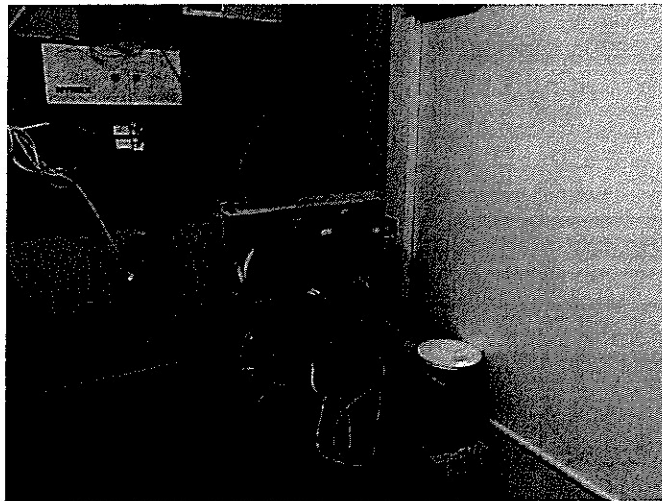
- .1 The building does not presently include a fire sprinkler system. The 4 inch new water main installed in 2006 may have suitable capacity for sprinklers although a 6 inch main is the far more common size.
- .2 The overall building as a Business type occupancy, may not require a fire sprinkler system by code although further analysis would be required for a precise determination.
- .3 However, the gymnasium and the Cafetorium would be classified as an Assembly space by the present code. For this assembly occupancy the code requires that "An automatic sprinkler system shall be provided throughout buildings and portions thereof used as an assembly occupancy".

9. TELECOMMUNICATIONS SYSTEMS

9.1 Telecommunications system:

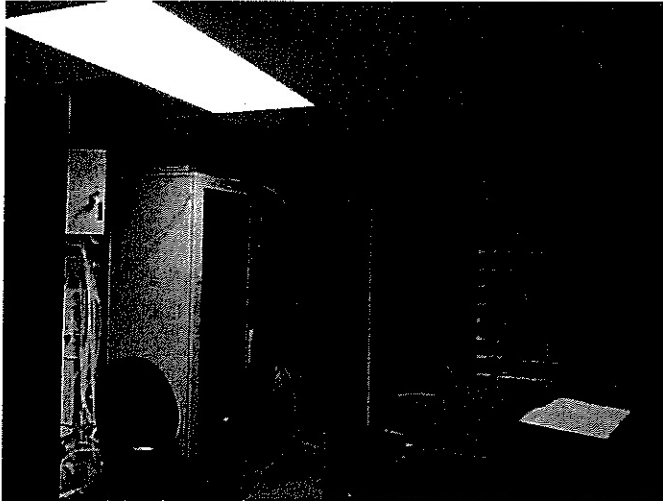
.1 Communications:

- .1 Almost the entire telecommunication systems in use at the present time is the property of the Sheriff's Department. Based on that, we did not thoroughly review all aspects of this system since the Department is aware of their own systems capabilities.
- .2 There are two (2) independent telecommunication entrances:
 - .1 One is located at the far west end of the original 1948 building, Room 15, that appears to include a new fiber optic entrance (possibly redundant fiber entrances) server, half rack of data cable distribution, and UPS back-up. This entrance serves the town court.



9. TELECOMMUNICATIONS SYSTEMS

- .2 The main telecommunications room 24B is located in a room opposite the entrance to the Gymnasium. This room also includes the radio communications equipment and antennae cabling for the antennas attached to the gymnasium roof.



- .3 The main telecommunications room is not presently air conditioned and there appears to be a significant level of equipment in this room. We would recommend the addition of a dedicated air conditioning system to this room.
- .4 In the 2006 renovation, the drawings indicate that the existing communication entrance cables in Room 24B were to remain and be re-used. At this time, it could not be determined if those cables are still in use today, or if they have been replaced. It is assumed they have been replaced with new fiber if they are that old.

10. SECURITY SYSTEMS

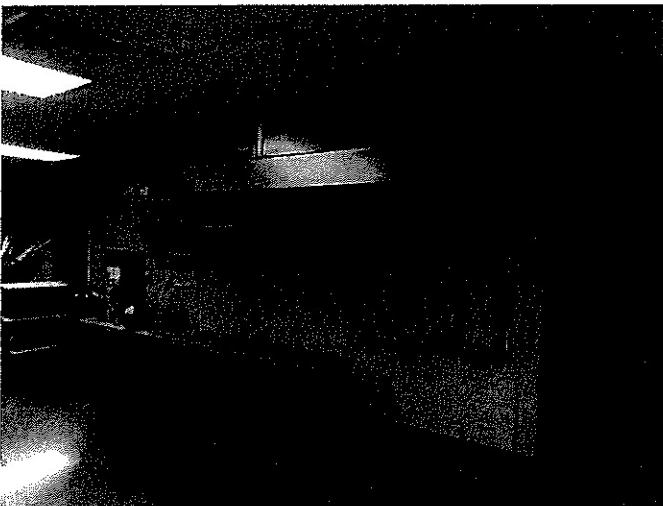
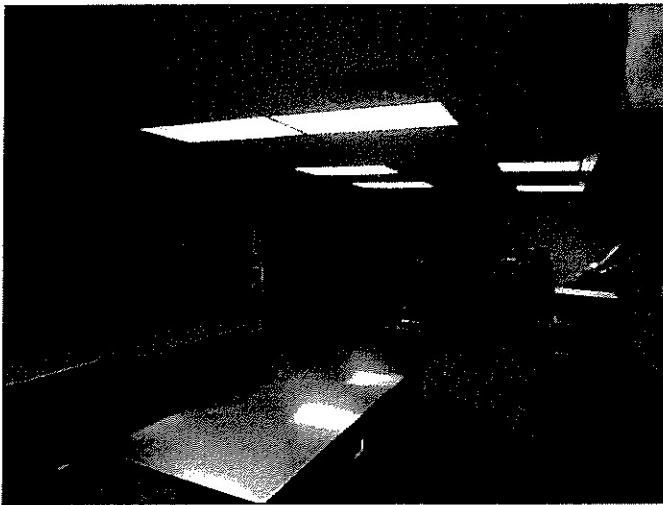
10.1 Security

- .1 Controlling and monitoring access to the Sheriff's patrol space by the general public when court is in session is a regular concern. This is currently accomplished by physically constructed barriers and video monitoring. Maintenance of this control must be considered with renovations to any areas separating the uses.
- .2 Building occupants described issues with gaps in security camera coverage, and that plans were in place to increase the quantity of cameras to expand video coverage to the uncovered areas.
- .3 Further analysis of security systems should be undertaken as a part of programming of future renovations of the Sheriff patrol occupied portions of the building.

11. KITCHEN EQUIPMENT

11.1 Equipment Conditions

Cooking and dishwashing equipment and a wash sink were removed from the building by the School District when school operations ceased in 2012. The existing cooking hood and roof exhausts for the cooking hood and dishwasher remain in place. To restore full kitchen functionality new kitchen equipment and a sink must be purchased and installed, and the hood and exhaust fans should be tested to ensure functionality.



12. FURNITURE

12.1 Furniture Condition

Spaces have primarily been furnished using existing furniture brought to the site by the Sheriff's Office. No obvious deficiencies in the existing furniture were noted, and building occupants did not identify any issues related to the current furniture.

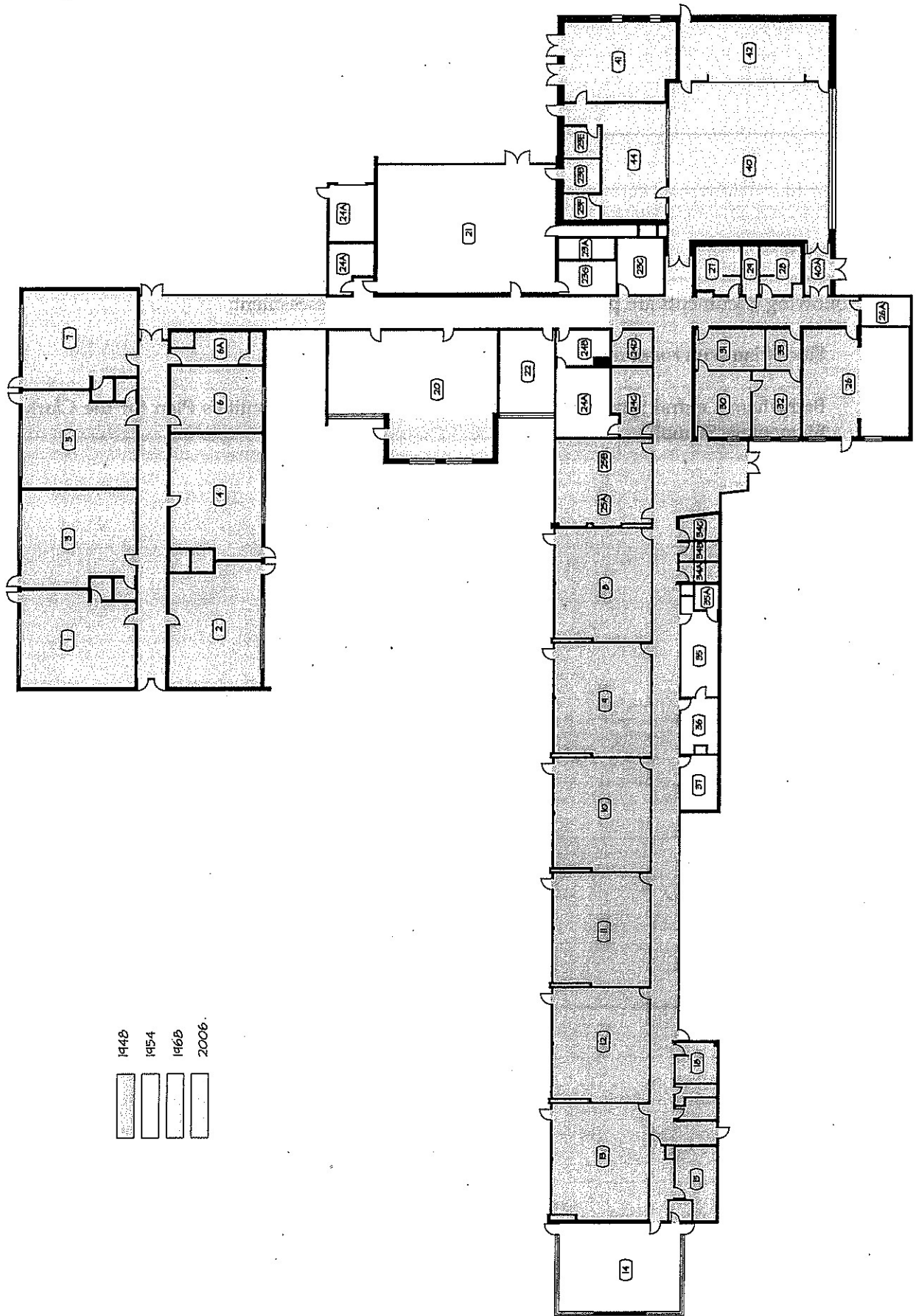
If renovations are pursued with the building, the suitability of the existing furniture to new space configurations should be evaluated to determine if new furnishings are required.

13. REFERENCE DOCUMENTS

13.1 Documents

The following documents are provided as references for the Assessment:

- .1 Floor Plan with room numbers and dates of construction
- .2 Bethlehem Central School District 2015 Five-Year Capital Facilities Plan for the Clarksville Elementary School



1448
 1454
 1468
 2006