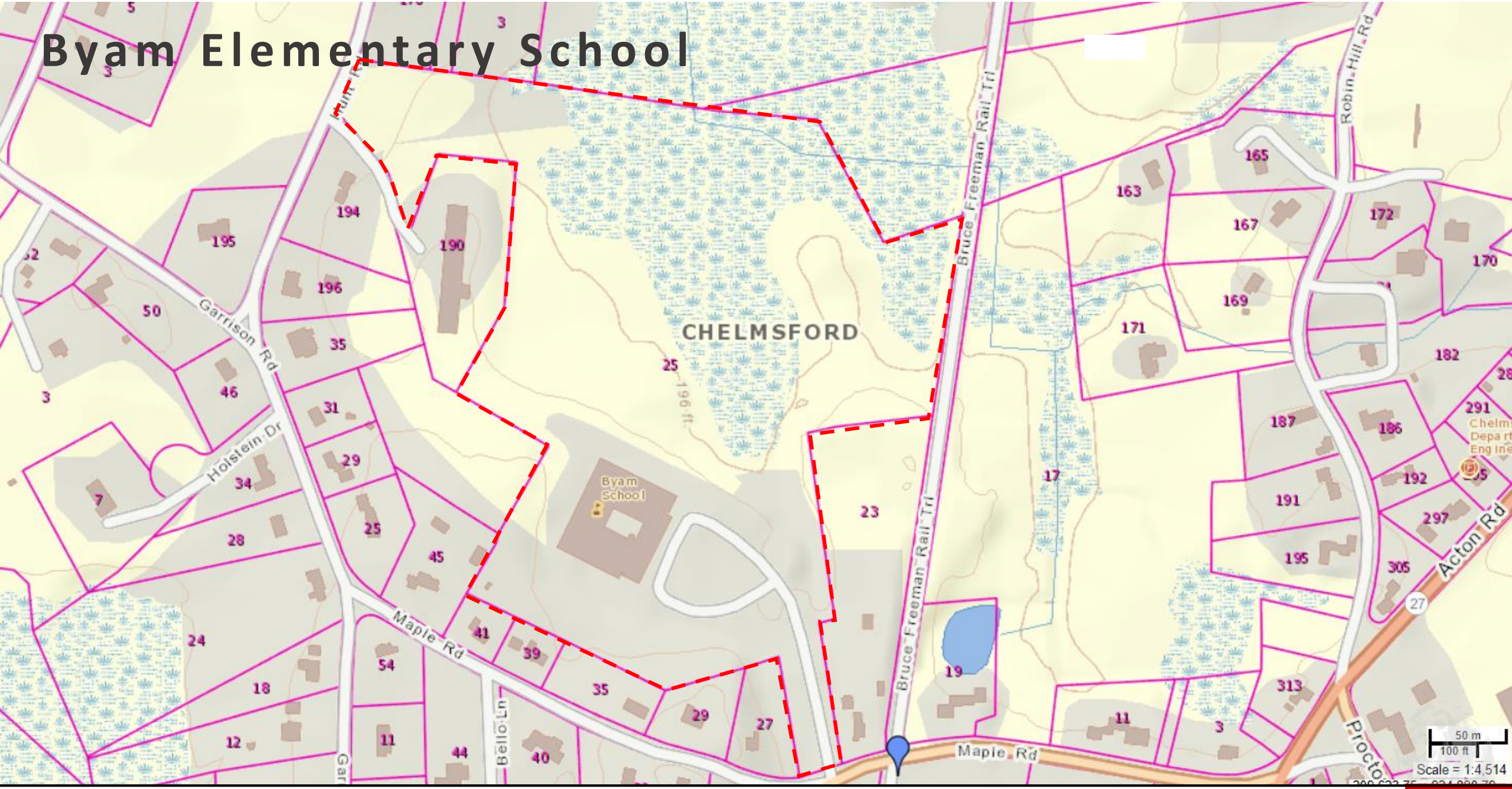
Byam Elementary School



Byam Elementary School

ARCHITECTURAL ASSESSMENT

GENERAL DESCRIPTION

The Byam Elementary School was designed by The Architects Collaborative in 1969. The facility is in generally good condition and has had some mechanical systems upgrades as well as a window replacement project in 2004 and a complete roof replacement in 2011.

The building is a two story facility with classrooms on each level. The gross floor area of the "at-grade" level is approximately 30,221 SF, and the total building is approximately 60,442 square feet.

The structural makeup of the facility is concrete and CMU with load-bearing interior and exterior walls. The structure is not fireproofed, and as such best fits the description of a Type II-B construction as defined by the current building code. The building does not feature fire suppression sprinklers throughout all areas as would be required under today's building codes.

Current enrollment is approximately 544 students in grades ½ day K-4.

The facility assessment for this report was conducted on February 17, 2016.

GENERAL CODE CONSIDERATIONS

As an existing occupied building, significant code upgrades are not required in order to continue using the building, unless specifically identified as issues requiring remediation by the Building Inspector or other Authorities Having Jurisdiction (AHJ). However, any plans for significant renovations or additions may trigger multiple code upgrade requirements outside of the proposed area of renovation or addition and could require work to all areas of the existing facility.

Based on the building occupancy Use and Construction Type the current building area (60,442 square feet) suggests that the facility significantly exceeds the

Image 1

Image 2

Image 3

maximum allowable area for its construction type and primary use occupancy under the current building code. As such, per MGL Chapter 148 any addition to this building would likely require fire walls to be constructed to subdivide the building and /or a fire sprinkler system to be installed throughout the building in order to meet current code. Note that given the existing floor to ceiling height and building construction type an automatic fire suppression system (sprinklers) would be difficult to install.

Additionally, should any renovations be proposed for this facility a more in-depth analysis of the building occupancies and strategies to satisfy building height and area limitations would be required to conform to existing code requirements. Based on the construction type, building area, and lack of sprinkler systems, the current code would require that different occupancy areas, such as the gym and cafeteria, would require separation.

ACCESSIBILITY

The Byam Elementary School has multiple conditions that are considered non-accessible or do not meet the current Massachusetts Architectural Access Board Rules (MAAB) or the Americans with Disabilities Act (2010) Standards (ADA).

EXTERIOR SITE AND BUILDING ENTRANCE

There are approximatly 50 marked parking spaces, however, cars parallel park along the edge of the drive way. Handicap parking spaces are located at the rear of the school. The separated parking and entrance are not consistent with the ADA requirements.

INTERIOR SPACES

The front office area provides a clear floor area for accessibility. Within this space a handicap person, adult or child, could be accommodated. However, the goal of the ADA and MAAB is to provide equal access and services in a more universal approach. With this intent the front desk should provide an area of the counter that meets the requirements for accessibility.

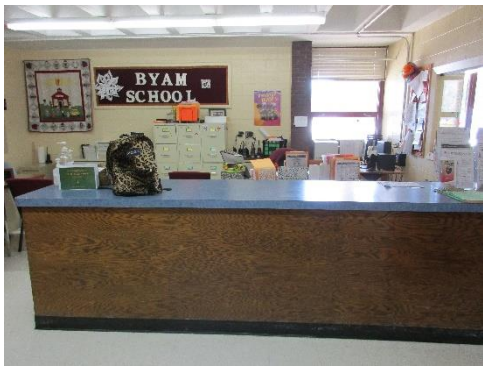


Image 4

The toilet rooms as a whole are not accessible. The spaces are too tight to maneuver in and the fixtures are not ADA compliant. Many of the restrooms are missing grab bars, some of the bathrooms have retrofitted grab bars, however they are not ADA compliant. The toilet partitions are too narrow and not compliant. It is recommended that these bathrooms should be renovated to meet current MAAB / ADA code requirements. If the number of fixtures need to be reduced to provide the proper clearance for accessibility, the total fixtures count and occupancy load will need to be reviewed.

Image 5

Renovations and repairs to the toilet rooms to meet accessibility requirements include:

- Provide proper clearance around all fixtures.
- Provide the proper mounting heights for sinks and toilets for elementary school aged students in restrooms located in the classroom wings.
- When replacing toilet fixtures provide flush controls on the proper side of the toilet to meet accessibility requirements.
- Provide grab bars as required and correct mounting heights for grab bars that are not properly installed .
- Correct the mounting heights and locations of toilet accessories including toilet paper, paper towel and soap dispensers.
- Provide appropriate faucet controls.
- Provide insulation at all hot water piping.
- Where urinals are provided adjust mounting

Image 6

Image 7

Image 8

Image 9

Image 10

height to meet the requirements of elementary school age children.

- Relocate fixtures to prevent doors from swinging into the required clear floor space.

An elevator has been provided and although not centrally located the elevator provides access to the second floor teaching spaces. The elevator meets the minimum size requirements for accessibility based on existing conditions.

Stairs, handrails, and guardrails have requirements that must be met for accessibility. At the Byam School there are three stairways for common use. Each of these stairs have non-conforming handrails that should be replaced.

Per current accessibility codes access to performance areas such as stages and platforms must be provided with an accessible route that coincides with access route for performers or other users. This route can be achieved via a ramp or lift. In the case of Byam School a lift, although a more expensive solution would be the most space efficient.

Libraries also required clear floor area, accessible shelving and accessible table area for students to do work. The existing library appears to meet these requirements.

Door hardware is required to be operable with a closed fist, often this is done by changing knobs to levers or push / pull hardware that meets the requirements of ADA and MAAB. Push / pull floor clearances are also required for doors with latches and closing devices. The dimensional clearance varies based on the approach to the door. In many areas the clearance to operate the door has not been provided or is to narrow. Repairing this condition often requires removing walls and expanding the area around the door. In some case simply changing the swing of the door may resolve or improve the existing condition.

In general permanent rooms, stairways, and other spaces require signage that identify the room by number. Signs are required to be mounted on the latch side of the door,

at the appropriate height and in Braille. This type of signage appears to be missing throughout the school facility.

An outdoor courtyard is located in the center of the building. Due to the time of year of our visit we were not able to assess the full accessibility of the courtyard. However, we note the following issues: The entrance and exit doors to the courtyard are not accessible, there are steps and grade change that make accessing this space difficult, walking paths must be of proper surface material and pitch, areas in the courtyard that are used for teaching spaces must provide handicap accessibility for students and teachers.

Recommendations for upgrades to meet accessibility include:

- Provide elevator controls to meet accessibility; including providing Braille signage, audible and visible signals.
- Replace handrails at stairways with rounded handrails that extend the proper dimension beyond the top and bottom landing.
- Provide handicap accessible lift or ramp to the performance stage.
- Replace door hardware with levers or other accessible hardware.
- Review all door hardware including closers and locking devices.
- Review door swing clearances and push / pull clearances.
- Provide signage both inside and outside the building to meet ADA / MAAB needs.
- Provide a ramp and accessible paths in courtyard.

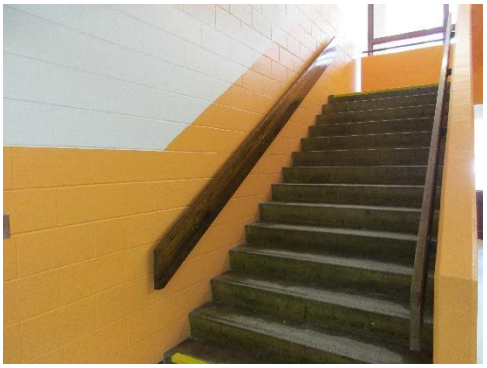


Image 11

Image 12

Image 13

Image 14

Image 15

Image 16

Image 17

BUILDING ELEMENTS

EXTERIOR

FOUNDATION

Foundations are poured in-place concrete. In most areas the grade is at the top of the foundation walls and not visible from the exterior.

EXTERIOR WALLS

The building is concrete frame with infill of brick and mortar exterior veneer and CMU backup. The precast concrete floor planks project past the exterior wall to form cantilevers above the first floor (Image 15).

Many areas around the building exhibited cracking in the brick and spalling of the concrete. These areas need repair to prevent further damage and avoid potential water or moisture infiltration into the wall cavity.

Some water damage and leaking is evident near corners where leaking may be occurring above at the roof area and pooling within the soffit. Other areas of the exterior building that should be maintained include areas around down spouts, in spaces where ivy and other climbing vines become invasive, and in locations where birds or other animals can nest.

Specific Issues

- Several areas of severe cracking on the brick and mortar veneer (Image 16).
- Several areas where the precast concrete cantilevers are spalling and in some cases exposing the rebar (Image 17).
- Few locations where concrete window sills have cracked.
- Few locations where the steel lintel supporting the precast concrete band above the 2nd floor windows is rusting.
- There are several areas where the paint on the soffits are flaking and falling off, this may be due to moisture (Image 18).
- Maintenance of downspouts, roof overflow drains

- General maintenance of vegetation and nesting.

Recommendations include:

- Repair exterior brickwork to prevent further damage.
- Patch and repair spalling concrete cantilevers.
- Patch and repair concrete window sills
- Determine cause of water / moisture damage in soffits; repair.
- In the internal courtyard, where the ivy and vegetation is growing against the building,cut the vines at the base of the wall and remove from side of building.
- At the supporting angles for precast band above second story windows sand blast or remove rust, paint steel angles with rust inhibitive paint.
- Scrape old paint from underside of soffits and repaint with exterior grade enamel paint.
- At the exterior lighting remove bird nests and all debris. Fabricate and install bird cages around exterior lighting.

Image 18

Image 19

WINDOWS

The Byam School underwent a window replacement in 2004. The new windows are aluminum with insulated glazing and most have an operable section. In general the windows are in good to excellent condition with few exceptions.

Image 20

Specific Issues

- The windows system and framing extends to the ground or sits on top of the concrete shelf. This condition facilitates rusting along the bottom edge of the frame.

Recommendations

- At the locations of surface rust remove surface rust and repaint paint to match.

Image 21

Image 22

Image 23

DOORS

The exterior doors were replaced in 2004 and are in good condition. Doors are aluminum storefront doors, and hollow metal doors with hollow metal frames. Several doors have upgraded hardware. Older door frames remain in many locations.

Specific Issues

- Some of the kick plate screws on the bottom of the doors are rusting.

Recommendations

- At the doors that have rusted kickplate screws remove the screws and replace with exterior grade zinc coated screws.

LOUVERS/ OTHER OPENINGS

Several louvers exist around the building for venting of HVAC units and other spaces. There is a combination of aluminum fin construction and simple steel mesh louvers. In general the louvers appear to be in good condition.

Specific Issues

- Intake louvers for the unit heaters in the classrooms are missing insect screens.
- Some of the lower steel grate louvers have become dented, damaged, and rusting.
- Plexi-glass is covering one of the louver vents (Image 23).
- Birds are nesting in louvers, soffit areas and other areas around the building structure.

Recommendations

- Install insect screening behind the louver grate at unit heaters.
- Remove and replace damaged louvers.
- Review condition of covered louver vent to determine appropriate permanent solution.

ROOF

The facility underwent a reroofing project in 2011 that included the installation of rooftop PV solar array panels. The existing roof was removed and replaced down to the existing concrete roof deck. The new roof membrane is .060" thick PVC membrane fully adhered. Due to weather conditions at the time of the site visit an inspection of the roof conditions was not conducted. Per reports from on-site personnel the roof is in good condition.

Image 20

Specific Issues

- No issues were reported at the time of survey.

Recommendations

- None reported.

INTERIOR

FLOORING

Flooring throughout the school is predominantly VCT in classrooms, administration areas, corridors, and the cafeteria. Carpet tiles are used in the library. Ceramic (1"x1") tile is used in most bathrooms. The kitchen flooring is a 6"x6" quarry tile. The back of house and storage areas have, mostly, sealed concrete floors. In some areas the concrete has an epoxy finish. Stair treads are also concrete and have imbedded metal edges. There is a rubber sports floor system in the gymnasium and a wood floor system on the stage.

Image 25

Image 26

Specific Issues

- In general the VCT flooring throughout the school appears to have staining that may be associated with improper cleaning materials
- VCT at recessed entrance mat and other areas such as floor clean outs is lifting and cracking
- The topping on the stair treads is completely worn off exposing raw concrete. (Image 28)
- The 1"x1" ceramic tile and grout in all the bathrooms is very dirty. (Image 29)
- Marble thresholds that have cracked will begin to chip away over time and may result in a potential

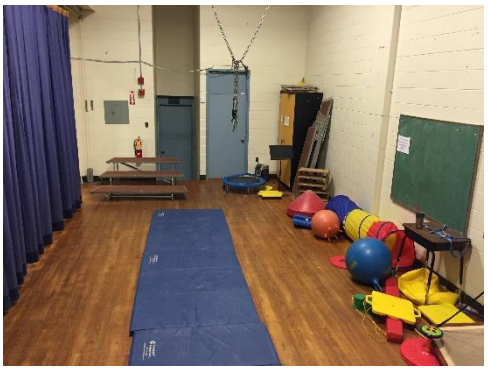


Image 27

Image 28

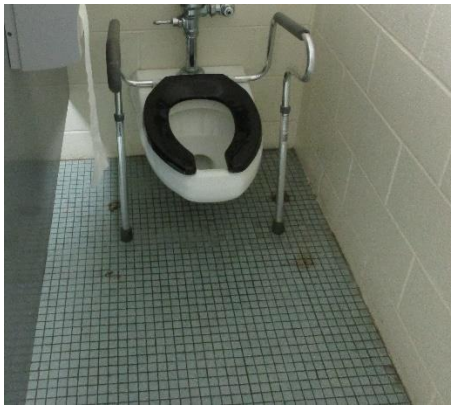


Image 29

Image 30

Image 31

tripping hazard (image 30).

- In most areas of epoxy painted concrete floor the paint is showing severe wear and is exposing the raw concrete (Image 31).
- The wood stage flooring is showing its age there are several areas of deep gouges, exposed raw wood and "spongy" or soft when walked on (Image 27).
- Carpeted areas such as the library appear to be in good condition.
- The Gym floor is in good condition.
- The quarry tile kitchen floor is in good condition but in need of proper cleaning.

Recommendations

- At the recessed walk off mat remove the VCT tile around the area of lifted concrete, then grind adhesive, remove any loose concrete, level flooring around the walk off mat and install new VCT tile.
- In areas where VCT is cracked remove damaged VCT tiles and replace with new.
- At the stair treads remove existing topping and install raised rubber tile on the stairs or refinish existing concrete.
- Review floor cleaning methods throughout the facility. Clean floors and wall bases that have been stained or damaged from existing cleaning methods.
- At the bathrooms where the marble thresholds are cracked or damaged, remove the existing threshold and install new marble thresholds.
- In the rooms where the existing epoxy paint is peeling or damaged strip the remaining paint and repaint with epoxy floor paint.
- Replace stage flooring.

WALLS & PARTITIONS

Most of the interior walls are load bearing CMU walls, some poured in place concrete. Interior walls on the first floor terminate at the underside of the second floor precast floor planks, second floor walls terminate at the underside of the precast roof deck planks.

Specific Issues

- Several CMU walls have cracks that extend the height of the wall. Some of these occur at the corners, other cracks are located where CMU meets the poured in place concrete and some at the center span of the wall (Image 31, & 32).
- In some of the bathrooms the epoxy wall paint on the CMU walls is flaking off along the bottom 3'-0" of the wall (Image 32).
- In one of the gang bathrooms there is a large crack in the CMU wall behind the toilet (Image 34).
- In one of the gang bathrooms there is a large crack in the CMU wall behind the bank of sinks (Image 35).
- In some of the bathrooms cracks exist in the walls where plumbing fixtures were replaced.

Recommendations

- Some investigation of the cause and full extent of some of the cracking may be warranted; the cracking noted is not believed to be due to any structural issues. Repair of cracks is recommended.
- In the bathrooms where the epoxy paint is coming off the walls, review issues of moisture around the toilet fixture. Remove existing paint and repaint with new epoxy paint.
- Replace cracked CMU block and mortar.

Image 31

Image 32

Image 33

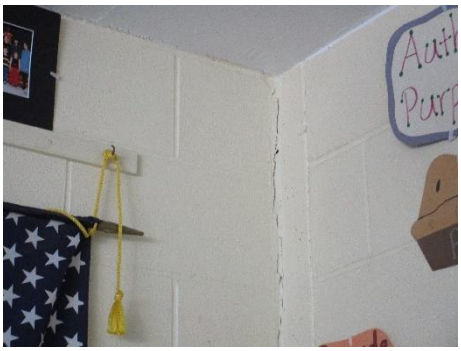


Image 34

Image 35

Image 36

Image 37

Image 31

CEILINGS

Primarily, the ceiling is exposed precast concrete planks painted white with acoustic panels adhered to the underside of the recessed troffer. Lighting fixtures are surface mounted to the concrete ribs and almost all piping is exposed. The kitchen and kitchen support spaces have 9”x9” ceiling tiles with drop-in light fixtures.

Specific Issues

- Adhered acoustical ceiling tiles have become loose and fallen off in several locations
- Some areas have staining along the concrete ribs.
- In the kitchen and kitchen support areas the 9”x9” ceiling tile is in very poor condition. Tiles are stained, missing and deteriorated. (Image 38)
- Lighting levels in corridor are low.

Recommendations

- Remove adhered acoustical tiles (some may have asbestos glue tabs) and replace with acoustical tiles or dropped ceiling
- Review source of staining on concrete ceiling. Patch and repair source and repaint concrete.
- Replace all kitchen and support area ceiling tiles. Kitchen area to have scrubbable ceiling tiles.
- Install additional light fixtures in corridor.

DOORS

Fire separation doors within the corridor have hollow metal frames and clear vision glazing. Surface mounted push bar hardware is mounted on the egress side of the doors. Classroom and office doors are solid wood doors in hollow metal frames, a few of the doors are hollow metal with hollow metal frames. Door panel types vary; some are solid, others have different sized vision panels and louvers. Generally the doors and frames appear to be in good condition. Hardware on doors varies.

Specific Issues

- Several doors still have knob hardware.
- Some of the doors with vision panels have wired glass.

Recommendations

- Refinish wood doors that are fading.
- Repaint hollow metal doors and frames that are fading.
- When replacing doors with wire glazing, replace with rated doors with tempered glass.

Image 32

FIXTURES & FURNITURE (BUILT-IN)

Student cubbies are located in the corridor; shelves both below and above the coat hooks serve as additional teacher storage for books and materials. Within the classrooms there are teacher wardrobes and built-in shelving. Each classroom has a countertop, cabinet storage area and sink. Most shelving, and other built-in fixtures, are original to the building and are well worn.

Toilet room partitions are in poor condition

Specific Issues

- Built in classroom furniture is worn and dated; most is in fair condition.
- Classroom storage is needed for teacher supplies.
- The toilet room fixtures and toilet partition walls are in poor condition.

Recommendations

- Replace existing classroom shelving and casework. Provide additional storage areas for teacher and student supplies.

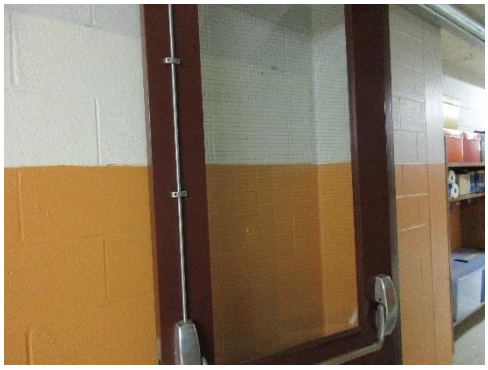


Image 33

Image 34

- Replace classroom countertops, sinks and cabinet storage with accessible countertops and sinks.
- Replace all damaged bathroom partitions.

Image 35

FUNCTIONAL USE OF SPACE

Throughout the facility there are several areas where the functional use of the space needs improvement. These include areas where students are being taught, items are being stored, teacher work rooms and spaces appropriate for both large and small meetings are held.

Specific Issues

- Small group teaching in hallway spaces.
- Multiple teachers sharing one space.
- Large storage in hallway.
- Former storage closets used for teaching spaces.
- The stage area used for physical therapy.
- Former loading area used as teaching space.

Recommendations

- Provide additions and renovations to meet current student needs.

Image 36

Image 37

Image 38

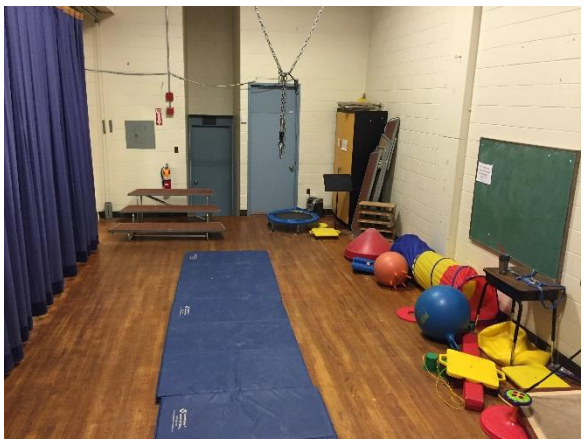


Image 39

Image 40

Image 41

Image 42

Image 43

CIVIL ENGINEERING ASSESSMENT

Nitsch Engineering has performed research of the existing site conditions at the Byam Elementary School located at 25 Maple Road in Chelmsford, Massachusetts. Nitsch Engineering has used Chelmsford GIS and design drawings provided by the Town. Nitsch Engineering gathered information during a site visit conducted by Brittney Veeck, EIT on February 17, 2016 and a site visit conducted by Dave Conway, PE on March 4, 2016.

GENERAL SITE DESCRIPTION

The existing Byam Elementary School is located at 25 Maple Road, Chelmsford, Massachusetts. The site is bounded by wetlands to the north and east and residential areas to the west and south.

There is an asphalt driveway entrance along Maple Road that extends from the street and around the building. There is paved parking to the southeast of the building.

The asphalt driveway crosses over a culvert (Image 1) which connects a small swale from the west side of the site to the wetlands along the eastern and northern side of the site.

There are play fields to the north of the building along the wetlands and residential area.

Image 1

Image 2

EXISTING SITE UTILITIES

STORM DRAINAGE

Chelmsford GIS shows that there are no public closed drainage systems in Maple Street adjacent to the school site.

Stormwater runoff from the parking lot is collected in catch basins and discharged through one of two headwalls which lead to the hydraulic connection (swale) to the wetlands (Image 2 and 3).

Stormwater runoff from the roof is collected through the building and discharged below grade. One downspout was observed on site and it discharged at grade (Image 4). Record plans show the roof runoff being piped underground and discharging into the wetlands to the north of the site through a vitrified clay pipe.

Runoff from the driveway to the south of the building is collected in a swale and directed through the culvert and eventually to the

Image 3

Image 4

Image 5

Image 6

Image 7

wetlands.

Stormwater runoff from the driveway to the north of building is collected in catch basins and discharged along with the roof runoff through a headwall and into the wetlands to the north of the site.

SEWER

There is a town sewer main in Maple Road. Chelmsford GIS shows a force main connecting the sanitary sewer for the school to the gravity main in Maple Road. Record plans show a septic system to the south of the school building, however this information is probably outdated.

Two sewer manholes and a hatch were observed on site where the GIS indicates a sewer manhole at the east corner of the building (Image 5). The manholes and hatch could be indicative of a pump and support the idea of a force main for the site.

A sewer manhole was observed along the northeast face of the building (Image 6). This manhole may be where the sewer service exits the building.

WATER

The Town of Chelmsford is split up into three separate water districts: the Chelmsford Water District, the North Chelmsford Water District, and the East Chelmsford Water District.

Two hydrants were observed on site. One of the hydrants was located at the northwest corner of the building along the asphalt driveway (Image 7) and the other hydrant was located at the southeast corner of the building along the parking (Image 8). Record plans show a 6-inch water service from Maple Road through the eastern side of the site that runs to both hydrants.

The record plans do not show a domestic or fire protection service that runs to the school; however, the school services likely connect to the 6-inch water line or have a separate connection to the water main in Maple Road.

NATURAL GAS

There is a gas meter located along the asphalt drive at the northwest corner of the building (Image 9). That gas meter is not on the face of the building, it is located across the driveway from the building.

There is a generator located along the northwestern face of the building adjacent to the gas meter (Image 10).

Record plans indicate the gas service coming from Maple Road, through the eastern side of the site and around the north side of the building to reach the meter and building.

Image 9

ELECTRICAL

There is a transformer located at the northwest corner of the building. The transformer had a sign posted on it indicating that the building has multiple power sources (Image 11).

Overhead wires were observed onsite connecting to the northwest face of the building from a utility pole to the northwest of the property (Image 12).

Electrical services enter the building at the northwest corner of the building.

Image 10

Image 11

Image 12

EXISTING SITE CONDITIONS

SOILS

Based on the Natural Resources Conservation Service (NRCS) Middlesex County Soil Survey the site of the Byam Elementary School property is on soil classified as Merrimac-Urban Land Complex, Hinckley loamy sand, and Swansea muck.

PAVEMENT/CURBING

The asphalt pavement within the site is in generally fair condition with some areas of cracking. There are areas of ponding, mainly in the driveway around the school (Image 12 and 13).

Walkways onsite are asphalt and concrete and are generally in good condition (Image 14). Some of the accessible ramps on site have ponding (Image 15). There is a walkway from Maple Road to the school site that was not accessible at the time of the site visit because it was covered in ice.

There is concrete curb and vertical granite curb between the sidewalk on the southeast face of the building and the parking lot/driveway (Image 14 and 16). This concrete curb is in generally good condition and the vertical granite curb is in generally fair condition. The curb along the driveway entrance was covered in snow at the time of the site visit and no curb was observed. Sloped granite curb was observed along the driveway and parking areas. Limited areas of curb were exposed through the snow but the curb that was observed was in fair to poor condition (Image 17).

PLAYFIELDS

The Byam Elementary School has limited playfields that appear to be used primarily for recess and physical education. The fields do not have lights or irrigation and are not lined or skinned for any organized sport. The fields are level enough for unstructured play but would need to be regraded to be used for any team sports. The grass cover is patchy. The paved play area in the rear of the school is cracked and uneven with dated and limited infrastructure.

PERMITTING CONCERNS

The Byam Elementary School has regulated wetlands on site and is within wetland buffer zones. Work on site may require permitting and approval from the Chelmsford Conservation Commission. The site is not within a Zone II Wellhead Protection Area. The site may be within a FEMA Flood Zone AE.

RECOMMENDATIONS

- Mill and overlay sections of pavement where cracking/degradation have occurred.
- Regrade paved areas to prevent ponding which can lead to ice patches in the cold weather.
- Clean out the sediment accumulation in the culvert.
- Replace vitrified clay pipes.
- Reset vertical granite curb as needed.

Image 13

Image 15

Image 14

Image 16

Image 17

Image 18

STRUCTURAL ENGINEERING ASSESSMENT

The purpose of this report is to assess the structure of the existing building, comment on the existing structure and comment on the structural integrity of the building.

Basis of the Report

This report is based on visual observations during our site visit on February 16, 2016. During the visit we did not remove any finishes or take measurements so our understanding of the structure is limited.

Existing Conditions

The Byam Elementary School and Harrington Elementary School are very similar in their construction. The Byam School was constructed in 1970 and is a two-story structure.

We observed the exterior concrete facade from within the courtyard and noted moderate spalling and exposed steel reinforcing. On the outside face of the building, we observed signs of past repairs, some of which exhibited cracks through the patch material.

On the exterior red brick masonry façade, we observed ½" wide vertical cracks.

The structure, for the most part, consists of pan-joist concrete rib floors supported on concrete columns.

We observed half-height interior masonry walls in the bathrooms. When a future renovation is planned, these walls would need to be evaluated and anchored to the main structure.

HVAC ASSESSMENT

HOT WATER PLANT

The Byam Elementary school is heated by a hot water boiler plant consisting of three (3) gas fired hot water boilers, hot water pumps, accessories, breeching, combustion air ductwork, and controls. The boilers were manufactured by Aerco, with an estimated heating capacity of 1,706 MBH output, and maximum input of 2,000 MBH each. The boilers were installed in 2002 and appear to be in very good condition. The boiler flue gases are vented through the use of a stainless steel breeching through the roof. Combustion air for the boilers is provided through the use of insulated sheet metal vent ducts (Image 1, 2, & 3).

Hot water is distributed from the boiler to the buildings heating equipment by a pair of base mounted end suction hot water pumps that are equipped with VFD drives. The pumps appear to have been re-built in recent years with new motors; however the pumps appear to be nearing the end of their useful service life. The hot water piping and insulation located within the main boiler room appear to be in good condition. However, the majority of the hot water distribution piping and insulation are original to the building and in fair to poor condition (Image 4, 5, 6, 8, 9, & 10).

ADMINISTRATIVE OFFICES

The offices are heated, ventilated and air conditioned by packaged thru wall air conditioning (PTAC) units with hot water heating coils. The PTAC units appear to be in fair condition. The offices with exterior walls are ventilated naturally through the use of operable windows (Image 7).

Image 1 – Hot Water Boilers

Image 2 – Boiler Flue Vents

Image 3 – Boiler Breeching

Image 4 – Hot Water Pumps

Image 5 – Hot Water Pumps

Image 6 – Hot Water Pump VFD Drivers

Image 7 – Admin. Office PTAC Unit

Image 8 – Permeter Fin Tub Radiation

SUPPLEMENTAL AC SYSTEMS

The majority of the building is not air-conditioned. Besides some of the Administration offices, which are served by PTAC units, the technology classroom is served by a ductless split system AC unit. The split system AC unit appears to be have been installed in 2015 and was manufactured by Daikin (Model RKN24NMVJU), and has a capacity of 2 tons of cooling (Image 13).

CLASSROOMS

Ceiling suspended horizontal classroom unit ventilators are utilized for the heating and ventilation requirements of the majority of the classroom spaces. The unit ventilators are manufactured by MagicAire and appear to have been recently installed in 2014. There are approximately fourteen (14) unit ventilators located on the first floor and nineteen (19) unit ventilators located on the second floor, for a combined total of (33) unit ventilators. Ventilation air is introduced to each of these units through a wall-mounted louver. Some of the louvers appear to be in need of cleaning, repair, and/or replacement. Each unit is equipped with a hot water heating coil, supply fan and filter. The units are in very good condition. The classroom spaces are provided with exhaust systems to remove any outdoor air that is introduced through the unit ventilators which helps maintain a neutral pressure within the space. Most of the classrooms are served by central roof mounted exhaust fan systems. The majority of classrooms with exterior walls also have perimeter hot water fin tube radiation. The fin tube radiation appears to be originally installed equipment and is generally past its expected useful service life. Some of the fin tube radiation enclosure grilles are damaged and dirty (Image 11, 12, & 13).

CAFETERIA AND KITCHEN

The Cafeteria is heated by an indoor heating and ventilation unit. The unit is provided with a hot water coil, supply fan and filter section and was manufactured by Herman Nelson/American Air Filter (Model AUDIvent H-11-LPWSYA). The Kitchen is provided with heating, and make-up air

ventilation by an indoor heating and ventilation unit. The unit is provided with a hot water coil, supply fan and filter section and was manufactured by Herman Nelson/American Air Filter. The Cafeteria and Kitchen H&V units and associated ductwork are located on a mezzanine support platform located above the Kitchen. Both of the H&V units appear to be originally installed equipment that are over 50 years old, in poor condition and past their expected useful service life. Galvanized sheet metal ductwork is distributed from the airhandling units to sidewall diffusers in the Cafeteria and ceiling diffusers in the Kitchen. The Cafeteria has a low wall return grille and the Kitchen has a kitchen exhaust hood. The kitchen exhaust hood is connected to a roof mounted exhaust air fan. The exhaust air fan and hood appear to be in good physical condition. (Figure 14, Figure 15, Figure 16)

Image 9 – Fin Tube Radiation Heating

Image 10 – Typical Classroom Unit Ventilator

GYM

The Gym is served by two (2) indoor heating and ventilation units that are located in the adjacent Gym storage room. The H&V units are ceiling suspended units. The units each have a hot water coil, supply fan and filter section and were manufactured by Herman Nelson/American Air Filter. Galvanized sheet metal ductwork is distributed from the air handling unit to the Gym. Supply air diffusers are located on the sidewall, and low floor return air registers are installed in the gym. The indoor air-handling units and associated ductwork appear to be originally installed equipment that is over 50 years old, in poor condition and past their expected useful service life (Image 18, 19, & 20).

Image 11 – Typical Classroom Exhaust Grille

EXHAUST SYSTEMS

The majority of classroom spaces are exhausted through roof mounted exhaust fans. There are also dedicated exhaust fans which are roof mounted for areas such as the gang toilets, Kitchen hood, storage rooms and large group spaces such as the Gym and Cafeteria These areas utilize a galvanized sheet metal duct distribution system from the space to the roof mounted exhaust fans. There are approximately 34 roof

Image 12 - Library Unit Ventilator

Image 13 – Ductless AC Unit Condensers

Image 14 – Cafeteria Supply Diffusers

Image 15 – Kitchen Make-up Air Unit

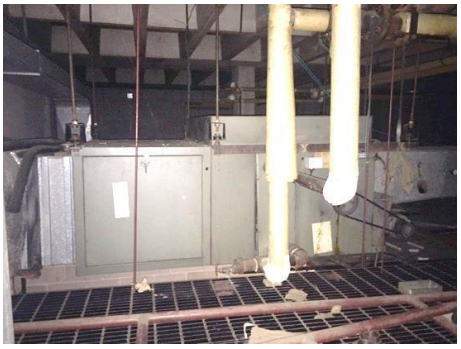


Image 16 – Cafeteria H&V Unit

mounted exhaust fans. The majority of the exhaust fans appear to be in very good condition, with most appearing to have been recently replaced. The majority of exhaust fans were manufactured by Loren Cook or CentriMaster. The majority of the existing exhaust air ductwork appears to be original and past its useful expected service life (Image 17, & 22).

RESTROOMS

The restrooms are heated by hot water convector units that appear to be in fair to poor condition. The restrooms are typically exhausted by ceiling or sidewall exhaust air grilles that are connected to exhaust air fans located on the roof. Some of the exhaust air grilles were soiled (Image 21).

ENTRYWAYS AND CORRIDORS

The main entryways are heated by hot water convector units that appear to be originally installed equipment; some of the unit heaters show signs of corrosion on the cabinets. The majority of corridors are not provided with code required fresh air ventilation. The corridors are heated by a combination of hot water convectors and fin tube radiation that appears to be in poor to fair condition (Image 23, & 24).

CONTROLS

The majority of the building HVAC systems and the heating plant are controlled by a combination DDC (direct digital control) and pneumatic control system. The ATC control system was upgraded during the 2014 HVAC system renovation project. The DDC/ATC system was manufactured by Trend Controls and installed by FMC Control Technologies. The Control system has a DDC (direct digital control) front-end controller, DDC equipment controllers, and network type thermostats. The majority of the renovated heating and ventilation system have DDC controls; however, there are still some pneumatic control

systems installed for the existing H&V equipment that were not replaced during the recent renovation. The pneumatic compressor appears to be in good condition (Image 25, 26, & 27).

RECOMMENDATIONS

In general, the school's heating and ventilation equipment is in good condition as the boilers, and unit ventilators have recently been replaced. A new DDC system was also recently installed. However, the majority of the existing hot water piping and terminal heating equipment is originally installed equipment. Based upon our site observations and review of the existing system we offer the following recommendations for HVAC system repairs and/or renovations:

- The existing hot water plant including hot water boilers, pumps, accessories and controls should continue to be maintained in accordance with manufacturers recommendations.
- New hot water pumps should be installed.
- The existing classroom unit ventilators and indoor unit ventilators should continue to be maintained in accordance with manufacturer recommendations.
- The Cafeteria H&V Unit and Kitchen Make-Up indoor air-handling unit located in the Mezzanine area above the Kitchen should be replaced.
- Rooftop exhaust air fans should continue to be maintained.
- Existing ductwork and air distribution devices should be cleaned.
- Existing cabinet unit heaters, hot water fin tube radiation, and convectors should be replaced; new hot water branch piping and valves with insulation should be provided.
- Existing hot water supply and return piping outside of boiler room should be replaced with new insulated piping.

Image 17 – Kitchen Exhaust Hood

Image 18 – Gym Sidewall Supply Diffusers

Image 19 – Gym H&V Unit

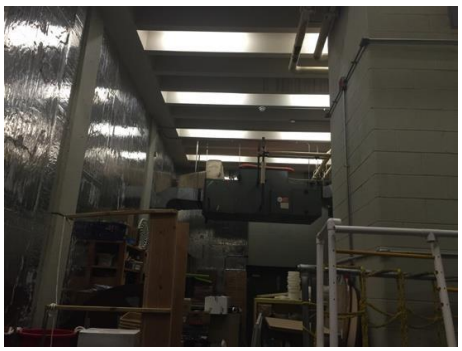


Image 20 – Gym H&V Unit

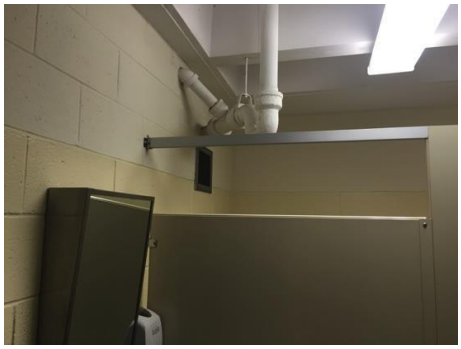


Image 21 – Restroom Exhaust Grille

Image 22 – Restroom Exhaust Air Fans

- Alternatively, existing hot water piping system should be drained and pressure tested and faulty valves and pipe sections should be replaced and insulated. Damaged piping insulation should be replaced.
- Ventilation air systems should be provided for the corridors.
- Copy rooms should be exhausted to the outdoors.
- A high efficiency AC system should be installed to replace the administration area PTAC units.
- The ATC system should be further upgraded to convert all remaining pneumatic controls with new DDC controls.
- Mechanical ventilation should be provided for the following interior areas of the buildings: Administration interior offices, Library interior office and Teacher's Special ED Workroom.

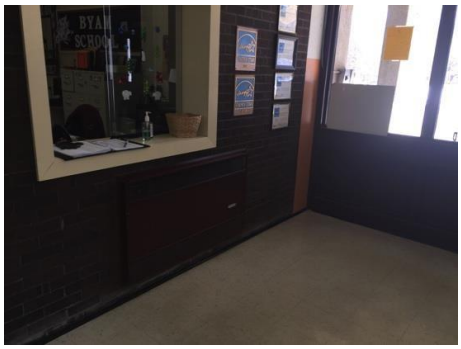


Image 23 – Entryway Hot Water Unit Heater

Image 24 – Corridor Hot Water Unit Heater

Image 25 – Pneumatic Compressor

Image 26 – ATC Controls & Control Panel

Image 27 – DDC Control Panel

ELECTRICAL ASSESSMENT

EXISTING SYSTEMS

The existing systems of this facility range from original vintage, approximately 47 years old, to upgrades and/or add-ons recently installed including fire alarm, branch circuit panelboards, lighting, and photovoltaics. Although new devices, equipment, and fixtures were provided, generally the existing wiring, raceways, and boxes were reused. While the facility is well maintained and clean, the systems do not reflect nor meet the needs of a modern day facility. Code changes over the years have resulted in existing systems that do not meet today's electrical codes. Most of the existing systems are not suited for expansion due to the incompatibility of new technologies. Replacement parts are no longer available for many of the systems. We recommend replacement of all the electrical systems for this facility under a renovation program.

Image 1 – Utility Pole Riser

Image 2 – Pad Mount Transformer

ELECTICAL DISTRIBUTION SYSTEM

The service is fed from a utility pole riser to a utility company owned pad mounted transformer adjacent to the building (Image 1, & 2).

A 1,200 ampere, 120/280 volt, 3 phase, 4 wire service serves the building. The main service equipment is located within the building's boiler room. The switchboard consists of a main/C.T. cabinet and a main distribution section, distribution style construction. The equipment is of original vintage and manufactured by General Electric. No ground was observed at the building's main water service, which is a code requirement (Image 3).

Branch circuit panelboards vary from original General Electric panelboards that are in poor condition to recently installed General Electrical panelboards that are in good condition. There has been some additional branch circuitry added throughout the school. New power branch circuits

Image 3 – Switch Gear

Image 4– Original G.E.P.B

Image 5 – Updated G.E.P. B.

Image 6 – New Branch Circuit Install

(blue) are installed in color coded conduits (Image 4, 5, & 6).

INTERIOR LIGHTING

Corridor lighting consists of surface mounted fluorescent fixtures with acrylic lenses and other surface mounted cylinders and sconces. Corridor lighting is controlled via line voltage switches at the ends of the corridor (Image 7).

Classroom lighting consists of surface mounted fluorescent fixtures with acrylic lenses. Light levels appear adequate in the classrooms. Each classroom has been equipped with a wireless Lutron occupancy sensor and two local switches that control a line voltage power pack (Image 8, & 14).

Restrooms contain ceiling mounted fluorescent round fixtures with PLT lamps. Light levels in the restrooms are very low (Image 12)

Gym lighting and cafeteria lighting consists of high output, 2x4 fluorescent high bays. Light levels seem adequate (Image 9 & 11).

Incandescent track heads are used to light the platform in the cafetorium for performances (Image 10).

In general, most of the interior lighting is in fair condition. Most switching has been replaced with switch style occupancy sensors. Multiple rooms were noted that they did not get the occupancy sensor switch upgrade (Image 13).

EXTERIOR LIGHTING

The site is lit with a combination of recently installed pole and building mounted LED flood lighting. Under the main canopy, existing lighting has been upgraded to LED lighting (Image 15, 16, & 17).

In general, the exterior lighting is in fair condition; however, it does not meet any dark sky requirements. Exterior lighting is controlled via a time clock.

EMERGENCY STANDBY SYSTEM

A recently upgraded diesel fired generator, 50 kW, 120/208 volt, in a weather-proof, sound attenuated enclosure is installed adjacent to the building within a fenced in enclosure. The generator feeds an ASCO transfer switch and serves emergency lighting, as well as other loads. The emergency system does not comply with current electrical code as the emergency equipment is not separated from normal equipment (Image 18, & 19).

FIRE ALARM SYSTEM

The fire alarm system consists of an addressable FCI S3 Series control panel. The control panel is located in the lobby. Horn/strobes are ADA compliant and located throughout the school. Manual pull stations also seem to be compliant (Image 20, 21, & 22).

The detector does not meet NFPA72 spacing in rooms with beams. Also, a detector device should be in each space “Full Coverage” which did not seem to be the case. E-use groups require speaker/strobes, which means this school does not comply with current code.

An exterior master box and knox box are located at the main entrance (Image 23).

Image 7 – Corridor Lighting

Image 8 – Classroom Lighting

Image 9 – Cafetorium Lighting

Image 10 – Platform Track Lights

Image 11 – Gym Lighting

Image 12 – Toilet Lighting

LIGHTNING PROTECTION SYSTEM

The facility does not have a lightning protection system.

PHOTOVOLTAIC SYSTEM

The facility contains a recently installed roof-mounted photovoltaic system.

DATA / TELEPHONE / CLASSROOM INTERCOM / CLOCK SYSTEM

There are IDF rooms and one MDF room. The MDF room serves each IDF room in a star topology with 62.5 - micron multi-mode fiber.

In general, data wiring is Cat5 throughout the building. IDF data racks are generally installed in existing storage or janitor closets and emergency branch circuits have been run to each rack (Image 25, & 26).

The school's telephone system is a hosted system. Handsets in the school are manufactured by Polycom.

The existing clock system is a standard electric time clock and seems to be operational; however, this system is obsolete.

A Rauland tele-center paging system head-end is located in the MDF room. A Valcom paging interface is used to interface the hosted system to the paging system and has been problematic (Image 27).

Most classrooms are equipped with A/U control systems for projector, document camera, and computer connections. Each also contains a sound reinforcement system. Projectors are ceiling mount type (Image 24, 29, & 30).

The cafetorium's existing Dukane local sound system is no longer in use. A portable system is used. The portable system is not tied into the fire alarm system which is a code requirement (Image 28).

SECURITY

The building contains an Aiphone intercom door communication system at the main entry that is in fair condition (Image 33 & 35).

The building also contains an intrusion system, CCTV cameras, and an access control system.

The intrusion system is a Honeywell system and is operational; however, appears to be in poor condition (Image 34 & 36).

CCTV cameras are located on the exterior covering the building perimeter. They are connected to an S2 video management system; the head-end is located at the Central administration office (Images 32).

Access control is manufactured by S2 and there are micro-nodes located in the IDF closets to serve the access controlled doors (Image 31).

Image 13 – Occupancy Sensor

Image 14 – Toilet Lighting

Image 15 – Pole Mounted LED Flood

Image 16 – Building Mounted LED

Image 17 – Canopy Light Fixture

Image 18 – Generator

Image 19 Automatic Transfer Switch

Image 20 – Fire Alarm Control Panel

Image 21 – Horn / Strobe

Image 22 – Pull Station

Image 23 – Master & Knox Box

Image 24 – Typical Projector Setup

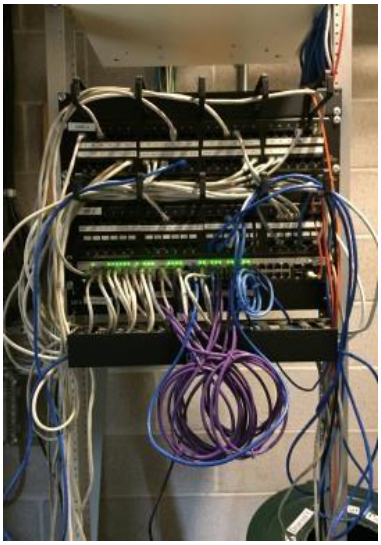


Image 25 – IDF

Image 26 – MDF

Image 27 – Paging System

Image 28 – Portable Local Sound System

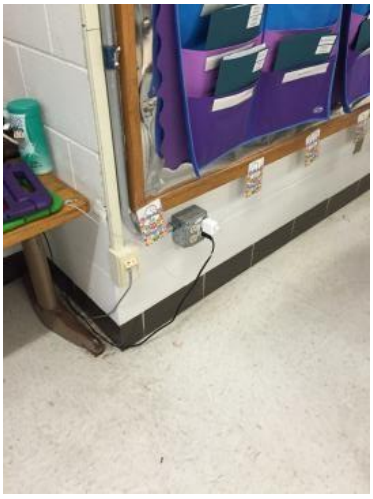


Image 29 – Classroom Data Wiring

Image30 – A/U Control System

Image 31 – Access Controller

Image 32 – CCTV Camera

Image 33 – Ai phone Intercom

Image 34 – Intrusion Keypad

Image 35 – Intercom Master Station

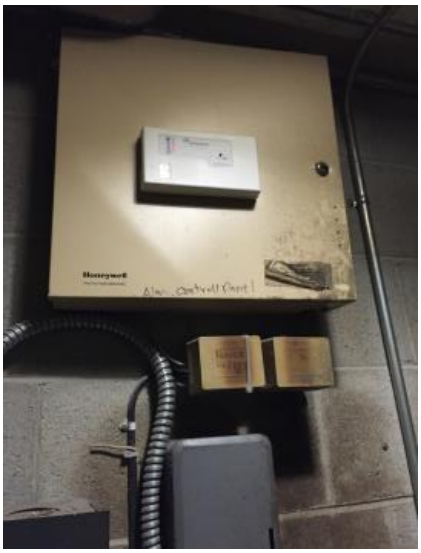


Image 36 – Intrusion System Control Panel

PLUMBING ASSESSMENT

EXISTING SYSTEMS

Presently, the plumbing systems serving the building are cold water, hot water, sanitary, waste and vent system, storm drain piping, and natural gas. Municipal sewer and municipal water service the building.

FIXTURES

Water closets are wall hung vitreous china with manual flush valves (Image 1).

Image 1 – Wall Hung Water Closet

Urinals are wall hung vitreous china with automatic sensor type flush valves (Image 2).

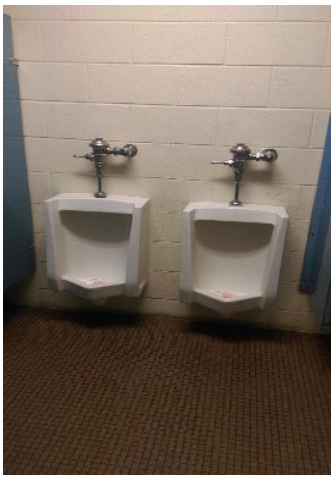


Image 2 – Urinals

Lavatories are wall hung vitreous china. The lavatories are fitted with hot and cold water faucets (Image 3).

Janitors sinks are floor mounted mop receptors.

Faucets are equipped with vacuum breakers.

Drinking fountains are vitreous china recessed type (Image 4).

Classroom sinks are stainless steel drop-in type with hot and cold water faucet with gooseneck. Classroom sinks include a bubbler (Image 5).

Kitchen area fixtures are in fair condition. The pot washing sink is not piped to a grease interceptor (Image 6).

See Kitchen Equipment Assessment for additional information.

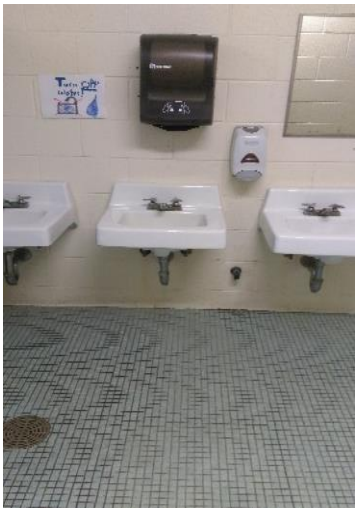


Image 3 – Wall Hung Lavatories

Image 4– Drinking Fountain

Image 5 – Classroom Sink

Image 6 – Pot Wash Sink

WATER SYSTEM

The domestic water service is located in the Mechanical Room. The service appears to be 4" in size and includes a meter and two (2) reduced pressure backflow preventers in parallel (Image 7).

Piping is copper tubing with sweat joints. The majority of piping is insulated but not labeled. In general, the original gate valves are in fair condition (Image 8).

The main building domestic hot water is generated through a gas-fired standard efficiency non-condensing storage tank type water heaters. The water heater has a natural gas input of 77,000 BTUH and a water storage capacity of 100 gallons (Image 9).

A thermostatic mixing valve is not provided for the building domestic hot water system. The domestic hot water system is recirculated. There is no expansion tank on the cold water make-up to the water heater.

GAS

Building is serviced by an elevated pressure natural gas service. The gas service, regulator and meter are located on the exterior in a caged area. Gas service is 3” in size (Image 10).

Gas is supplied to heating boilers, water heater and kitchen equipment.

Gas piping is black steel with either welded or threaded joints depending on pipe size.

SANITARY DRAINAGE SYSTEM

In general, cast iron is used for sanitary drainage. Piping and fittings above slab are no-hub with coupling joints and bell & spigot. Where visible, the cast iron pipe appears to be in fair condition. Smaller pipe sizes appear to be copper for waste (Image 11)

ROOF DRAINAGE

The flat roofs are collected by roof drains and interior cast iron rain leaders. The roof and drains are in fair condition. Portions of the horizontal rain leader piping is insulated (Image 12).

RECOMMENDATIONS

Plumbing fixtures meet current code for water conservation. However, new high-efficiency low flow fixtures could be installed to reduce water consumption.

In general, existing cast iron drainage piping can be re-used if sized appropriately. We recommend video inspection of existing drains to confirm integrity.

- Provide reduced pressure backflow preventers at Janitor's closet soap dispenser.
- Local sewer may require Kitchen waste be directed to exterior grease trap.
- Install a high efficiency water heater including master mixing valve, recirculated hot water and expansion tank on cold water make-up line.
- Sanitary, waste, vent and storm drainage piping should be video-taped to determine condition.

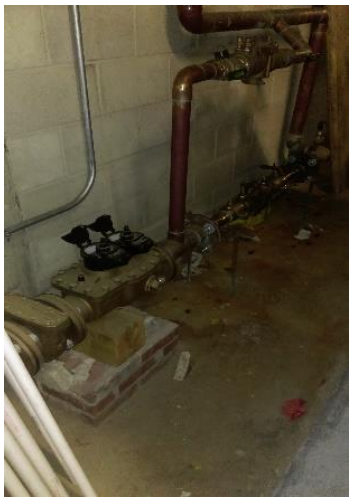


Image 7 – Water Service

Image 8 – Water Piping

Image 9 – Water Heater

Image 10 – Gas Service and Meter

Image 11 – Sanitary Piping

Image 12 – storm Piping

FOODSERVICE EQUIPMENT ASSESSMENT

EXISTING

The Byman Elementary School serves approximately 500 students in grades K through 4. The kitchen equipment appears to be more of a serving kitchen with limited cooking capability. Much of the area sits idle including what was at one time the dish room. Today the dish room is used for storage.

The school's cafeteria kitchen serves the typical school lunch program in a single serving line configuration. The equipment that is present is mostly outdated. Floors and walls are constructed of the apprpriate materials and have held up well.

Image 1

KITCHEN EQUIPMENT

During the site visit we noticed many pieces of equipment were missing. In places where equipment was remove tripping hazards exist where unused utility stubs are located.

General conditions (Image 1):

- The cooking equipment is composed of a convection oven and a combination kettle and steamer. The pressure steamer shown in this image is the same style as seen in the high school kitchen. As with the high school the high-pressure steam condition presents a condition where burns are more likely. This type of steamer is no longer common. Many now use pressure-less steam equipment.
- Wood topped table can be seen in this image. Wood topped work surfaces are not allowed in a kitchen unless it is being used in conjunction with dough preparation in a scratch baking program. There is no scratch baking taking place in this kitchen.

Image 2

Walk-in Cooler & Freezer Image 2:

- The walk-in panels and doors are outdated and inefficient. The condensing units for the walk-in cooler and freezer are located indoors, resulting in noise and

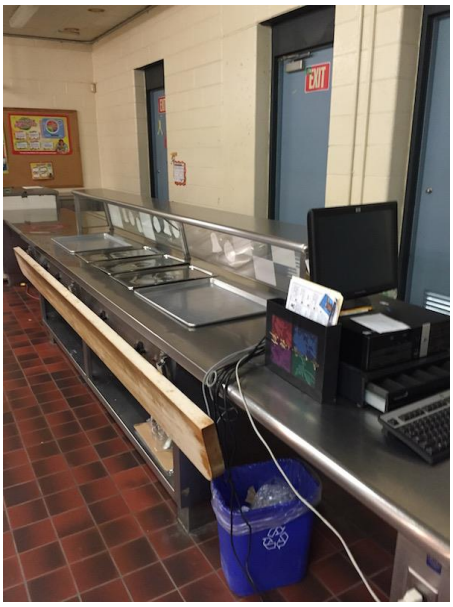


Image 3

heat being rejected into the indoor space. There is visible corrosion on the surface of the walk-in panels.

Serving line (Image 3):

- The serving line is a single serving line with milk at the beginning and the check out/cash station at the end. The cash terminal is set on a standard worktable that could be better utilized as a work surface.

- Note the wood material work board attached to the serving counter. Wood is a restricted material in a commercial kitchen environment.

- The serving counter is not equipped with cold food holding equipment. Without a mechanical cooler it can be difficult to maintain proper cold serving temperatures.

- The sneeze shield in the serving counter is not compliant with current sneeze guard standards.

Work surfaces (Image 4):

Image 4

- This image is of a baking table that was appropriate at a time when many schools utilized a scratch-baking program. Wood is a restricted material. In this case given the age of the wood, the material has split and open gaps are present in the work surface. Food debris accumulates in the gaps and effective cleaning and sanitizing of this type of wood surface is not possible.

Recommendations:

1. Eliminate all wood surfaces. Replace them with appropriate materials that are complaint with the current health code standards.
2. Add appropriate mobile worktables to provide for additional work surfaces that are flexible.
3. Redeploy the dish room or eliminate the equipment from the dish room to provide for additional storage.
4. Replace the antiquated cooking equipment and exhaust hood to better prepare and cook at this facility.
5. As a standalone full service kitchen we estimate a complete equipment fit out to cost approximately $325,000

1.1 INTRODUCTION:

UEC has been providing comprehensive asbestos services since 2001 and has completed projects throughout New England. We have completed projects for a variety of clients including commercial, industrial, municipal, and public and private schools. We maintain appropriate asbestos licenses and staff with a minimum of twenty years of experience.

As part of the proposed renovation and demolition project, UEC was contracted by Dore & Whittier Architects to conduct the following services at the Byam Elementary School, Chelmsford, MA:

- Inspection and Testing for Asbestos Containing Materials (ACM);
- Inspection for Polychlorinated Biphenyls (PCB's)-Electrical Equipment and Light Fixtures;
- Inspection for Lead Based Paint (LBP).

Information included in this report was based on the AHERA Management Plans and on a determination inspection performed by UEC. Limited testing was performed as part of this study. It is recommended that once a detailed scope of work is identified for a renovation or a demolition project, a comprehensive Environmental Protection Agency (EPA) NESHAP inspection including asbestos testing for all suspect materials and testing for other hazardous materials including, Polychlorinated Biphenyls (PCB's) and Lead Based Paint (LBP) should be performed, which would provide a more accurate hazardous materials abatement costs and scope.

Additional testing and abatement plans for EPA review are required to be performed should PCB's be found in the caulking.

The scope of work included the inspection of accessible ACM, collection of bulk samples from materials suspected to contain asbestos, determination of types of ACM found and cost estimates for remediation. Bulk samples analyses for asbestos were performed using the standard Polarized Light Microscopy (PLM) in accordance with EPA standard. Bulk samples were collected by Massachusetts licensed asbestos inspector Mr. Jason Becotte (AI-034963) and analyzed by a Massachusetts licensed laboratory EMSL, Woburn, MA.

Refer to samples results.

2.0 FINDINGS:

The regulations for asbestos inspection are based on representative sampling. It would be impractical and costly to sample all materials in all areas. Therefore, representative samples of each homogenous area were collected and analyzed or assumed.

All suspect materials were grouped into homogenous areas. By definition a homogenous area is one in which the materials are evenly mixed and similar in appearance and texture throughout. A homogeneous area shall be determined to contain asbestos based on findings that the results of at least one sample collected from that area shows that asbestos is present in an amount >1% in accordance with EPA regulations. All suspect materials that contain any amount of asbestos must be considered asbestos if it is scheduled to be removed per the Department of Environmental Protection (DEP) regulations.

Number of Samples Collected

Four (4) bulk samples were collected from the following materials suspected of containing asbestos:

Type and Location of Material

1. Exterior expansion joint caulking
2. Interior door glazing caulking at hallway
3. Interior vertical caulking at boiler room
4. White 12” x 12” vinyl floor tile at first floor hallway

Samples Results

Type and Location of Material	Sample Result
1. Exterior expansion joint caulking	No Asbestos Detected
2. Interior door glazing caulking at hallway	6% Asbestos
3. Interior vertical caulking at boiler room	No Asbestos Detected
4. White 12” x 12” vinyl floor tile at first floor hallway	No Asbestos Detected

3.0 OBSERVATION AND COST ESTIMATES:

OBSERVATIONS:

All ACM must be removed by a Massachusetts licensed asbestos abatement contractor under the supervision of a Massachusetts licensed project monitor prior to any renovation or demolition activities that might disturb the ACM.

1. Brown glue daubs for 1’ x 1’ acoustical ceiling tiles was either assumed or previously found to contain asbestos.
2. 9” x 9” Vinyl floor tile and mastic were either assumed or previously found to contain asbestos.
3. Grey pipe packing cement was either assumed or previously found to contain asbestos.
4. 12” x 12” Crème vinyl floor tile and mastic were either assumed or previously found to contain asbestos.
5. Black sink coating was previously found to contain asbestos.
6. Hard joint insulation was previously found to contain asbestos.
7. Interior door glazing caulking was found to contain asbestos.
8. Glue holding blackboard was assumed to contain asbestos.
9. All remaining suspect materials were found not to contain asbestos.
10. Rubber flooring was assumed to contain mercury.
11. Underground sewer pipe was assumed to contain asbestos.
12. Damproofing on exterior and foundation walls was assumed to contain asbestos. The demolition contractor will have to segregate the ACM from non-ACM building surfaces for proper disposal in an EPA approved landfill that does not recycle.
13. Roofing materials were assumed to contain asbestos. The demolition contractor will have to segregate the ACM from non-ACM building surfaces for proper disposal in an EPA approved landfill that does not recycle.
14. Painted surfaces were assumed to be LBP. All LBP activities performed, including waste disposal, should be in accordance with applicable Federal, State, or local laws, ordinances, codes or regulations governing evaluation and hazard reduction. In the event of discrepancies, the most protective requirements prevail. These requirements can be found in OSHA 29 CFR 1926-Construction Industry Standards, 29 CFR 1926.62-Construction Industry Lead Standards, 29 CFR 1910.1200-Hazards Communication, 40 CFR 261-EPA Regulations.
15. Visual inspection of various equipments such as light fixtures, thermostats, exit signs and switches was performed for the presence of PCB’s and mercury. Ballasts in light fixtures were assumed not to contain PCB’s. Tubes, thermostats, exit signs and switches were assumed to contain mercury. It

would be very costly to test those equipments and dismantling would be required to access. Therefore, the above mentioned equipments should be disposed in an EPA approved landfill.

16. Caulking materials were assumed to contain PCB's.

COST ESTIMATES:

The cost includes removal and disposal of all accessible ACM and an allowance for removal of inaccessible or hidden ACM that may be found during the demolition or renovation project.

Location	Material	Approximate Quantity	Cost Estimate ($)
Various Locations	Brown 1' x 1' Glue Daubs	42,000 SF	126,000.00
	9" x 9" Vinyl Floor Tile and Mastic	60,000 SF	300,000.00
	Crème 12" x 12" Vinyl Floor Tile and Mastic	200 SF	1,000.00
	Interior Doors	125 Total	12,500.00
	Sinks	35 Total	3,500.00
	Hard Joint Insulation	35 Total	3,500.00
	Blackboards	Unknown	8,000.00
	Hidden ACM	Unknown	25,000.00
	Miscellaneous Hazardous Materials	Unknown	25,000.00
Mechanical Room	Grey Pipe Packing	100 SF	2,500.00
Gymnasium	Rubber Flooring	4.300 SF	43,000.00
Exterior	Transite Sewer Pipes	Unknown[1]	50,000.00
	Roofing Materials	60,440 SF	60,440.00
	Damproofing on Exterior/Foundation Walls	Unknown[1]	125,000.00
PCB's Remediation[2]			25,000.00
Estimated costs for ACM Inspection and Testing Services			7,500.00
Estimated costs for PCB's Testing and Abatement Plans Services[2]			25,000.00
Estimated costs for Design, Construction Monitoring and Air Sampling Services			82,060.00
		Total:	**925,000.00**

[1]: Part of Total Demolition and Excavation.
[2]: Should results exceed EPA limit.

4.0 DESCRIPTION OF SURVEY METHODS AND LABORATORY ANALYSES:

Asbestos samples were collected using a method that prevents fiber release. Homogeneous sample areas were determined by criteria outlined in EPA document 560/5-85-030a.

Bulk material samples were analyzed using PLM and dispersion staining techniques with EPA method 600/M4-82-020.

5.0 LIMITATIONS AND CONDITIONS:

This report has been completed based on visual and physical observations made and information available at the time of the site visits, as well as an interview with the Owner's representatives. This report is intended to be used as a summary of available information on existing conditions with conclusions based on a reasonable and knowledgeable review of evidence found in accordance with normally accepted industry standards, state and federal protocols, and within the scope and budget established by the client. Any additional data obtained by further review must be reviewed by UEC and the conclusions presented herein may be modified accordingly.

This report and attachments, prepared for the exclusive use of Owner for use in an environmental evaluation of the subject site, are an integral part of the inspections and opinions should not be formulated without reading the report in its entirety. No part of this report may be altered, used, copied or relied upon without prior written permission from UEC, except that this report may be conveyed in its entirety to parties associated with Owner for this subject study.

Inspected By:

Jason Becotte
Asbestos Inspector (AI-034963)

		BYAM SCHOOL	Health, Safety & Welfare	Code Compliance	Functional Use of Building or Site	Handicap Accessibility	Extending the Life of the Building (Maintenance)	Energy Efficiency / Energy, Water Saving	Hazardous Material Abatement	Estimated Project Cost (5/2016 $)	High Priority (1-3 yrs) 2017-2020	Medium Priority (4-6 yrs) 2021-2023	Low Priority (7-10 yrs) 2024-2034 or under a full renovation project	On Going Maintenance	Notes / Totals
		GSF 60,442													
1	**Site & Civil**														
	1.01	Provide additional parking spaces including HC Van space & signage		x	x	x				$15,180		**$15,180**			
	1.02	Provide Accessible access to the front entrance from HC designated parking		x	x	x				$37,950		**$37,950**			
	1.03	Provide accessible route to the playground and accessible playground equipment		x	x	x				$75,900		**$75,900**			
	1.04	Provide accessible curb cuts and ramps at all exterior doors		x	x	x				$8,349		**$8,349**			
	1.05	Mill & overlay sections of pavement where degradation/ cracking has occurred			x		x			$30,360			**$30,360**		
	1.06	Regrade paved areas to prevent ponding and ice patches	x				x			$30,360			**$30,360**		
	1.07	Clean out sediment in culvert					x			$1,518				**$1,518**	
	1.08	Replace vitrified clay pipes					x			$45,540			**$45,540**		
	1.09	Reset vertical granite curb as needed					x			$15,180		**$15,180**			
		TOTAL										**$ 152,559.00**	**$ 106,260.00**	**$ 1,518.00**	260337
2	**Structural Elements**														
	2.01														
	2.02														
		TOTAL								**0**	**0**	**0**	**0**	**0**	
3	**Exterior Architectural Elements**														
	3.01	Repair exterior brickwork to prevent additional damage to walls and moisture	x				x			$846,133	**$846,133**				
	3.02	Patch & repair spalling concrete cantilevers					x			$15,180	**$15,180**				
	3.03	Patch & repair concrete window sills					x			$15,180		**$15,180**			
	3.04	Repair/ reconstruct soffits at locations of water damage					x			$22,770	**$22,770**				
	3.05	Remove vegetation from walls at interior courtyard					x			$5,465				**$5,465**	
	3.06	Remove rust from support angles above 2nd floor windows and paint with rust inhibitive paint to prevent additional damage					x			$12,144				**$12,144**	
	3.07	Remove old paint from underside of soffits and repaint with exterior grade enamel paint					x			$22,770				**$22,770**	
	3.08	Remove debris from exterior lighting. Install protection or deterrent for birds.	x				x			$7,590				**$7,590**	

		BYAM SCHOOL	Health, Safety & Welfare	Code Compliance	Functional Use of Building or Site	Handicap Accessibility	Extending the Life of the Building (Maintenance)	Energy Efficiency / Energy, Water Saving	Hazardous Material Abatement	Estimated Project Cost (5/2016 $)	High Priority (1-3 yrs) 2017-2020	Medium Priority (4-6 yrs) 2021-2023	Low Priority (7-10 yrs) 2024-2034 or under a full renovation project	On Going Maintenance	Notes / Totals
	3.09	Remove surface rust from surface of window frames and repaint					x			$34,610				$34,610	
	3.10	Replace screws at exterior door kickplates with exterior grade zinc coated screws					x			$759				$759	
	3.11	Install insect screening at louvers for unit heaters	x							$6,603	$6,603				
	3.12	Replace damaged louvers	x				x	x		$7,590	$7,590				
	3.13	Replace covered louver vent with permanent solution	x				x	x		$759	$759				
		TOTAL									$ 899,035.50	$ 15,180.00	$ -	$ 83,338.20	$ 997,553.70
4	Interior Architectural Items														
	4.01	Provide accessible access to front office		x	x	x				$15,180		$15,180			
	4.02	Renovate front office counter to meet accessibility needs		x		x				$16,698		$16,698			
	4.03	Provide proper clearance around all plumbing fixtures to meet ADA		x		x				$177,606	$177,606				
	4.04	Adjust mounting heights of fixtures and toilet accessories to meet ADA for elementary school age students	x	x	x	x					$0				
	4.05	Provide flush controls on toilet fixtures to meet accessibility requirements		x	x	x				$7,104	$7,104				
	4.06	Provide grab bars and other toilet accessories as required and at correct mounting heights	x	x	x	x				$14,801	$14,801				
	4.07	Provide accessible faucet controls	x	x	x	x				$11,840	$11,840				
	4.08	Provide protection at sink piping for accessibility		x		x				$8,880	$8,880				
	4.09	Adjust room layout to avoid door swinging into required clear floor space		x		x				$177,606	$177,606				
	4.10	Provide required signage for all spaces including electrical, janitorial closets and storage rooms		x		x				$2,732	$2,732				
	4.11	Provide elevator controls to meet accessibility including providing Braille signage, audible and visible signals	x	x		x				$15,180		$15,180			
	4.12	Replace existing handrails on stairs	x	x	x	x				$21,859			$21,859		
	4.13	Provide accessible lift or ramp to the performance stage	x	x	x	x				$68,310			$68,310		
	4.14	Replace door hardware with levers or other accessible hardware; confirm closers, locking devices		x		x	x			$79,543	$79,543				
	4.15	Provide accessible ramp and paths in courtyard to meet ADA		x	x	x				$45,540		$45,540			
	4.16	Remove damaged flooring and replace with new at recessed walk off mat	x				x			$5,465				$5,465	
	4.17	Replace damaged VCT throughout the facility	x				x			$7,590				$7,590	
	4.18	Install raised rubber treads at stairs or refinish concrete					x			$14,231		$14,231			

		BYAM SCHOOL	Health, Safety & Welfare	Code Compliance	Functional Use of Building or Site	Handicap Accessibility	Extending the Life of the Building (Maintenance)	Energy Efficiency / Energy, Water Saving	Hazardous Material Abatement	Estimated Project Cost (5/2016 $)	High Priority (1-3 yrs) 2017-2020	Medium Priority (4-6 yrs) 2021-2023	Low Priority (7-10 yrs) 2024-2034 or under a full renovation project	On Going Maintenance	Notes / Totals
	4.19	Repair or replace damaged toilet room thresholds					x			$4,326	**$4,326**				
	4.20	Strip peeling and/or epoxy paint and repaint.					x			$29,715				**$29,715**	
	4.21	Replace stage flooring					x			$31,499			**$31,499**		
	4.22	Repair cracking at interior partitions - investigate causes					x			$7,590		**$7,590**			
	4.23	Repaint with epoxy paint in toilet rooms where paint is peeling					x			$38,299	**$38,299**				
	4.24	Repair or replace cracked CMU block and mortar					x			$15,180		**$15,180**			
	4.25	Remove adhered acoustical tiles and replace with acoustical ceiling tile or dropped ceiling					x			$15,180				**$15,180**	
	4.26	Review source of staining at ceilings; repair source and replace or repaint at ceilings	x		x		x			$22,770				**$22,770**	
	4.27	Replace all ceilings at kitchen and support spaces with scrubable ceilings	x	x	x		x			$28,106	**$28,106**				
	4.28	Install additional light fixtures in corridors to achieve proper lighting levels	x	x	x		x	x		$7,590		**$7,590**			
	4.29	Refinish wood doors					x			$6,831				**$6,831**	
	4.30	Repaint hollow metal doors and frames					x			$1,822				**$1,822**	
	4.31	Replace wired glazing in rated doors with tempered glass	x				x			$759			**$759**		
	4.32	Replace existing classroom shelving and casework. Provide additional storage areas			x		x			$281,741	**$281,741**				
	4.33	Replace classroom countertops, sinks and cabinet storage with accessible countertops and sinks			x	x	x				**$0**				
	4.34	Replace all damaged bathroom partitions					x			$86,526	**$86,526**				
	4.35	addition, renovation) to prevent the use of corridors, and storage rooms as teaching spaces	x	x	x	x	x				**$0**				
	4.36	Provide additional storage areas (modular classrooms, building additio	x	x	x						**$0**				
	4.37	Provide proper push / pull clearance at all door locations	x	x	x	x				$86,460	**$86,460**				
		TOATL									**$ 1,005,571**	**$137,189**	**$ 122,427**	**$ 89,372**	**$ 1,354,559**

		BYAM SCHOOL	Health, Safety & Welfare	Code Compliance	Functional Use of Building or Site	Handicap Accessibility	Extending the Life of the Building (Maintenance)	Energy Efficiency / Energy, Water Saving	Hazardous Material Abatement	Estimated Project Cost (5/2016 $)	High Priority (1-3 yrs) 2017-2020	Medium Priority (4-6 yrs) 2021-2023	Low Priority (7-10 yrs) 2024-2034 or under a full renovation project	On Going Maintenance	Notes / Totals
5	**Mechanical - HVAC**														
	5.01	Install new hot water pumps	x		x		x	x		$11,385				**$11,385**	
	5.02	Replace cafeteria heating and venting unit	x	x	x		x	x		$18,216	**$18,216**				
	5.03	Replace kitchen make-up indoor ai handling units in mezzanine area	x	x	x		x	x		$30,360	**$30,360**				
	5.04	Clean existing ductwork and air distribution devices	x		x		x	x		$22,770	**$22,770**				
	5.05	Replace hot water distribution piping and insulation						x		$417,450			**$417,450**		
	5.06	Replace fin tube radiation units and grilles, provide hot water branch piping and valves with insulation			x		x	x		$189,750			**$189,750**		
	5.07	Replace existing cabinet unit heaters,			x		x	x		$22,770		**$22,770**			
	5.08	Replace existing hot water supply and return piping outside of boiler room with new insulated piping	x		x		x	x		$27,324		**$27,324**			
	5.09	Drain and pressure test existing hot water piping system; faulty valves and pipe sections should be replace and insulated. Damaged piping insulation should be replaced.	x		x		x			$37,950		**$37,950**			
	5.10	Provide ventilation air systems for corridors	x	x	x		x			$75,900			**$75,900**		
	5.11	Provide exhaust to the outside at the copy rooms	x	x	x					$15,180			**$15,180**		
	5.12	Replace administration area PTAC units with a high efficiency AC system						x		$45,540			**$45,540**		
	5.13	Upgrade the ATC system to convert all remaining pneumatic controls with DDC controls					x	x		$459,954	**$459,954**				
	5.14	Provide mechanical ventilation for administration interior offices, library interior office and teacher's SPED workroom	x	x	x					$227,700		**$227,700**			
		TOTAL									**$ 531,300.00**	**$ 315,744.00**	**$ 743,820.00**	**$ 11,385.00**	**$ 1,602,249.00**
6	**Electrical**														
	6.01	Replace existing wiring, raceways, and boxes that are original to the building			x		x			$531,300		**$531,300**			
	6.02	Install ground at building main water service as required by code	x	x	x					$7,590	**$7,590**				
	6.03	Install additional lighting at toilet rooms to meet lighting requirements	x	x						$10,930	**$10,930**				
	6.04	Install occupancy sensors at all rooms that have not been upgraded						x		$91,080	**$91,080**				
	6.05	Upgrade exterior lighting to meet dark sky requirements.		x				x		$45,540			**$45,540**		
	6.06	Separate emergency electrical system from normal equipment to meet current electrical code	x	x	x					$136,620			**$136,620**		
	6.07	Install lightning protection system			x					$40,986	**$40,986**				
	6.08	Upgrade clock system as existing system is obsolete			x					$45,540	**$45,540**				

		BYAM SCHOOL	Health, Safety & Welfare	Code Compliance	Functional Use of Building or Site	Handicap Accessibility	Extending the Life of the Building (Maintenance)	Energy Efficiency / Energy, Water Saving	Hazardous Material Abatement	Estimated Project Cost (5/2016 $)	High Priority (1-3 yrs) 2017-2020	Medium Priority (4-6 yrs) 2021-2023	Low Priority (7-10 yrs) 2024-2034 or under a full renovation project	On Going Maintenance	Notes / Totals
	6.09	Upgrade problematic Valcom paging system	x	x	x					$45,540	**$45,540**				
	6.10	Upgrade intrusion system, it is in poor condition	x		x					$379,500	**$379,500**				
	6.11	Replace branch circuit panelboards that are original to the building (20%)			x		x			$83,490		**$83,490**			
	6.12	Provide additional lighting in corridor	x		x					$182,160		**$182,160**			
	6.13	Replace lighting that is in generally fair condition	x		x					$455,400			**$455,400**		
	6.14	replace fire alarm system detector to meet NFPA 72 and provide speakers and strobes	x	x						$265,650	**$265,650**				
	6.15	Provide sound system in cafeteria that is tied in to the fire alarm system	x	x	x					$22,770	**$22,770**				
		TOTAL									**$909,586**	**$796,950**	**$637,560**	**$0**	**$2,344,096**
7	**Plumbing**														
	7.01	Connect pot washing sink to grease interceptor	x	x						$1,822	**$1,822**				
	7.02	Replace original gate valves on domestic water service					x	x		$7,590			**$7,590**		
	7.03	Replace cast iron piping					x			$227,700			**$227,700**		
	7.04	Replace roof drains			x		x			$22,770			**$22,770**		
	7.05	Provide reduced pressure backflow preventers at janitor's closet soap disper	x	x						$4,554	**$4,554**	**complete**			
	7.06	install high efficiency water heater including master mixing valve, recirculated hot water and expansion tank on cold water make-up line	x		x		x	x		$53,130			**$53,130**		
	7.07	video tape sanitary waste, vent and storm drainage piping					x			$4,554				**$4,554**	
	7.08	replace existing toilet fixtures with low flow fixtures						x		$113,850	**$113,850**				
		TOTAL									$120,226	$0	$311,190	$4,554	$435,970
8	**Fire Protection**														
	8.01	Replace smoke detectors with beams with equipment that meets current code.		x						$15,180					review requirement
	8.02	Upgrade fire alarm system to include full coverage and speaker/strobes as required by current code		x							**$0**				
	8.03	Upgrade cafetorium portable sound system to be tied to fire alarm system as required by code		x							**$0**				
	8.04	Install fire suppression system (sprinklers) throughout the facility	x	x						$598,376			**$598,376**		
		TOTAL								$613,556	$0	$0	$598,376	$0	$598,376

		BYAM SCHOOL	Health, Safety & Welfare	Code Compliance	Functional Use of Building or Site	Handicap Accessibility	Extending the Life of the Building (Maintenance)	Energy Efficiency / Energy, Water Saving	Hazardous Material Abatement	Estimated Project Cost (5/2016 $)	High Priority (1-3 yrs) 2017-2020	Medium Priority (4-6 yrs) 2021-2023	Low Priority (7-10 yrs) 2024-2034 or under a full renovation project	On Going Maintenance	Notes / Totals
9	**Hazardous Material**														
	9.01	HazMat costs - Pricing from UEC report dated March 11, 2016							x	$1,276,500				**$1,276,500**	
	9.01	Remove asbestos containing material							x					**$0**	
	9.02	Brown glue at adhered ceiling tiles are assumed or previously found to contain asbestos							x					**$0**	
	9.03	Vinyl floor tile and mastic are assumed or previously found to contain asbestos							x					**$0**	
	9.04	Grey pipe packing cement is assumed or previously found to contain asbestos							x					**$0**	
	9.05	Black sink coating was previously found to contain asbestos							x					**$0**	
	9.06	Hard joint insulation was previously found to contain asbestos							x					**$0**	
	9.07	Caulking at interior door glazing was found to contain asbestos							x					**$0**	
	9.08	Glue holding blackboard is assumed to contain asbestos							x					**$0**	
	9.09	Rubber flooring is assumed to contain mercury							x					**$0**	
	9.10	Underground sewer pipe was assumed to contain asbestos							x					**$0**	
	9.11	Damproofing on exterior and foundation walls is assumed to contain asbestos.							x					**$0**	
	9.12	Roofing materials are assumed to contain asbestos							x					**$0**	
	9.13	Painted surfaces are assumed to be lead based paint							x					**$0**	Haz/Mat includes cost associated with complete renovation or demolition; additional costs are included should results exceed EPA limits
	9.14	Light tubes, thermostats, exit signs, and switches are assumed to contain mercury							x					**$0**	
	9.15	Caulking materials are assumed to contain PCBs							x					**$0**	
		TOTAL								$1,276,500				**$1,276,500**	$1,276,500
GENERAL NOTES															
1. Refer to each section of the Report for more detailed information. Before moving forward with a specific project, a detailed review of the scope of work and a re-assessment of the cost estimate for that scope should be performed.															
2. Some items should be completed in combination with other items. Some of these suggestions may be noted above. We recommend that once a scope of work is desired to be pursued, a mini-study should be done to confirm which work should be done together. See the next general note below for additional information.															
3. Due to the conceptual nature of these recommendations and estimates and the complexity of existing conditions, several solutions may be provided to achieve the end result. Existing conditions in some areas may limit the ability to fully implement the proposed scope of work. Part or all of this work may trigger other renovation requirements related to code, seismic, sprinklers or handicap accessibility. Once a determination is made to move forward with a specific improvement line item, a mini study specific to the scope of work should be done to confirm the scope of work, prepare sketches as necessary and prepare a refined cost estimate.															