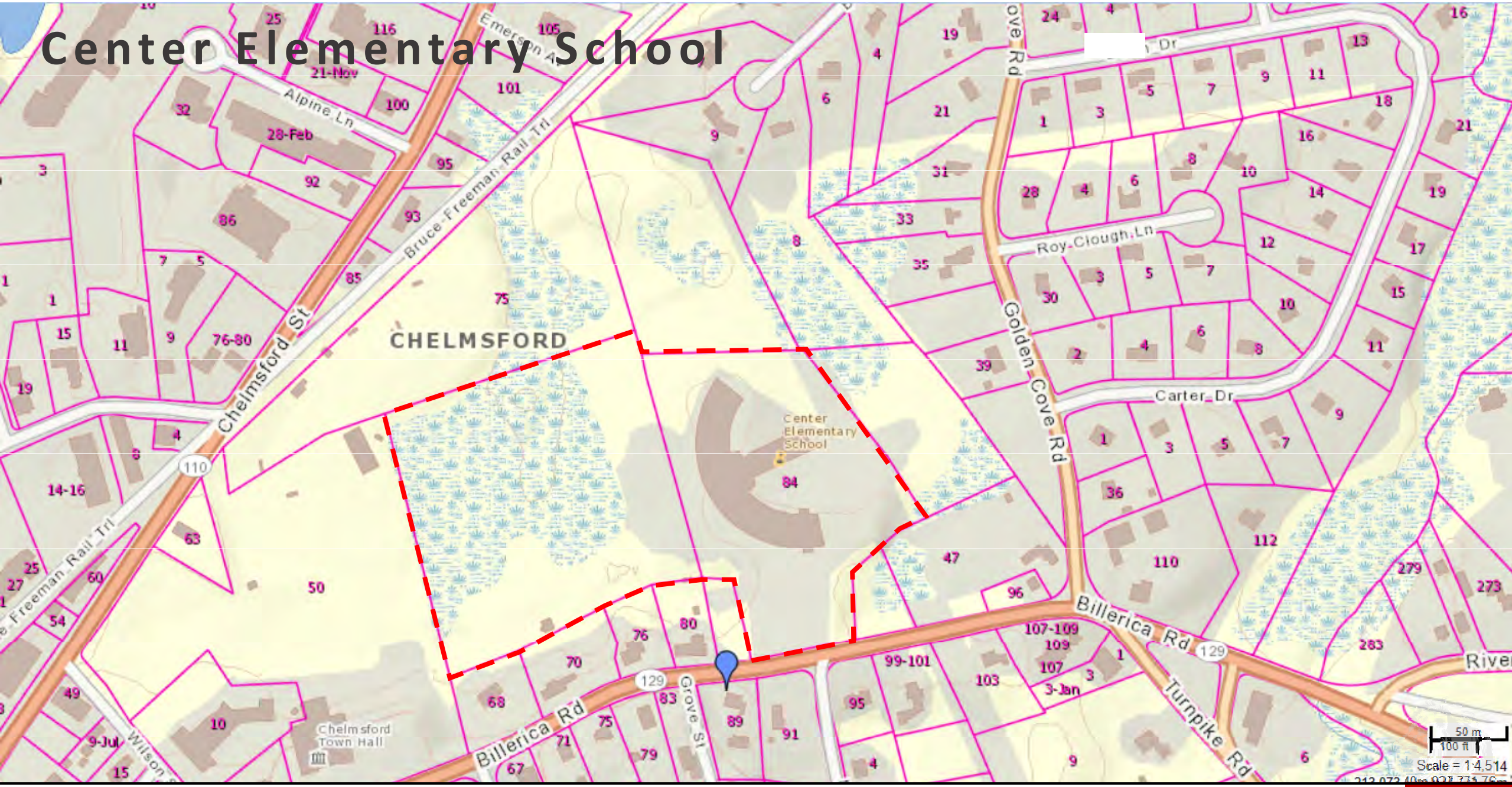
Center Elementary School



Center Elementary School

ARCHITECTURAL ASSESSMENT

GENERAL DESCRIPTION

The school was designed by Kilham, Hopkins, Greeley & Brodie Architects in 1953. An addition and renovation in 1999 by DiNisco Design Partnership added classroom space for music, art, and computer science and increased the existing library space as well as provided renovations to the classroom wings.

The building consists of two single-story classroom wings that are connected in the center by a two-story cafeteria and gym. The gross floor area of the "at-grade" level is approximately 43,400 SF, and a total of 52,300+/- square feet.

The building is generally described as a wood framed structure, with load-bearing interior and exterior walls. The structure is not fireproofed, and as such best fits the description of a Type V-B construction as defined by the current building code. The building features a fire suppression system (sprinklers) throughout all areas which was installed as part of the 1999 renovations.

Current enrollment is approximately 508 students in grades K-4. Kindergarten is a ½ day program and peak staff during the day is reported to be approximately 105.

The building survey for this report was conducted on February 17-18, 2016.

Image 1

Image 2

Image 3

GENERAL CODE CONSIDERATIONS

As an occupied building with approved occupancies, 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, as the building currently stands, any plans for significant renovations or additions should be planned in awareness of the following limitations.

As part of the previous renovations a full fire suppression system was added to the facility. Under the current code any additions and renovations to the existing building would also be required to be fully sprinklered and be tied into the existing system to meet current code.

Image 4

Image 5

Image 6

Image 7

Should additional renovations or additions to the building be proposed for this facility a more in-depth analysis of the building occupancies and constructions type will need to occur. The existing wood construction does not meet current code seismic requirements. A review of the existing structure and the impact of additions and renovations will be needed. It is likely that any addition or renovation would trigger the need to upgrade any existing non-compliant ADA / MAAB issues.

ACCESSIBILITY

Massachusetts Architectural Access Board Rules and Americans with Disabilities Act (2010) Standards are applicable to the building. Unlike the building code, accessibility discrimination can be pursued at any time in the form of civil lawsuits brought under the ADA rules.

Given the building's age, items that are compliant with the 1991 ADA Guidelines and are not altered are considered to be "safe harbor" and not required to comply with the 2010 Standards, even if the 2010 Standard requirements are different. Given the extensive renovations that took place in 1999, it is assumed that all building features comply with the 1991 guidelines or received a variance to allow pre-existing items to remain.

This report notes items that are not in compliance with today's codes and should be considered if major additions and or renovations are to take place.

The renovations to the school in 1999 involved improvements to accessibility. The elevator, lift at the stage, ramp in the main lobby and accessible toilet rooms appear to meet codes that were in place at the time and for the most part, meet the current ADA and MAAB codes as well. Recommendations include providing clear floor space in front of doors and accessible fixtures. Storage should be removed from access paths to assure that they remain accessible.

EXTERIOR SITE AND BUILDING ENTRANCE

The site provides accessible parking spaces, including van accessible spaces. A crosswalk with curb cut is provided. The curb cut appears to meet the slope; however, improvements to these should include a textured surface and improved drainage in this area. Some accessible curb cuts are not connected to crosswalks (Image 6).

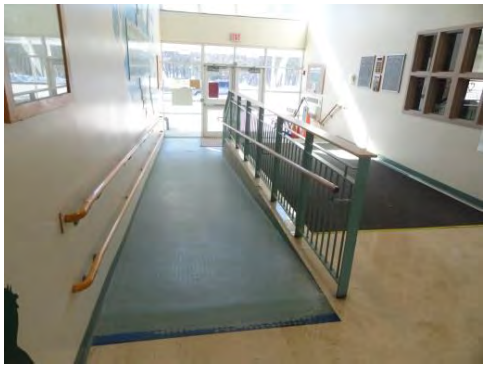


Image 8

INTERIOR SPACES

The 1999 upgrades provide the school with a ramp at the main entrance. The ramp appears to meet accessibility requirements for slope. Improvements would include additional handrail and handrail extensions on both sides of the ramp. An accessible path to the main office is provided. Door hardware and push / pull clearances have been addressed. However, it is important to maintain these clearances and not place furniture within the clear floor space. Rest rooms have been upgraded to provide clear turning radius and handrails, which appear to be at correct height. Improvements include verifying that other toilet accessories such as toilet paper and paper towel dispensers, are located at the proper height and within the "reach range" noted in the accessibility guidelines. Sinks with countertops do not appear to be located at accessible height for the age group that is being served. Additionally, hot water pipes should be insulated at accessible sinks. In a few locations doors swing into the clear floor space which is not in line with MAAB or ADA requirements.

Image 9

Image 10

Renovations and repairs needed to meet current accessibility requirements include:

- Correct drainage at curb cut areas to prevent pooling of water and icy conditions.
- Provide textured surface at curb cuts.
- Provide crosswalks at all curb cuts.
- Add extra width to sidewalks where curb cuts are located.
- Review door swings to provide clear floor area and push/pull clearance.
- Provide additional handrails at ramps.

Image 11

Image 12

Image 13

Image 14

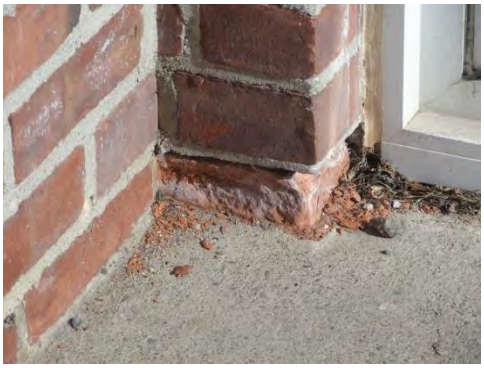


Image 15

- Provide new handrails with extensions or continuous wrap at ramps and stairs where extensions do not currently exist.
- Provide insulation or pipe protection at accessible sinks.
- Relocate stored items to allow access to the lift.
- Review heights of sinks and toilet accessories to verify that they meet ADA and MAAB requirements.
- Provide handrails per requirements (example: missing handrail Image 9).

EXTERIOR

FOUNDATION

Cast in place concrete foundation walls are in good condition where visible. Some parging of repaired surfaces has occurred. Interior foundation walls are visible from the boiler room and appear to be in good condition.

Specific Issues

- Cast in place concrete foundation has been parged and the surface is spalling in several locations (Image 13)
- A portion of the lower level is below grade with retaining foundation walls.
- Areas have vegetation and over growth around the base of the foundation walls.

Recommendations

- Remove vegetation to discourage roots and moisture from affecting the foundation structure.
- Continue to patch and repair areas where parging has occurred.

EXTERIOR WALLS

Exterior walls are brick veneer and in generally good to fair condition. Efflorescence on the brick can be seen in some areas, and deterioration of the brick has occurred in areas especially where the brick sits close to grade or on concrete surfaces. Many areas are in need of repointing. A small

portion of the building has horizontal metal panels that are in good condition.

Specific Issues

- Recent accident where a vehicle hit the wing wall at the northern-most classrooms which is in need of immediate repair to avoid further damage to the brick (Image 16).
- Common bond brick is in fair condition in many areas and should be replaced
- Repointing and patching is needed in many areas.
- Prefinished metal wall panels are in good condition.
- Brick veneer is at grade around much of the building and in poor condition in many locations
- Occasional mortar is loose or missing at window lintels.
- Some weeps at the newer brick walls have been filled by insects and/or dirt.

Recommendations

- Install bollards at locations where vehicles drives are adjacent to the walls.
- Keep brick weeps clear in order for moisture to drain properly
- Repair or replace brick at grade, consider replacement with a non-porous stone material.
- Repoint brick work where needed

Image 16

Image 17

Image 18

Image 19

WINDOWS

The windows installed during the 1999 renovations to the building are generally in good condition.

Specific Issues

- Insulated EFCO aluminum awning windows are in good condition.
- Most classroom window sills are ground face block sills or brick.
- Office and gym/cafeteria window sills are original rowlock brick. These brick window sills lack pan flashing and the mortar is cracking or pulling away from the wall.
- The large half-circle window at the gym appears to be original to the building. It is in good condition, but appears to be single-pane glazed (Image 19).

Image 20

Image 21

Image 22

Image 23

Recommendations

- Consider replacing original half-circle window in the gym with an insulated, double-glazed window for improved energy efficiency.
- Repair or replace the brick window sills. Install prefinished metal flashing at window sills with rowlock brick to keep moisture from getting into wall cavities.
- Repair caulking around windows and frames

EXTERIOR DOORS

Insulated aluminum entry systems and hollow metal doors are in generally good condition.

Specific Issues

- Main entrance doors and secondary entrances are aluminum storefront systems in good condition.
- Egress doors and maintenance entries are hollow metal doors and frames in fair condition with some dents and rusting (Image 21 & 22).
- The main entrance doors do not have a vestibule, which is not energy efficient.

Recommendations

- Repair / repaint doors and frames that are rusting
- Install a vestibule at the main entrance doors to increase energy efficiency (Image 20).

LOUVERS / OTHER OPENINGS

Exterior openings, including louvers, are generally in good condition.

Specific Issues

- Louvers for unit ventilators appear to have been recently updated and are in good condition.
- Louvers at the boiler room are a mixture of older and newer louvers. The older louvers

are in poor shape, while the newer louvers are in good condition.

Recommendations

- Repair or replace older louvers

ROOF, SOFFITS, AND RAIN LEADERS

Portions of the roof were replaced in 2013 and are reported to be in good condition. The new roof section is a fully adhered roof membrane. Photo-voltaic panels were installed on the roof. Due to weather conditions at the time of the site visit, a detailed roof assessment was not conducted; however, roof leaks were not visible or reported at the time of the visit. The older roof sections are located over the gym / cafeteria wing and were last replaced in 1999.

Specific issues

- Termination flashing is in poor condition at the connector above the office and storage rooms on the south side of the gym as seen from the ground (Image 24).
- Several locations inside the building are showing cracks in gypsum wallboard. Onsite personnel believe these may have been a result of the heavy snow loads during the 2015 snowfall. This possibility has not been confirmed.
- Prefinished metal soffits and fascia in good condition.
- Prefinished metal gutters and downspouts in good condition, with the exception of the one downspout that has become disconnected from the cast iron pipe that runs below grade.
- Redirection of rain water to avoid puddling and icy sidewalks.
- Several interior ceiling tiles have water stains.

Recommendations

- Repair the termination joint above the office and storage room on the south side of the gym.
- Removal of snow in extreme situations is required.
- Review interior ceiling conditions to verify that water stains are not from roof leaks

Image 24

Image 25

Image 26

Image 27

Image 28

Image 29

Image 30

Image 31

- Repair roof leaders and redirect water flow at the ground when leaders are not tied into the underground system

OTHER EXTERIOR ISSUES

Other exterior issues include the loading dock platform. The platform is concrete and in poor condition.

The columns at the front canopy are rusting at the base of the column due to the pooling of water around the base.

Specific Issues

- Surface of the concrete is chipping and parged.
- The corner of the concrete has cracked.
- Bumpers are worn.
- Concrete around railing post at stairs has cracked and chipped.
- Rusting columns at the canopy.

Recommendations

- Repair loading dock.
- Replace bumpers.
- Repair area around railing post.
- Replace rusting hand rails.
- Develop base detail for column that will resist rusting (Image 26).

INTERIOR

FLOORING

The flooring throughout the building includes carpets, sports floor, tile and VCT. Most of the flooring is in generally good condition with some areas in need of repair. The VCT in the hallways and classrooms has become stained. This appears to be a result of improper cleaning methods or uneven subsurface telegraphing through the VCT, creating dark spots and pooling of floor wax.

Specific Issues

- Carpet in the Main Office is in fair condition, traffic flow areas are worn and matted.
- Library carpet is in good condition
- Classroom carpets are in good to fair condition with some signs of traffic wear and staining

- 2x2 porcelain tile in bathroom is in good condition but in need of thorough cleaning of tile and grout
- VCT staining may be due to uneven surface of the subfloor telegraphing through the VCT in hallways and creating expanses of dark spots where floor wax pools and can't be fully stripped, or improper waxing and cleaning of the VCT. The VCT is generally in good condition with a few concentrated areas of cracking at building joints. (Image 33)
- Rubber stair treads and ramp flooring are in generally good condition. The applied yellow strips on the stair nosing have become worn and in need of repair. The ramp has blue stripping at the top and bottom of the ramp that is worn and in need of repair.
- VCT has cracked in some areas of flooring transition and along building joints
- The gym has a sports floor system in fair condition. Some areas are showing excessive wear or delamination of the surface (Image 34).
- The stage has tongue and groove hardwood in fair condition.

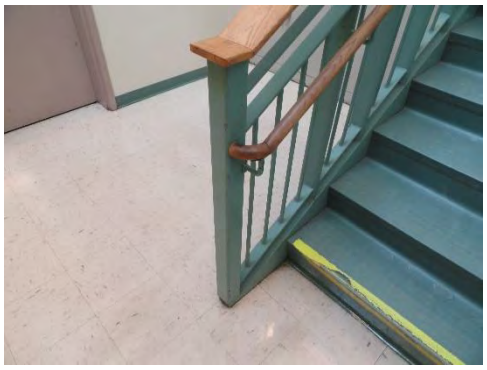


Image 32

Image 33

Image 34

Recommendations

- Repair or replace VCT where cracking has occurred.
- Review cause of VCT staining.
- Replace worn carpets, consider replacement with carpet tile to provide flexible changing of carpet areas in the future.
- Repair color strips on stairs and ramps.
- Repair gym flooring.
- Repair or replace stage flooring.

WALLS AND PARTITIONS

The interior face of exterior CMU walls shows severe cracking in several locations. This is particularly evident in the gym. A structural review has determined that there is no immediate concern and the cause of the cracking may be due to lack of insulation or movement in the wall.

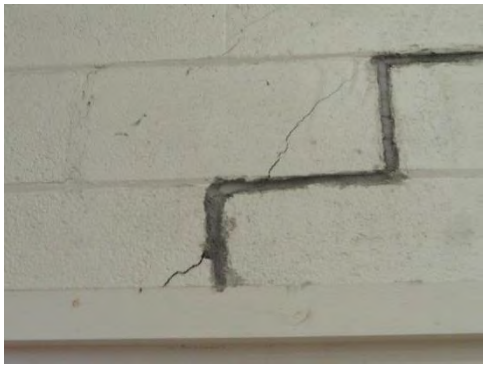


Image 35

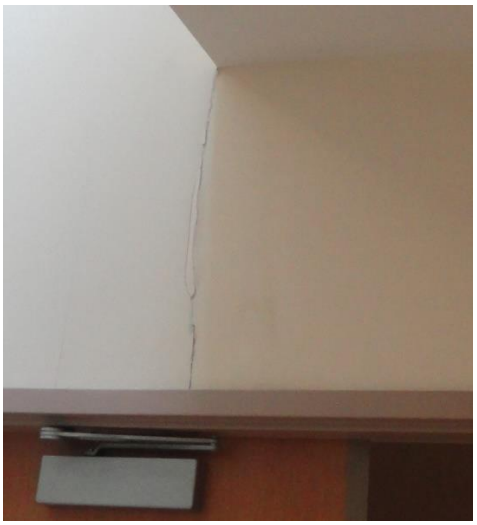


Image 36

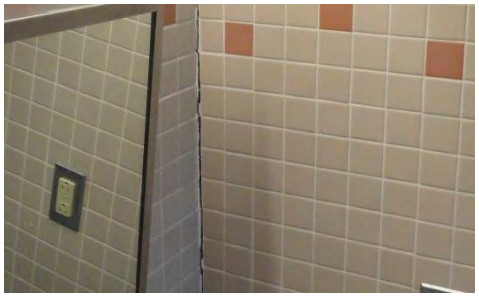


Image 37

Image 38

Interior gypsum wallboard walls throughout the school are in generally good condition; however, there is cracking in the wall board in several areas. This cracking may be due to movement, changes in temperature, or increased snow load on the roof.

In some areas there is paint peeling from the walls which may be a result of movement in the wall at the seam or improper wall prep prior to painting.

Specific Issues

- Cracking of exterior CMU walls in the gym, cafeteria and stairwells.
- Cracking of gypsum wallboard in areas that may have additional loading or movement in the wall
- Gypsum wallboard finishes are peeling and there are several areas where joint failures (cracking) exist.
- Classrooms have painted wood panel wainscot and chair rail. The joints in the wainscot are gapping at several locations and a few spots are damaged due to the gapping.
- Some of the restrooms have tile cracks at the joints

Recommendations

- Review conditions of cracking and movement of exterior walls. Add insulation or reinforcement to prevent further damage.
- Repair existing walls and joints as needed
- Repair wainscot to prevent further damage
- Repair tile joints in restrooms

CEILINGS

Most of the school has acoustical drop in ceiling tiles. Both the tiles and grid are in good to fair condition. Several ceiling tiles are stained. These tiles should be replaced and above ceiling conditions should be inspected to determine cause for staining. In several areas the ceiling tiles appear to be cupping. Roof leaks, moisture build up, pipe sweating or leaking, and humidity are all potential causes for the stains and cupping.

Gypsum soffits and ceilings are located throughout the building in areas of transition. In general, these soffits are in fair condition with several soffits showing cracking and in need of repair. The gym and stage area have acoustical tiles that are directly adhered to the structure. These tiles appear to be in good condition.

Specific Issues

- A gypsum wallboard soffit in the library is being held up with a lally column. Building staff suspected that the roof deflected after the Jan / Feb 2015 snow storms (Image 39).
- Multiple stains are evident on ceiling tiles throughout the school. These could be an indication of leaks from above ceiling equipment or from the roof.
- Ceiling tiles appear to be cupping throughout the school.
- Wood framing is supporting electrical and mechanical equipment above the ceilings. In the area noted, insulation has been installed above the ceiling tiles in some bays but appears to be missing in others (Image 40).

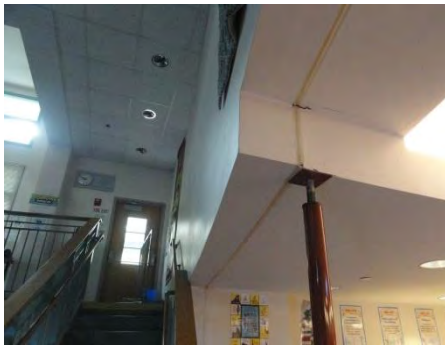


Image 39

Image 40

Recommendations

- Resolve source of staining above the ceiling and replace damaged tiles.
- Repair soffit structure and wall board in the library.
- Investigate above ceilings for dampness and humidity or other causes for cupping of ceiling tiles. Location of insulation may be a factor in this condition.
- Repair any cracking in soffits around joints.

DOORS

Interior doors throughout the school are in good condition. Office and classroom doors are solid wood with vision glass and handicap accessible door hardware. Single user and gang toilet rooms have solid wood doors with handicap accessible door hardware. Doors located in the hallway (assumed to be fire rated or to meet code requirements) are solid wood with small vision panel and push bar / panic hardware.

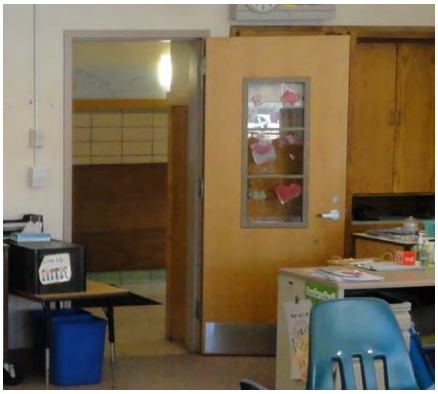


Image 41

Specific Issues

- In general interior doors are in good condition and hardware including locks and latches, appears to be in good working order.

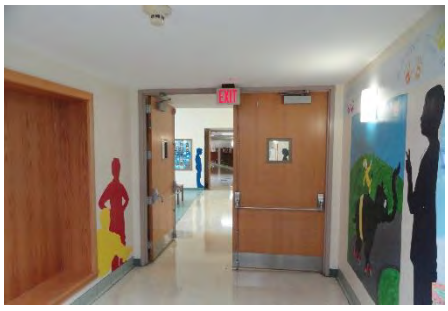


Image 42

Image 43

Image 44

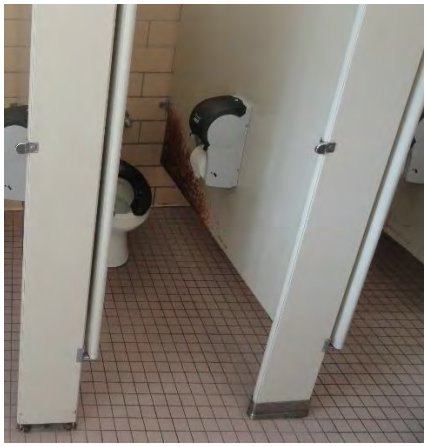


Image 45

Recommendations

- Install hold opens on doors that typically remain open to avoid the use of door wedges

FIXTURES, FINISHES & FURNITURE (BUILT -IN FURNISHINGS ONLY)

The fixtures and furniture include cubbies and storage in the hallway, book shelves in offices and classrooms, wardrobe closets in classrooms, and bathroom partitions. In general, the built in furniture and storage units are in good condition. Some areas are in need of repair or general maintenance. The restroom partitions are in poor to very poor condition and should be replaced. Classroom sinks and cabinetry are in good condition

Specific Issues

- Some damage is evident at hallway cubbies and storage units
- Where wood trim around hallway fixtures is in contact with the floor there is wear from the floor cleaning methods.
- Toilet room partitions are in very poor condition.
- Window shades in rooms are difficult to operate and do not block light properly.

Recommendations

- Repair loose shelving and areas of delamination at cubbies and storage areas.
- Sand and remove stains from base of wood trim, refinish with protective sealer to prevent moisture stains from floor cleaning.
- Replace all toilet partitions.
- Consider additional storage units for classrooms and office spaces to reduce the use of items piling on window sills.
- Replace window shades with more functional sun blocking devices.

FUNCTIONAL USE OF SPACE

Spaces throughout the building are well used; however, there are many areas that require additional storage space such as classrooms, gym, and office spaces. Electrical rooms should not be used for storage. Additionally, other storage rooms can be organized to provide more efficient use of space.

Specific Issues

- Storage of gym or recess equipment in stairwells.
- Storage of items on racks in hallways and egress paths.
- Storage of chemicals and janitor equipment in electrical rooms.
- Book cases and other storage units located in the path of the handicap lift.
- Physical therapy room requires additional space for storage of equipment so that the useable space is more efficient.

Recommendations

- Create storage for gym and recess equipment
- Create storage for items currently stored in the hallway / egress path.
- Develop storage solutions for classrooms and office spaces.
- Resolve equipment and space issues for special education programs including physical therapy.
- Provide proper storage for janitor equipment and remove storage from electrical rooms and areas in front of electrical panels.

Image 46

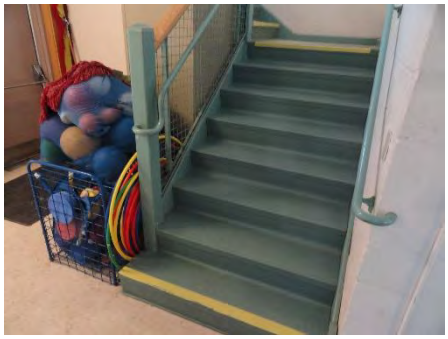


Image 47

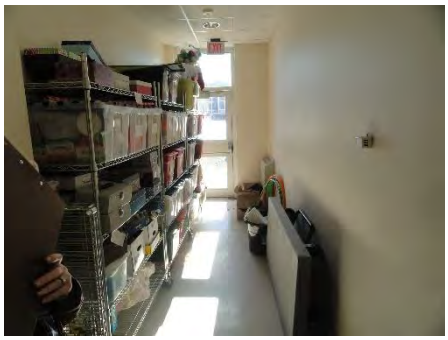


Image 48

Image 49

Image 50

Image 51

Image 52

OTHER

Other areas noted for repair or replacement include the pump located in the basement (see HVAC report). The guard railing located in the attic space that houses HVAC equipment is not properly anchored to the floor (Image 51).

Severe rusting is occurring on the metal file cabinets, and other metal equipment in the nurse's office. The cause of this rusting should be investigated.

Specific Issues

- Leaking of equipment and pooling of water and oils on concrete floor.
- Guard rail is not securely fastened to the concrete.

Recommendations

- Repair pump (see HVAC report).
- Remove existing railing and install new rail.
- Patch and repair the concrete flooring edge.

CIVIL ENGINEERING ASSESSMENT

Nitsch Engineering researched the existing site conditions at the Center Elementary School located at 84 Billerica Road in Chelmsford, Massachusetts. Nitsch Engineering 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 DESCRIPTION

The existing Center Elementary School is located at 84 Billerica Road, Chelmsford, Massachusetts. The site is bound by Billerica Road to the south and wooded areas and wetlands to the west, north, and east.

There are two paved driveway entrances to the site along Billerica Road and one emergency access drive through the wooded area to the west of the site. The access drive leads to the town complex parking lot near the Chelmsford Fire Station headquarters.

There is a parking lot to the west of the building and a paved asphalt access road that goes around the building.

There are fields located at the northwest corner of the site along the woods/wetlands.

EXISTING SITE UTILITIES

STORM DRAINAGE

Chelmsford GIS shows that there are no public closed drainage systems in the Billerica Road adjacent to the project site.

There were no catch basins observed in the parking lot to the west of the building. The parking lot appeared to slope towards the northwest corner of the site. Snow covered the curb line so it is unclear if there is a curb or a catch basin in this corner of the parking lot (Image 1). Stormwater runoff may be collected or allowed to runoff of the site into the adjacent wetlands.

Stormwater runoff is collected in downspouts and collected underground before being discharged, possibly toward the

Image 1

Image 2

Image 3

Image 4

Image 5

Image 6

wetlands. A broken downspout was observed onsite (Image 2).

The driveway to the north and east of the building contained some catch basins to collect stormwater runoff.

Stormwater runoff from some of the site appears to be collected below grade and discharged into the wetlands to the east of the site. An outlet pipe was observed on site directing water to the wetlands (Image 3 and 4).

SEWER

There is a town sewer main in Billerica Road. Record plans show a sewer force main exiting the building along the east side and going under the driveway and connecting into the gravity main in Billerica Road. Sewer manholes were observed onsite in the same locations as shown on the record plans (Image 5).

No grease trap was observed on site but a grease trap is located inside the kitchen

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.

Record plans show an 8-inch fire protection exiting the center of the south face of the building and running through the driveway to a water main in Billerica Road. Record plans also show an 8-inch domestic water service exiting the east side of the building and connecting to a main in Billerica Road.

A post indicator valve was observed in the lawn to the east of the site (Image 6).

Two fire hydrants were observed on site. One of the hydrants was located along the parking lot to the west of the building

and the other was located along the driveway to the east of the building.

NATURAL GAS

There is a gas meter located at the center of the east face of the building (Image 7). A generator was observed along the paved driveway to the east of the site (Image 8).

Record plans show the gas service connecting from the building, through the driveway, into a gas main in Billerica Road.

Image 7

ELECTRICAL

There is a transformer located to the east of the building along the driveway (Image 9).

There appears to be a solar array on the roof of the building and there is solar energy equipment located in the lawn area long the southern side of the building (Image 10 and 11).

Image 8

EXISTING SITE CONDITIONS

SOILS

Based on the Natural Resources Conservation Service (NRCS) Middlesex County Soil Survey the site of the Center Elementary School property is on soil classified as Udorthents- Urban Land Complex.

Image 9

PAVEMENT/CURBING

The asphalt pavement within the site is in generally good to fair condition with some areas of cracking and degradation (Image 12).

Walkways onsite are asphalt or concrete and are generally in good to fair condition. There are some asphalt walks to the east of the building with ponding that has iced over (Image 13). Some walkways onsite appear not to be ADA accessible (Image 14).

Curb on site appears to be in generally good condition although not all curb was visible at the time of the site visit

Image 10

due to snow accumulation. Concrete and vertical granite curb was observed on site.

PLAYFIELDS

The Center Elementary School has a small field to the north of the school building. The field has a backstop and a skinned infield in poor condition. The grass is in poor condition and there are no lights on the field. The field appears to be used primarily for recess and physical education.

PERMITTING CONCERNS

The Center Elementary School is likely within the regulated wetland buffer zones. Work on site will likely require permitting and approval from the Chelmsford Conservation Commission. The site is within a Zone II Wellhead Protection Area. The site does not appear to be in a FEMA Flood Zone.

RECOMMENDATIONS

- Mill and overlay sections of pavement where cracking/degradation has occurred.
- Regrade paved areas to prevent ponding which can lead to ice patches in the cold weather.
- Confirm walkways are ADA accessible.

Image 11


Image 12


Image 13


Image 14

STRUCTURAL ASSESSMENT

GENERAL DESCRIPTION

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 17, 2016. During the visit we did not remove any finishes or take measurements, so our understanding of the structure is limited.

EXISTING CONDITIONS

The original 1955 building is a two-story structure with a central core, and single-story classroom wings to the north and south. An addition was constructed in 1999 and is attached to the west side.

The structure of the 1999 addition appeared to be performing well for the most part. We observed a crack in the library soffit and signs of past repairs consisting of a temporary screw-jacket shoring post. This item was discussed with the architect in a separate correspondence.

We observed the inside face of concrete masonry block walls at the gable-ends of the gym wing. We noted diagonal cracking and a slight displacement. We observed signs of past repairs to the masonry wall consisting of a cementitious patch material made prominent by lack of painting. This item was discussed with the architect in a separate correspondence. Other masonry walls in the structure exhibited light shrinkage cracking.

We observed the front canopy structure and noted deterioration to the bases of the posts due to moisture. One of the posts was in direct contact with the ground.

The exterior façade consists of red brick masonry. We observed the façade and noted signs of past repairs to the masonry joints. At building corners, we observed

cracked and spalled concrete foundation walls. On the gym wall, we observed deteriorating red brick masonry units and the damage appeared to be due to moisture and weathering over time.

We observed steel lintels in the exterior façade and noted light rust staining through the paint.

The concrete loading dock exhibited signs of weathering and deterioration as evidenced by cracked and spalled concrete.

RECOMMENDATIONS

There are no recommendations at this time. Should additions or renovations be considered for this building the wood frame structure will need to be taken into consideration and the existing building may require bracing of the existing partition walls.

HVAC ASSESSMENT

HOT WATER PLANT

The Center Elementary School is heated by a hot water boiler plant consisting of two (2) gas fired hot water boilers, hot water pumps, accessories, breeching, combustion air ductwork, neutralization kit, Aerco boiler management system, and controls. The Benchmark 1.5 boilers were manufactured by Aerco, with an estimated heating capacity of 1,290 MBH output, and maximum input of 1,500 MBH each. The boilers were installed in 2013 and appear to be in very good condition.

Image 1 – Hot Water Boilers

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 existing insulated sheet metal vent ducts which connect to a louver. One duct, which the boiler ducts connect to, drops low where another duct runs higher in the space for the two (2) domestic water heaters. Both ducts are provided with pneumatic dampers. The space is served with original propeller type unit heaters manufactured by Modine and one wall mounted propeller type exhaust fan for exhaust (Image 1, 2, 3, & 4).

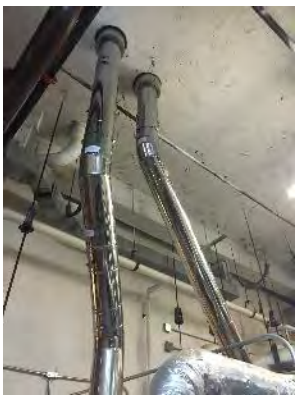


Image 2 – Boiler Flue Vents

Hot water is distributed from the boilers to the building heating equipment by a pair of Bell & Gossett base mounted end suction hot water pumps with new 10 HP Baldor motors that are equipped with Yaskawa VFD drives. Two (2) vertical Extrol expansion tanks, air separator, and a new chemical shot feeder are also provided. Piping is schedule 40 black steel and copper with fiberglass insulation and all asbestos elbows have been removed. The hot water piping and insulation located within the main boiler room appears to be in good condition with slight damage to insulation at some elbows and valves. The distribution piping system is a two-pipe changeover system with pneumatic valves (Image 5, 6, & 7).

Image 3 – Boiler Flue Vents

Specific Issues:

- The return inline pump is leaking at the impeller and shows signs of corrosion. This unit appears to be nearing the end of its useful service life.

Image 4 – Boiler Combustion Air Ductwork

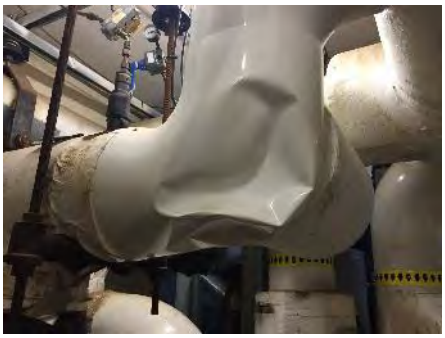


Image 5 – Existing Damaged Piping Insulation

Image 6 – Hot Water Pumps

Image 7 – Hot Water Pump VFD Drives

Image 8 – Air Cooled Chiller

- Some insulation is soiled at the air separator and pumps. There is slight damage at some elbows and valves.
- The majority of the hot water distribution piping and insulation is original to the building and in fair to poor condition.
- Replace pneumatic control valves with DDC control valves.
- Propeller type unit heaters are original and appear to be nearing the end of their useful service life.

Recommendations:

- Remove rain caps from breeching.
- New return inline pump should be installed.
- Repair and replace insulation where damaged or soiled.
- Existing hot water supply and return piping outside of the boiler room should be replaced with new insulated piping.
- Replace propeller type unit heaters.

CHILLED WATER PLANT

Chilled water is provided to the air handling units serving the building by a roof mounted air-cooled chiller, chilled water pump, accessories, and controls. The chiller is manufactured by York, with an estimated heating capacity 170 tons. The chiller was installed in 2013 and appears to be in very good condition.

Chilled water is distributed from the chiller to the building cooling equipment by the two-pipe changeover system through one (1) Bell & Gossett base mounted end suction hot water pump with a 7.5 HP Marathon motor that are equipped with a starter. The chilled water piping and insulation located within the main boiler room appear to be in good condition (Image 8).

Specific Issues:

- Chilled water pump is constant volume.

Recommendations:

- Provide chilled water pump with VFD.

ADMINISTRATIVE OFFICES

The exterior administrative office and support areas are heated, ventilated, and air conditioned by chilled/hot water coil floor mounted vertical unit ventilators. The unit ventilators are manufactured by MagicAire and appear to have been installed in 2014. There are approximately two (2) unit ventilators located on the first floor and five (5) unit ventilators located on the first floor, for a combined total of (7) 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 chilled water coil, hot water heating coil, supply fan, and filter. The units are in very good condition.

Image 9 – Vertical Unit Ventilator

Image 10 – Ceiling Mounted Diffuser

The interior administrative office and support areas are served by an indoor air handling unit that is equipped with a chilled water coil, hot water heating coil, supply fan, and filter. FMC is currently in the process of replacing the unit actuators with new DDC type actuators. Supply air is ducted from the unit to each space through ceiling mounted supply air diffusers.

The office area 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 offices are served by central roof mounted exhaust fan systems (Image 9, & 10).

Specific Issues:

- The unit ventilators do not have control valves, face & bypass, or CO2 controls and are provided with pneumatic thermostats with only ON/OFF control and actuator control, resulting in problems with temperature control.

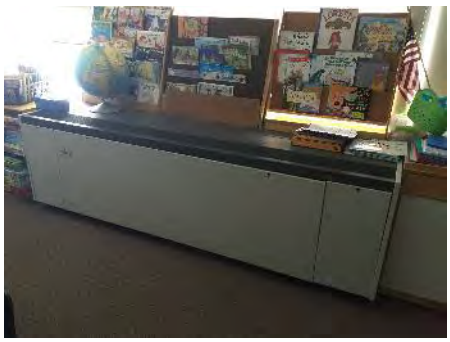


Image 11 – Classroom Unit Ventilator

Recommendations:

- Install new DDC control valves, controls, and thermostats with CO2 controls for each unit ventilator for temperature, CO2, and face & bypass control.
- Existing louvers and air distribution devices should be cleaned or replaced as needed.

CLASSROOMS

The classrooms, Library, Art, Music, and Computer Rooms are heated, ventilated, and air conditioned by chilled/hot water coil floor mounted vertical unit ventilators. Ceiling suspended horizontal classroom unit ventilators are utilized in the Reading and Sped Rooms on the second floor. The unit ventilators are manufactured by MagicAire and appear to have been installed in 2014. There are approximately two (2) unit ventilators located on the first floor, fourteen (14) unit ventilators located on the first floor, and seventeen (17) 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 chilled water coil, 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 (Image 11).

Specific Issues:

- The unit ventilators do not have control valves, face & bypass, or CO2 controls and are provided with pneumatic thermostats with only ON/OFF control and actuator control, resulting in problems with temperature control.

Recommendations:

- Install new DDC control valves, controls, and thermostats with CO2 controls for each unit ventilator for temperature, CO2, and face & bypass control.
- Existing louvers and air distribution devices should be cleaned or replaced as needed.

CAFETERIA AND KITCHEN

The Cafeteria is heated, ventilated, and air conditioned by five (5) chilled/hot water coil floor mounted vertical unit ventilators and a roof mounted exhaust fan. The unit ventilators are manufactured by Nesbit and appear to have been installed in 2014. The Kitchen is provided with heating and make-up air ventilation by an indoor air handling unit. The unit is provided with a chilled water coil, hot water coil, supply fan and filter section. FMC is currently in the process of replacing the unit actuators with new DDC type actuators. Galvanized sheet metal ductwork is distributed from the air-handling unit to ceiling diffusers in the Kitchen. The Kitchen has an exhaust hood connected to roof mounted exhaust air fans. The exhaust air fan and kitchen hood appear to be in good physical condition (Image 12, & 13)

Image 12 – Kitchen Exhaust Hood

Image 13 – Cafeteria Unit Ventilators

Specific Issues:

- None.

Recommendations:

- Existing ductwork and air distribution devices should be cleaned.

Image 14 – Gym Distribution Ductwork

GYM

The Gym is heated, ventilated, and air conditioned by an indoor air handling unit. The unit is provided with a chilled water coil, hot water coil, supply fan, filter section, and variable air volume (VAV) units. FMC is currently in the process of replacing the unit actuators with new DDC type actuators. Galvanized sheet metal ductwork is distributed from the air-handling unit to the Gym. Supply air diffusers

Image 15 – Roof Mounted Exhaust Fan

Image 16 – Restroom Convector

are located on the sides of the exposed main air ductwork distribution system running along the gym at ceiling level (Image 14)

Specific Issues:

- The existing ductwork is not insulated.

Recommendations:

- Replace or repair damaged and missing duct and piping insulation.
- Existing indoor air-handling unit along with existing ductwork and air distribution devices should be cleaned.

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 the 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 13 roof 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 originally installed and past its useful expected service life (Image 15).

Specific Issues:

- The majority of the existing exhaust air ductwork appears to be originally installed and past its useful expected service life.

Recommendations:

- Existing ductwork and air distribution devices should be replaced or cleaned.

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 16).

Specific Issues:

- Hot water convector units appear to be past their service life.
- Some exhaust grilles appear soiled.

Recommendations:

- Replace hot water convector units.
- Clean or replace dirty exhaust grilles.
- Existing ductwork and air distribution devices should be cleaned.

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 Lobby area and majority of corridors are served by an indoor air handling unit that is equipped with a chilled water coil, hot water heating coil, supply fan, and filter. FMC is currently in the process of replacing the unit actuators with new DDC type actuators. Supply air is ducted from the unit to each space through ceiling mounted supply air diffusers. 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 17, & 18).

Specific Issues:

- Hot water convectors, fin tube radiation, and unit heaters appear to be past their service life.

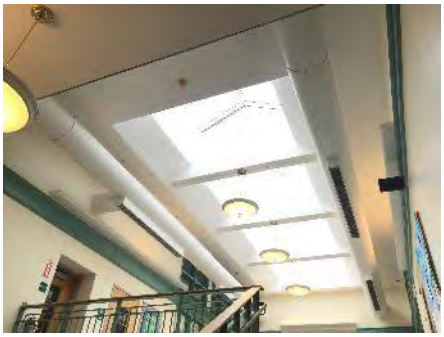


Image 17 – Lobby Ventilation

Image 18 – Corridor Unit Heater

Image 19 – DDC Thermostat

Image 20 – Pneumatic Control System

Recommendations:

- 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.

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 is a Tirdium Niagra System that has been installed by FMC Control Technologies. The Control system has a DDC (direct digital control) front-end controller, DDC equipment controllers, and network type thermostats and is tied into a Townwide Energy Management System controlled by DPW. FMC is currently in the process of replacing the air handling unit actuators with new DDC type actuators. The majority of the renovated unit ventilator systems are still pneumatic control. The pneumatic dual compressors are the originally installed compressors with 3 HP motors manufactured by Powerex with Square D starters and the original refrigerant air dryer is in place (Image 19, & 20).

Specific Issues:

- The unit ventilators do not have control valves, face & bypass, or CO2 controls and are provided with pneumatic thermostats with only ON/OFF control and actuator control; resulting in problems with temperature control.

Recommendations:

- Install new DDC control valves, controls, and thermostats with CO2 controls for each unit ventilator for temperature, CO2, and face & bypass control.
- Provide a complete DDC control system for optimal control and comfort and tie it into the townwide building management system.

ELECTRICAL ASSESSMENT

EXISTING SYSTEMS

The existing systems of this facility range from original vintage to upgrades and/or add-ons recently installed, including service equipment, branch circuit panelboards, some 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. We recommend replacement of some of the electrical systems for this facility under a renovation program. Existing electrical service and distribution equipment, along with the exterior generator and transfer switch, are in good condition and do not need to be replaced. Existing fire alarm system should be replaced with a voice evacuation type, per current code requirements.


Image 1 – Utility Pole Riser


Image 2 – Pad Mount Transformer

ELECTRICAL 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 2,000 ampere, 120/280 volt, 3 phase, 4 wire service serves the building. The main service equipment is located within the main electric room. The switchboard consists of a main/C.T. cabinet and a main distribution section. The equipment is relatively new and manufactured by Cuttler Hammer (Image 3).


Image 3 – Main Switchgear

Branch circuit panelboards have been updated to recently installed panelboards that are in good condition (Image 4).


Image 4 – Panelboards

INTERIOR LIGHTING

Corridor lighting consists of wall mounted fluorescent sconces with acrylic lenses and recessed downlights. Corridor lighting is controlled via line voltage switches at the ends of the corridor (Image 5).

Classroom lighting consists of indirect pendant mounted fluorescent fixtures. Light levels appear adequate in the classrooms. Each classroom has been equipped with an occupancy sensor and two switches that control the lights. Wall mounted direct/indirect is also provided at the teacher wall (Image 6).


Figure 5 – Corridor Lighting

Restrooms contain wall mounted fluorescent direct/indirect fixtures.

Gym lighting consists of high output, 2x4 fluorescent high bays. Light levels seem adequate (Image 7).

Incandescent track heads are used to light the platform on the stage for performances (Image 8).

Cafetorium lighting consists of cove lighting around the perimeter with indirect flood lights around the columns. Wall sconces are provided throughout the space (Image 9).

Library has recessed downlights, pendant bowl fixtures, and wall mounted indirect fluorescent fixtures (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 to not have received the occupancy sensor switch upgrade (Image 11).

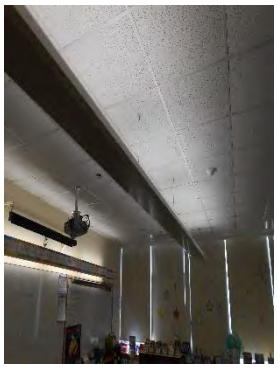


Image 6 – Classroom Lighting

Image 7 – Gym Lighting

Image 8 – Platform Track Lights

Image 9 – Cafetorium Lighting

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 12, 13, 14, & 15). Some wall packs are HID type along with the recessed square fixtures at canopy of the main entrance.

In general, the exterior lighting is in good condition with the exception of the HID fixtures. Exterior lighting is controlled via a time clock.

EMERGENCY STANDBY SYSTEM

A recently upgraded diesel fired Kohler generator, 120/208 volt, in a weather-proof, sound attenuated enclosure is installed adjacent to the building within a fenced in enclosure. The generator feeds two Kohler transfer switches and serves emergency lighting, as well as other loads. Exit signs are provided throughout the building (Image 16, & 17).

Fire Alarm System

The fire alarm system consists of a conventional FCI 7200 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. Smoke detectors are provided in corridors and throughout the building (Image 18, 19, & 20).

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 21).

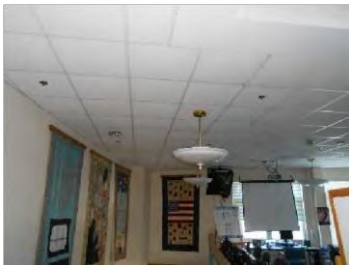


Image 10 – Library

Image 11 – Occupancy Sensor Switch

LIGHTING PROTECTION SYSTEM

The facility does not have a lightning protection system.

PHOTOVOLTAIC SYSTEM

The facility contains a recently installed roof-mounted photovoltaic system with the inverters located at the exterior of the building on a pad (Image 22, & 23).

Image 12 – Pole-Mounted LED Flood

DATA/TELEPHONE/CLASSROOM INTERCOM/CLOCK SYSTEM

There are IDF rooms and one MDF room. The MDF room serves each IDF room and is located off of the Library.

In general, data wiring is Cat5 throughout the building. IDF data racks are generally installed in existing storage or janitor closets, emergency branch circuits have been run to each rack. (Figure 24, Figure 25)

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. Clock/speaker panels are provided in the classrooms.

Image 13 – Building Mounted LED Flood

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 26).

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 27).

The cafetorium's existing TOA local sound system is located in the kitchen. A portable system is used but not tied into the fire alarm system which is required by code.

A system of surface wiremold G4000 raceways has been installed to accommodate the various communications cables added over the years.

SECURITY

The building 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. Panel and keypad is located in the MDF room (Image 30).

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 MDF room (Image 29).

Access control is manufactured by S2 and there are micro-nodes located in the IDF closets to serve the access controlled doors. The system's head-end is located at the MDF room (Image 28).

Image 14 – Canopy LED Fixture

Image 15 – HID Wall Pack

Image 16 - Generator

Image 17 – Automatic Transfer Switch

Image 18 – Fire Alarm Control Panel

Image 19 – Smoke Detector

Image 20 – Pull Station & Horn/Strobe

Image 21 – Master Box & Knox Box

Image 22 – PV Disconnect

Image 23 – PV Inverters

Image 24– IDF

Image 25 - MDF

Image 26 – Paging System

Image 27 – A/UControl System

Image 28 – Access Controller

Image 29 – CCTV Cameras

Image30 – Intrusion System Control Panel & Keypad

PLUMBING ASSESSMENT

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 a mix of wall hung and floor mounted vitreous china with manual flush valves (Image 1, & 2).

Urinals are wall hung vitreous china with manual flush valves (Image 3).

Lavatories are a mix of wall hung and counter mounted vitreous china. The lavatories are fitted with a mix of sensor type, metering, and hot and cold handle faucets (Image 4, & 5).

Utility sinks are wall hung enameled steel sink with wall mounted faucet. Faucets are equipped with vacuum breakers (Image 6).

Service sinks are floor mounted mop receptors. Faucets are equipped with vacuum breakers (Image 7).

Drinking fountains are stainless steel wall mounted push bar hi-lo type (Image 8).

Classroom sinks are counter mounted stainless steel with hot & cold water handle faucets and a water bubbler (Image 9).

Art sinks are counter mounted stainless steel with single lever handle faucet. Art sinks are equipped with sediment traps (Image 10).

Teachers' sinks are counter mounted stainless steel sink with hot & cold water handle faucet (Image 11).

Image 1 – Wall Hung Water Closet

Image 2 – Wall Hung Water Closet

Image 3 – Wall Hung Urinal

Image 4 – Wall Hung Lavatory

Kitchen area fixtures are in good condition. The pot washing sink is piped to a floor mounted grease interceptor (Image 12, & 13).

WATER SYSTEM

The domestic water service is located in the Mechanical Room. The service enters the building as an 8" and splits to a 4" Fire and a 3" Domestic and includes a meter (Image 14, & 15).

Piping is copper tubing with sweat joints. The majority of piping is insulated. In general, the valves are in good condition.

The building domestic hot water is generated through (2) gas-fired water heaters. Water heater-1 has a gas input of 77,000 BTUH and has a capacity of 100 gallons. Water heater-2 has a gas input of 75,000 BTUH and has a capacity of 100 gallons. Water heater-2 is not working. The hot water system is recirculated (Image 16, 17, & 18).

GAS

Building is serviced by natural gas. The gas meter is located along exterior of building. Gas service is 1" in size (Image 19).

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

Image 5 – Counter mounted Lavatory

Imge 6 – Utility Sink

Imge 7 – Service Sink

Image 8 – Drinking Fountain

bell and spigot. Where visible, the cast iron pipe appears to be in good condition. Smaller pipe sizes appear to be copper for waste.

A duplex sewer ejector pit and sump pit is located in the Mechanical Room (Image 20, 2 1, 22, & 23).

Image 9 – Classroom Sink

Image 10 – Art Sink

ROOF DRAINAGE SYSTEM

The flat roofs are collected by roof drains and interior cast iron rain leaders. Pitched roofs are collected with gutters and downspouts which either spill onto a flat roof or discharges to a below grade collection system. Canopy is collected with scupper drains and downspouts and discharges to a below grade collection system (Image 24, & 25).

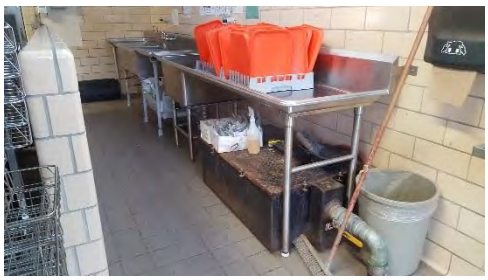
RECOMMENDATIONS

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.

1. Plumbing fixtures meet current code for water conservation. However, new high-efficiency low flow fixtures (faucets & flush valves) could be installed to reduce water consumption. It should be confirmed that the existing water closets and urinals are compatible with current low flow flush valves.
2. We recommend video inspection of existing drains to confirm integrity and correct pipe invert. If pitch is determined to be shallow, we would not recommend low flow plumbing fixtures.
3. Provide new high-efficiency gas-fired domestic
4. water heater once the existing water heaters have expired.

Image 11 – Teachers Sink



Imge 12 – Pot Washing Sink

5. Provide reduced pressure backflow preventers at Janitor's closet soap dispenser.
6. Paint gas piping exposed to exterior.

Image 13 – Grease Interceptor

Image 14 – Domestic Water & Fire Service

Imge 15 – Domestic Water Meter

Image 16 – Gas Fired Water Heaters

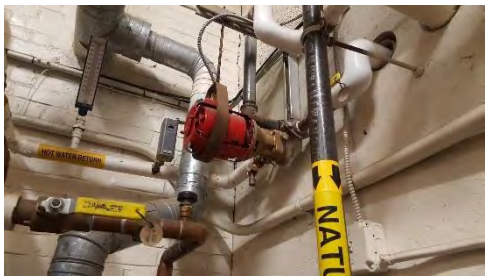


Image 17 – Hot Water Recirculating Pump

Image 18 – Mixing Valve

Image 19 – Gas Service & Meters

Image 20 – Cast Iron Piping

Image 21 – Sanitary Piping

Image 22 – Duplex Sewer Ejector Pit

Image 23 – Sump Pit

FIRE PROTECTION ASSESSMENT

The building is fully protected with an automatic sprinkler system fed from the municipal water supply. The system components are in good condition.

EXISTING CONDITIONS

There is an 8" water service which enters the Mechanical Room and splits to an 4" Fire service and a 3" Domestic. Service is protected with a 4" double check valve assembly (Image 1).

The system includes (2) wet alarm valves, each with a main flow switch (Image 2).

The Fire department connection is a 4" Storz type. A water motor gong is located above the fire department connection (Image 3).

Fire department valves are located throughout the building (Image 4).

Sprinkler piping is black steel with coupling joints on larger pipe size and threaded joints on smaller size branch piping. The piping appears to be in good condition.

Sprinkler heads are quick response type. In common areas sprinklers are fully concealed type (Image 5). Where no ceilings exist sprinklers are upright brass type (Image 6).

Recommendations:

- System is in good working order. Owner to continue to inspect/maintain system per NFPA 25 requirements.

Image 1 – Fire Service

Image 2 – Wet Alarm Valves

Image 3 – Fire Department Connection

Image 4 – Fire Department Valves

Image 5 – Concealed Sprinkler Head

Image 6 – Upright Sprinkler Head

FOODSERVICE EQUIPMENT ASSESSMENT

The Center Elementary School serves approximately 500 students in grades K through 4. The kitchen underwent a renovation in 1999 with a majority of the equipment being replaced at that time. Some counters and sinks were carried over from the original kitchen. That equipment has held up well and appears to be adequately maintained, as does the overall kitchen.

The school's cafeteria kitchen serves the typical school lunch program in a single serving line configuration. The serving line is rather simple and equipped with hot wells, but no cold wells. Floors and walls are constructed of the apprpriate materials and have held up well.

Image 1

Because this was a renovated kitchen and not new construction, the kitchen is not organized logically in some respects. However, the staff appears to make it work and the necessary components of a traditional foodservice program are present.

Image 2

KITCHEN EQUIPMENT

In general all the equipment seems to be in good condition. No major failures were observed.

Cooking Line (Image 1):

- The cooking equipment is composed of a convection oven, range kettle and steamer. In all, they are well maintained and in good working order.

Serving Line (Image 2):

- The sneeze shield used to protect the hot food on the serving line is out of date with current health code standards. Current standards now require an end panel in addition to the front glass panel.
- The milk cooler is located outside the footprint of the kitchen. Ideally, the milk cooler should be located within the kitchen so that it can be secured more easily.

Recommendations:

1. Consider adding a frost top to the serving line to assist with temperature maintenance of cold food items.

2. Shorten the serving line to work the milk cooler into the serving line. This will free up space in the seating area and bring the milk cooler into the kitchen zone.

3. Replace the sneeze guard located at the hot food wells but only if the counter is modified to accommodate the suggestions listed above.

1.0 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 Center 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 in 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

Five (5) bulk samples were collected from the following materials suspected of containing asbestos:

Type and Location of Material

1. White 12” x 12” vinyl floor tile at custodian room
2. Joint compound at stage
3. Joint compound at hallway
4. Exterior unit vent grille caulking
5. Exterior window framing caulking

Samples Results

Type and Location of Material	**Sample Result**
1. White 12” x 12” vinyl floor tile at custodian room	No Asbestos Detected
2. Joint compound at stage	No Asbestos Detected
3. Joint compound at hallway	No Asbestos Detected
4. Exterior unit vent grille caulking	No Asbestos Detected
5. Exterior window framing caulking	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. Grey flue cement was previously found to contain asbestos.
2. Inaccessible exterior residual window framing caulking was previously found to contain asbestos.
3. Glue holding blackboard was assumed to contain asbestos.
4. All remaining suspect materials were found not to contain asbestos.
5. Rubber flooring was assumed to contain mercury.
6. Underground sewer pipe was assumed to contain asbestos.
7. 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.
8. 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.
9. 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.
10. 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.
11. 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	Blackboards	Unknown	8,000.00
	Hidden ACM	Unknown	15,000.00
	Miscellaneous Hazardous Materials	Unknown	15,000.00
Mechanical Room	Grey Flue Cement	4 SF	500.00
Exterior	Old Windows Caulking	220 LF	2,500.00
	Transite Sewer Pipes	Unknown[1]	50,000.00
	Roofing Materials	55,562 SF[2]	55,562.00
	Damproofing on Exterior/Foundation Walls	Unknown[1]	75,000.00
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			30,938.00
		Total:	**310,000.00**

[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)

CAPITAL IMPROVEMENT PLAN

		CENTER ELEMENTARY 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) 2020-2023	Low Priority (7-10 yrs) 2023-2033 or under a full renovation project	On Going Maintenance	Notes / Total
		GSF 52,300 GSF													
1	**Site & Civil**														
	1.01	Repair broken downspout observed in February 2016					x			$759				**$759**	
	1.02	Mill and overlay areas of degradation in asphalt pavement			x					$15,180		**$15,180**			
	1.03	Regrade walkways that need to be accessible per code at ada curb cuts		x		x				$7,590				**$7,590**	
	1.04	Regrade walkways and paving that have ponding to prevent icing in winter	x		x					$9,108				**$9,108**	
	1.05	Revise drainage at curb cut areas	x		x		x			$27,324				**$27,324**	
	1.06	Provide textured surface at curb cuts		x		x				$4,554				**$4,554**	
	1.07	Provide crosswalks from all curb cuts to create a safe path of travel	x	x		x				$13,116				**$13,116**	
	1.08	Add additional width at sidewalks where curb cuts are located to allow for ADA turning requirements			x	x				$13,662				**$13,662**	
	1.09	Install bollards at locations where vehicles drive adjacent to the walls (no sidewalks to separate)			x		x			$6,831				**$6,831**	
	1.10	Regrade and reseed play field.			x					$12,296			**$12,296**		
		TOTAL									**0**	**15180**	**12295.8**	**$82,944**	110419.32
2	**Structural Elements**														
	2.01	Repair deterioration at support posts at exterior canopies			x		x			$7,590			**0**	**$7,590**	
	2.02	Repair and repaint exposed steel lintels with exterior rated rust inhibiting paint					x			$15,180			**0**	**$15,180**	
		TOTAL									**0**	**0**	**0**	**$22,770**	**$22,770**

3	**Exterior Architectural Elements**													
	3.01	Replace brick at grade with a non-porous stone material					x							
	3.02	Remove vegetation at foundation to discourage roots from affecting the foundation structure					x			$11,423				**$11,423**
	3.03	Clean brick weeps clear of debris					x			$4,858				**$4,858**
	3.04	Replace existing half-circle window at gym with double-glazed insulating window						x		$911			**$911**	
	3.05	Install prefinished metal flashing at window sills with rowlock brick and repair caulking					x			$12,144		**$12,144**		
	3.06	Repair the termination joint above the office and storage room on the south side of the gym					x			$1,184				**$1,184**
	3.07	Repair or replace deteriorated concrete at loading dock			x		x			$4,554	**$4,554**			
	3.08	Repair or replace brick at grade			x		x			$227,700		**$227,700**		
	3.09	Repoint brick as needed			x		x			$22,770		**$22,770**		
	3.10	Repair or replace older louvers			x		x			$3,036	**$3,036**			
		TOTAL									**$ 7,590.00**	**$ 262,614.00**	**$ 910.80**	**$ 17,464.59**	**$ 288,579.39**
4	**Interior Architectural Elements**													
	4.01	Add handrail extensions at ramp in front lobby to meet current accessibility requirements		x		x				$380		**$380**		
	4.02	Revise height of sinks in countertops to be the proper accessible height based on the age group of the users		x		x				$16,698			**$16,698**	
	4.03	Insulate piping at accessible sinks		x		x				$5,009				**$5,009**
	4.04	Revise door swings where they don't meet the requirements for accessibility		x		x				$45,540			**$45,540**	
	4.05	Provide additional handrails at restrooms where missing and verify height of all fixtures for accessibility requirements		x		x				$4,554			**$4,554**	
	4.06	Replace stained ceiling tiles and verify all stains on ceilings are from old leaks			x		x			$7,590	**X**			**$7,590**
	4.07	Repair or replace damaged VCT flooring at building joints			x		x			$1,214				**$1,214**
	4.08	Deep clean carpets in offices and classrooms					x			$16,736				**$16,736**
	4.09	Replace worn carpets in offices and classrooms (assume 20%)					x			$53,555	**$53,555**			
	4.10	Repair walls and joints where cracking has occurred					x			$15,180	**$15,180**			
	4.11	Install protection shrouds at the sinks in toilet rooms				x				$11,233				**$11,233**
	4.12	Review locations of all toilet room accessories and reinstall fixtures that are not properly located or missing (several locations)		x		x				$8,425	**$8,425**			
	4.13	Verify heights of sink in gang toilet rooms and adjust if required to meet ADA / MAAB		x	x	x				$15,180	**$15,180**			
	4.14	Replace all toilet partitions in gang toiler rooms	x		x		x			$30,360	**$30,360**			
	4.15	Install vestibule at main entrance to increase energy efficiency and security			x			x		$30,360		**$30,360**		
	4.16	Repair gym flooring			x		x			$31,726		**$31,726**		
	4.17	Repair or replace stage flooring			x		x			$31,119			**$31,119**	
	4.18	Review conditions of cracking and movement at the exterior walls - add insulation and reinforcement to prevent further cracking			x		x			$7,590	**$7,590**			

	4.19	Repair existing walls and joints where cracking has occurred			x		x			$15,180	**$15,180**				
	4.20	Repair cracking at tile joints in restrooms			x		x			$2,277	**$2,277**				
	4.21	Repair soffit structure in library with permanent solution		x	x		x			$1,898	**$1,898**				
	4.22	Repair cracking in soffits			x		x			$3,036	**$3,036**				
	4.23	Install hold-opens at doors (several are being held open with door wedges)	x	x	x					$22,770	**$22,770**				
	4.24	Repair damaged cubbies in hallway (5%)			x		x			$15,180	**$15,180**				
	4.25	Provide additional storage space for classrooms and office spaces (cabinets or shelving)	x		x					$43,415			**$43,415**		
	4.26	Replace existing window shades			x					$30,311		**$30,311**			
	4.27	Provide additional storage for gym equipment (shed) and remove storage from hallways and stairwells	x	x	x		x			$15,180	**$15,180**				
	4.28	Provide general storage area and remove all equipment and storage from electrical rooms	x	x	x		x			$22,770	**$22,770**				
	4.29	Replace guardrail at mezzanine	x	x	x		x			$9,108	**$9,108**				
	4.30	Determine cause of rusting of metal fixtures in nurse's office			x					$759	**$759**				
		TOTAL									**$ 238,447.44**	**$ 92,777.12**	**$ 141,325.80**	**$ 41,782.95**	$ 514,333.31
5	**Mechanical - HVAC**														
	5.01	Remove rain caps from breeching					x			$3,036				**$3,036**	Determine if the unit requires caps
	5.02	Install new return inline pump (existing is leaking and near end of life)					x			$6,831	**$6,831**	**completed**			
	5.03	Repair and replace insulation where damaged	x				x			$15,180				**$15,180**	
	5.04	Replace existing hot water supply and return piping outside of the boiler room with insulated piping		x				x		$30,360			**$30,360**		
	5.05	Replace propeller type unit heaters						x		$22,770			**$22,770**		
	5.06	Install chilled water pump with VFD						x		$18,216			**$18,216**		
	5.07	Install new DDC control valves, controls and thermostats with CO2 controls for each unit ventilator for temperature, CO2 and face & bypass control at administration offices						x		$37,950	**$37,950**				
	5.08	Clean or replace existing louvers and air distribution devices at administration offices	x				x	x		$3,036				**$3,036**	
	5.09	Install new DDC control valves, controls and thermostats with CO2 controls for each unit ventilator for temperature, CO2 and face & bypass control at classrooms						x		$75,900	**$75,900**	**complete**			
	5.10	Clean or replace existing louvers and air distribution devices at classrooms	x				x	x		$6,376				**$6,376**	

	5.11	Clean or replace existing louvers and air distribution devices at kitchen and cafeteria	x				x	x		$3,036				**$3,036**	
	5.12	Repair or replace damaged and missing duct and piping insulation at gym					x			$15,180				**$15,180**	
	5.13	Clean existing indoor air handling unit, louvers, ductwork and air distribution devices at gym	x				x	x		$4,554				**$4,554**	
	5.14	Clean or replace existing louvers and air distribution devices at exhaust systems in kitchen	x				x	x		$3,795				**$3,795**	
	5.15	Replace hot water convector units in restrooms								$18,216			**$18,216**		
	5.16	Clean or replace dirty exhaust grilles in restrooms	x				x	x		$12,144				**$12,144**	
	5.17	Clean existing ductwork and air distribution devices at restrooms	x				x			$11,385				**$11,385**	
	5.18	Replace existing entryway and corridor cabinet unit heaters, hot water fin tube radiation and convectors in the entryways and corridors. Install new hot water branch piping and valves with insulation			x			x		$37,950		**$37,950**			
	5.19	Install a complete DDC control system for optimal control and comfort and tie it into the town-wide building management system			x		x	x		$425,040	**$425,040**				
		TOTAL									**$545,721**	**$37,950**	**$89,562**	**$77,722**	
6	**Electrical**														
	6.01	Complete upgrade to occupancy sensor switches throughout the school			x			x		$129,030	**$129,030**	**complete**			
	6.02	Replace exterior HID light fixtures			x		x	x		$22,770	**$22,770**	**complete**			
	6.03	Install lightning protection system	x	x						$37,950	**$37,950**				
	6.04	Replace clock/speaker system, current system is obsolete	x		x					$37,950	**$37,950**				
	6.05	Upgrade or replace problematic paging system	x		x					$37,950	**$37,950**				
	6.06	Install sound system in cafetorium that is tied to the fire alarm system per code	x	x	x					$15,180	**$15,180**				
	6.07	Upgrade or replace intrusion system	x							$341,550	**$341,550**				
	6.08	Continue to inspect and maintain system per NFPA 25 requirements	x	x	x		x			$7,590				**$7,590**	
	6.09	Replace system with a voice evacuation type per current code requirements	x	x		x				$212,520	**$212,520**				
	6.10	Upgrade alarm system to speaker/strobe system to comply with code	x	x		x				$83,490	**$83,490**				
		TOTAL									**$918,390**	**$0**	**$0**	**$7,590**	

CAPITAL IMPROVEMENT PLAN

7	**Plumbing**														
	7.01	Install new high-efficiency low flow fixtures to reduce water consumption						x		$204,930			**$204,930**		
	7.02	Video inspect existing drains to confirm the integrity of the piping and the correct pipe invert for low flow fixtures			x		x	x		$4,554				**$4,554**	
	7.03	Install new high-efficiency gas-fired domestic water heater when the existing water heater expires						x		$27,324			**$27,324**		
	7.04	Install reduced pressure backflow preventers at janitor's closet soap dispenser	x	x						$4,554	**$4,554**	**complete**			
	7.05	Paint gas piping exposed to the exterior					x			$759				**$759**	
		TOTAL									$4,554	$0	$232,254	$5,313	
8	**Fire Protection**														
		TOTAL								0	**0**	**0**	**0**	**0**	
9	**Hazardous Material**														
	9.01	HazMat Removals per UEC Report Dated March 11, 2016							x	$372,000					Renovation of existing building address building Haz / Mat. Report and Cost noted would be to demo existing building and site and therefor not included in this CIP
		TOTAL								$372,000	$0	$0	$0	$0	

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.