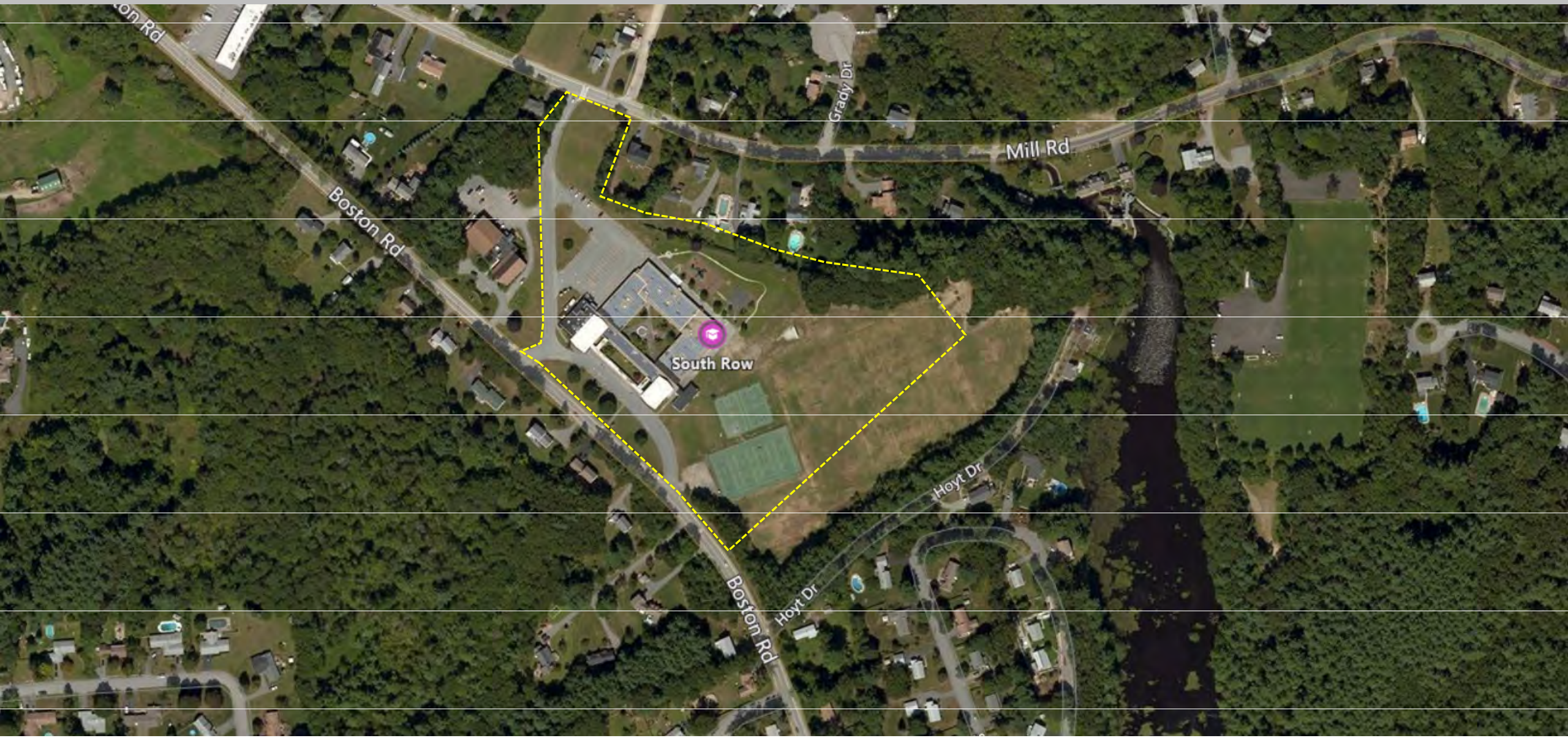
South Row Elementary School

Dore & Whittier Architects Inc.

G1-1

South Row Elementary School



ARCHITECTURAL ASSESSMENT

GENERAL DESCRIPTION

The Elementary School was designed by Rich & Tucker Associates in 1961. The building is a single story facility, with a gross floor area (at-grade) of approximately 44,580 gross square feet.

The building is generally described as a steel framed and laminated beam structure, with load-bearing interior and exterior walls. The structure is not fireproofed, and as such best fits the description of a Type II-A/II-B construction as defined by the current building code. The building does not contain a fire suppression system (sprinklers). throughout all areas.

Current enrollment is approximately 392 students in grades kindergarten through grade 4. Peak staff during the day is approximately 55 FTE.

The building survey for this report was conducted on February 16, 2016.

Image 1


Image 2


Image 3


Image 4


Image 5

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. However, as the building currently stands, any plans for significant renovations or additions may trigger multiple code upgrade requirements outside of the proposed area of renovations or addition and could require work to all areas of the existing facility.

Given that the building is currently not sprinklered and is in excess of 7500 square feet in gross area, it is likely that any significant planned renovations or additions would require the installation of a fire suppression system throughout the building, per MGL chapter 148.

Based on the building occupancy Use and Construction Type the current building area of approximately 42,500 square feet suggests that the building exceeds the maximum allowable area for its construction type and primary use occupancy under the current building code.

Image 6

Image 7

Image 8

Major additions or renovations may also require fire walls be constructed to subdivide the building.

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, and building area, additions and renovations may require different occupancy areas such as the gym or cafeteria be separated from other space via fire rated partition walls and doors.

A more in-depth analysis of the building occupancies and strategies to satisfy building height and area limitations would be required to confirm code requirements.

ACCESSIBILITY

The South Row Elementary School has several conditions that are not considered accessible per the current Massachusetts Architectural Access Board Rules or the Americans with Disabilities Act (2010) Standards.

EXTERIOR SITE AND BUILDING ENTRANCE

There are three handicap parking spaces located across the driveway from the front entrance. It appears that at least one of the spaces is large enough for van parking although it is not specifically designated so. There is no designated crossing area from the accessible parking to the sidewalk. A sloped asphalt sidewalk provides transition from the parking area to the concrete sidewalk however this sloped pavement is not marked for accessibility and does not provide the proper turning radius at the end of the pavement. Consideration should be given to relocation of the accessible parking spaces to provide a direct route to the front door and a cross walk should be provided for safety.

A cross walk with accessible curb cuts is provided for students crossing Boston Road (Image 7) however, once on

school property the path ends at the entrance drive. A clear crossing area and curb cut should be provided across the entrance drive to allow safe and accessible access to the school.

There are several playfields and courts located on the South Row School site. Per ADA / MAAB accessible paths and parking must be provided to allow for access to these areas. Currently there are parking spaces located near the tennis courts but there is no accessible path to the play fields.

Recommendations

- Provide signage for accessible van parking
- Provide designated crossing area from accessible parking spaces to the sidewalk
- Install proper accessible curb cuts at sidewalk
- Provide directional signage to front entrance
- Provide an extension of the crosswalk from Boston Road to the school entrance
- Provide accessible paths to playfields

Image 9

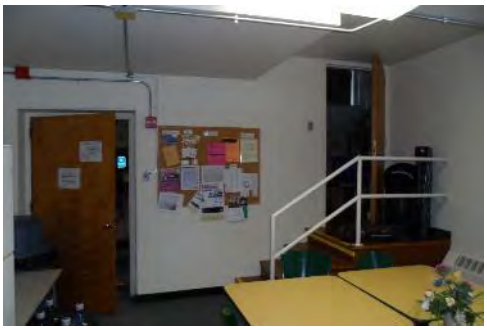


Image 10

INTERIOR SPACES

Several areas within the South Row School do not meet accessibility requirements. The front office is located near the main entrance door. Similar to other schools in the district the counter height in the main office does not provide a lower counter area to meet accessibility requirements. The performance stage in the Cafetorium is only reachable by steps. The steps and handrails do not meet ADA / MAAB guidelines and a lift or ramp is required to provide access to the stage level.

Image 11

Where ramps and stairs are provided throughout the building efforts have been made to meet the requirements for accessibility. However, these efforts fall short in some cases. Image 11 indicates a ramp where the upper handrail was dropped to accommodate the location of the existing electrical panels. This condition should be revised to provide a continuous handrail on both sides of the ramp. In other locations the handrails at the stairway do not

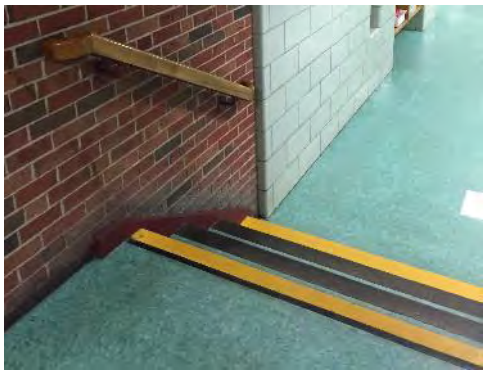


Image 12

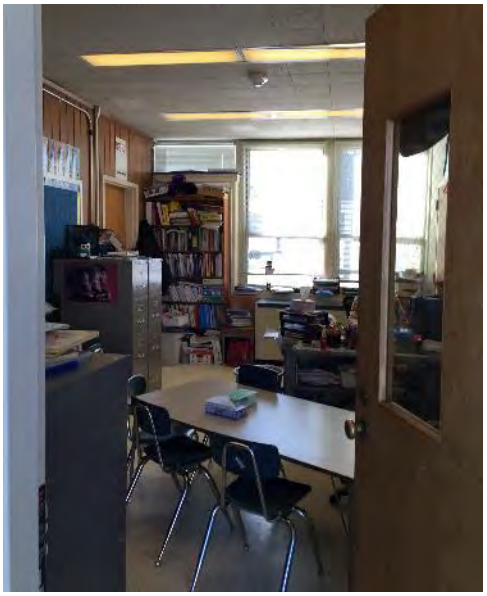


Image 13

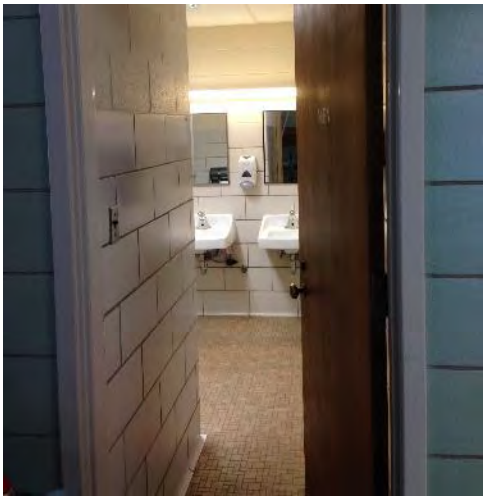


Image 14

Image 15

provide the proper extensions beyond the upper and lower steps.

Many doors throughout the facility still have knob hardware and in many locations the push / pull clearance at the door location does not meet accessibility guidelines. (image 13 & 14). This condition limits access to restrooms, offices, and classrooms throughout the facility. A clear path of access to the accessible restroom has not been provided. This is in part due to the lack of dedicated teaching spaces. In this condition the corridor is being used as a tutoring space and blocks the access to the accessible restroom.

The restrooms in general do not meet the requirements of ADA or MAAB. The requirements that are not met include the entrance path, door hardware, sinks that do not provide protection from the hot water pipes, the height of mirrors, the location of dispensers, and the dimensional requirements of the space or stalls.

Drinking fountains vary throughout the facility with some meeting the accessibility guidelines and others not (Image 10). The non-compliant drinking fountains should be replaced with ADA / MAAB compliant fixtures.

Recommendations

- Renovate main office counter to meet accessibility requirements
- Replace existing handrails at the stage to meet ADA / MAAB
- Install a lift or ramp to access stage
- Install segment of upper handrail on ramp in corridor
- Install new handrails at stair locations to meet ADA / MAAB requirements for dimension of handrail and extension beyond the top and bottom riser.
- Provide clear access to the accessible restroom
- Renovate restrooms, offices and classrooms to provide push / pull clearances at doorway
- Install protection around sink pipes

- Relocate mirrors and dispensers to meet accessible guidelines
- Renovate restrooms to provide proper sized stalls for accessibility
- Install handrails as required by accessibility guidelines
- Drinking fountains do not comply with ADA / MAAB guidelines for height and access.

Image 16

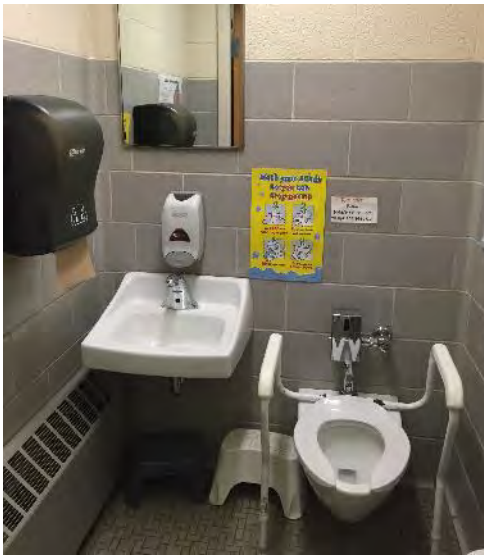


Image 17

Image 18

Image 19

Image 20

Image 21

Image 22

EXTERIOR BUILDING ELEMENTS

FOUNDATION

Foundations are poured in-place concrete. Grade is at the top of the foundation walls and the foundation is not visible from the exterior. The limited area of wall that was viewed from interior areas below grade appeared to be generally in good condition.

EXTERIOR WALLS

The building has a brick and mortar exterior veneer with CMU backup. Window opening bays have brick below and metal panel above to roof. The brick is in generally good condition with some staining but few cracks. The expansion joint is in poor condition and should be repaired (Image 21). Modular classrooms have T-111 siding in fair condition. The base of the modular buildings have some water damage due to the proximity of the wood to grade and to the poor drainage around the buildings.

Specific Issues

- Northeast brick has settled unevenly at the expansion joint causing ruptured sealant. (Image 11)
- Pod classrooms are wood cladding w/stud backup and are in fair condition. Many gutters and downspouts are missing causing water runoff and staining. (Image 12)

Recommendations

- Retool new sealant at expansion joint.
- Clean brick
- Redirect surface water drainage away from the building and modular classrooms.

WINDOWS

The school underwent a window replacement program in 2002. The primary exterior window type is aluminum with insulated glazing with operable section. Windows are in good condition throughout the facility.

Specific Issues

- In some locations the sealing at the windows appears to be in fair condition.

Recommendations

- Repair / maintain window sealant as required

DOORS

The exterior doors consist of aluminum storefront and hollow metal doors with hollow metal frames. Most doors are in good condition and were replaced during the time of the window replacement project. Door frames are original and generally in fair condition.

Specific Issues

- Maintain frames and door hardware

Image 23

LOUVERS /VENTS / OTHER OPENINGS

The louvers are a combination of aluminum fin construction and simple steel mesh construction.

Specific Issues

- Aluminum-framed louvers are in fair condition. Where brick sills are located the sills have general wear.
- Water runoff from the louvers has stained the exterior walls.
- Some louvers have missing screens

Image 24

Recommendations

- Install / maintain proper flashing around vents
- Repair brick sills and retool new mortar where damaged or worn
- Clean brick around vents
- Install screens where they are missing

Image 25

ROOF

Due to recent snow, the team was not able to assess the roof condition at the time of the visit. Portions of the roof were replaced in 2002 with an adhered membrane system and photo voltaic cells were added to the roof. The older portion of the roof is a built up roofing system last replaced in 1997. At the time of our visit we did not observe any leaking within the building but did notice several stained ceiling tiles. Fascia and roof drainage was observed. With the exception of the small canopies the building fascia is in good condition. Gutters and downspouts appear to be in good condition.

Image 2

Image 3

Image 4

Image 5

Specific Issues

- The side entrance canopy has metal fascia damage causing water runoff on walkway and appears to be leaking into the canopy causing damage to the soffit. (Image 24)
- Investigate the source of ceiling tile stains inside the school.

Recommendations

- Install new metal fascia at canopy.
- Replace soffit
- Verify proper drainage of canopy.

INTERIOR BUILDING ELEMENTS

FLOORING

VCT is predominate flooring type. This is located throughout the corridors, classrooms, and the cafeteria. In general, the VCT is in fair condition. The flooring is aged and worn. There are cracked tiles in many areas. This is consistent in areas where the floor transitions to a ramp, at the building joints, and other transition locations. The flooring also shows signs of pooled waxing that has discolored the tile.

The accessibility ramp located in the main hallway has a rubber flooring that appears aged and discolored in many areas. (Image 29)

The stage flooring and risers are in poor condition.

The gym floor has a sports flooring system with a faux wood finish. This floor is in fair condition. There are some locations with buckling and some missing seams that are in need of repair or replacement.

Both the library and the computer lab have carpet tile flooring. Some tiles have been replaced with mismatched carpet. In general, both the library and the computer lab flooring is in good condition.

Most bathrooms have porcelain tile flooring, some have VCT. The tile is original to the building and appears worn and dirty. Some patching of the tile has occurred where partitions have been removed or replaced.

Quarry tile was used in the kitchen. This tile is in good to fair condition.

All of the custodial and storage spaces are a combination of exposed concrete, sealed concrete, and epoxy painted concrete. Many of these areas are in need of refinishing. The paint or sealant has worn through leaving unprotected concrete floors.

Specific Issues

- Sports flooring system in gymnasium with a faux wood finish is in fair condition. There are some locations with buckling and some missing seams.
- Corridors VCT floors are in fair condition.
- Corridor stairs have metal nosings that are in fair condition.
- Corridor stair and ramp in modular classrooms have no slip resistant membrane surface as required by current codes. (Image 27)
- Corridor vestibule floor has improper slope towards exterior door and stair.
- Toilet rooms have porcelain tile in fair condition.
- Locker rooms and athletic offices have sealed/painted concrete in fair condition.
- Library and Technology Room carpet tile is generally in fair condition with some mismatched replacement pieces.
- Custodial closets and storage rooms have sealed/painted concrete in fair condition.
- The quarry tile in the kitchen and servery in fair condition.

Recommendations

- Replace existing non-slip material on the ramp with slip resistant flooring to meet current codes.
- Strip existing VCT of all wax to remove conditions of pooling
- Replace cracked or damaged VCT flooring
- Replace wood flooring on stage and risers
- Clean rubber flooring on ramp
- Replace yellow visual strips on stair nosing and transitions to ramps
- Replace mis-matched carpet tiles

.

Image 30

Image 31

Image 32

Image 33

Image 34

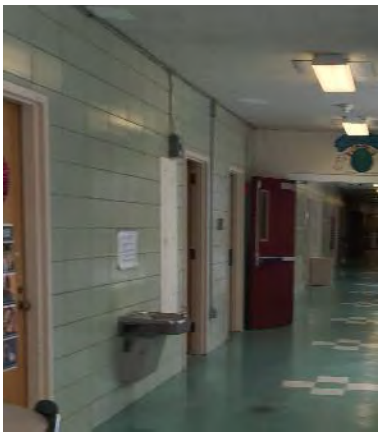


Image 35

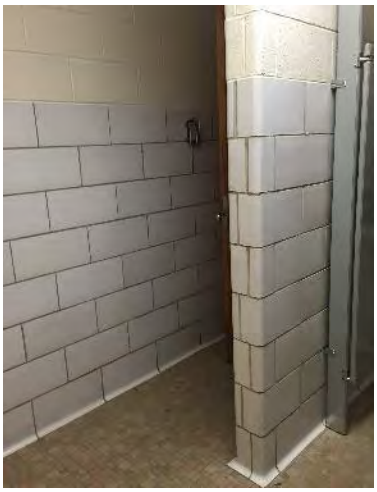


Image 36

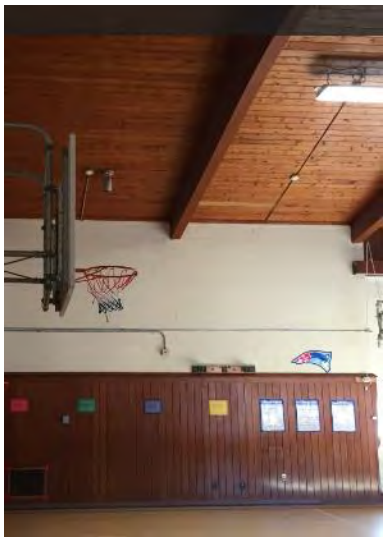


Image 37

WALLS & PARTITIONS

Most interior walls are load bearing painted cmu. In the corridors and restrooms the walls have a glazed tile finish, either full height or partial height of the wall with painted CMU above. The CMU walls are in good condition. The glazed tile walls are in generally good condition however the tiles in the restrooms appear dirty and aged.

The gymnasium has cmu wall with wood panel finish. This finish is in fair to poor condition. These walls should be refinished and crash pads added to the walls to protect both the wall and children.

Wood panel walls also exist in some of the classrooms. In these locations the finish has aged and dulled.

Interior brick walls are located in the corridor. These walls are in poor condition with cracking and visible efflorescence, an indicator of moisture in the wall cavity (image 37 & 38).

Specific Issues

- Glazed tile walls are aged and dirty.
- Wood paneling in gym and classrooms has aged and has signs of damage.
- Interior brick veneer has cracked and has signs of moisture infiltration

Recommendations

- Clean tile and grout on all glazed walls
- Re-grout bathroom tile walls
- Repair and refinish wood paneled walls
- Add wall pads to gym walls for protection of walls and students
- Where interior brick walls are cracking investigate cause and repair brick.
- Where moisture has infiltrated the brick walls further investigate the source of the moisture, and repair source. Remove efflorescence from brick and grout, refinish as needed.

CEILINGS

With the exception of a few locations the ceiling type throughout the school is acoustic 1x1 ceiling tile. In most areas the ceiling is in poor condition. Ceiling tiles are stained, mis-matched and unevenly placed. In several locations the ceiling tiles have been patched where light fixtures were previously located.

Restrooms have newer 2x4 acoustical tiles, these are in good condition.

The kitchen area has acoustical tiles as well. However, by code, kitchens are required to have "scrubbable" ceiling tiles. The existing ceiling tiles do not comply with this requirement.

The gym and cafetorium have wood ceilings with wood beams; these ceilings are in generally good condition.

Specific Issues

- Areas of original acoustic ceiling tile (1x1) in classrooms and offices are in fair to poor condition. Some ceilings are cupping or releasing from grid and show damage at the edges.
- Kitchen ceiling does not meet current code for "scrubbable" ceiling tiles

Bulleted List of Recommendations

- Replace 1x1 ceiling tiles throughout the school
- Replace kitchen ceiling tiles with acceptable tiles for food service areas
- Review sources of water and moisture staining above ceiling

Image 38

Image 38

Image 39

DOORS & WINDOWS

Most interior doors are wood with hollow metal frames. These include doors to classrooms, offices, and storage areas, as well as a few of the corridor doors. The wood doors vary in style and many have vision panes. Doors between classrooms are solid wood. Most wood doors are in fair condition. Many show signs of wear and most have non-accessible hardware and locking devices. Corridor doors are hollow metal and have been retrofitted with 'hold-open' devices tied to the fire alarm system. These

Image 40

Image 41

Image 42

Image 43

doors are in good condition and have operable hardware. Modular classrooms have hollow metal doors with panic release hardware. These doors are in good condition. Door frames throughout are in good to fair condition, some rusting has occurred at the base of the frames.

The interior borrowed lights have hollow metal frames and a combination of clear and wired glazing throughout the building. Wire glazing is no longer allowed in schools. It is recommended that this glazing is replaced

Specific Issues

- Most doors and frames are original and are in fair condition.
- Doors and interior glazing contain wired glass that no longer meets code.
- The Admin office hollow metal frame storefront / borrowed lite system has wired glass. (Image 44)

Recommendations

- Renovate all classroom doors to have upgraded hardware including levers and locking devices
- Repair / refinish classroom doors
- Remove wire glazing from doors, sidelights and other interior glazed locations
- Remove all wired glass panels from the interior doors and replace with tempered glass during a larger renovation or if the door is otherwise in need of replacement.

FIXTURES & FURNITURE (BUILT IN)

Corridors are lined with open space cubbies and hooks for students. These fixtures appear to be original to the building and are in good condition. Some water staining has occurred along the bottom shelf, most likely from the placement of wet coats and items on the shelf.

Classrooms have built-in metal shelving with sliding doors that is also original to the building. This shelving is in good condition in most classrooms, however some sliding doors are difficult to move. Some metal shelves have dented due to use and should be replaced.

Several classrooms have wood casework base cabinets with sinks. Many of the base cabinets have been replaced

with newer bases, countertops and sinks. These are in good condition.

Specific Issues

- Staining on bottom shelf of coat cubbies
- Dented metal shelving
- Dented sliding metal doors.

Recommendations

- Refinish cubbies and provide protective material on base shelf
- Repair / replace dented metal shelving and sliding doors

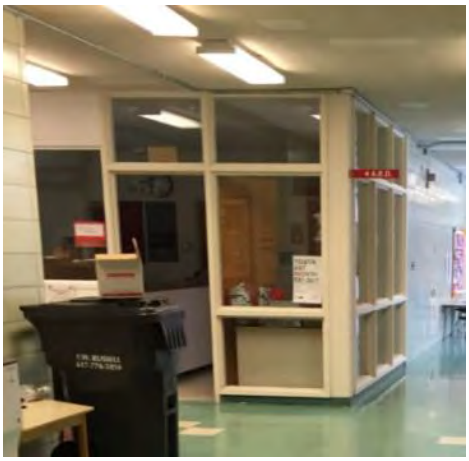


Image 44

FUNCTIONAL USE OF SPACE

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

At the South Row School many areas are inappropriate for the function they are serving. This is evident with vestibules acting as teaching spaces and small group learning (image 48). Corridors are used for storage, and storage closets are used as office space.

Image 45

Specific Issues

- Small group teaching in hallway and vestibule spaces
- Multiple teachers sharing one space
- Large storage in hallway
- Former storage closets used for teaching spaces
- Storage located in front of electrical panels

Image 46

Recommendations

- Provide additions and renovations to meet student and teacher space needs.

Image 47

Image 47

Image 48

Image 49

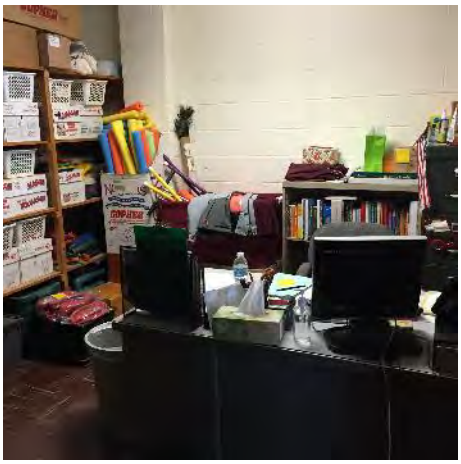


Image 50

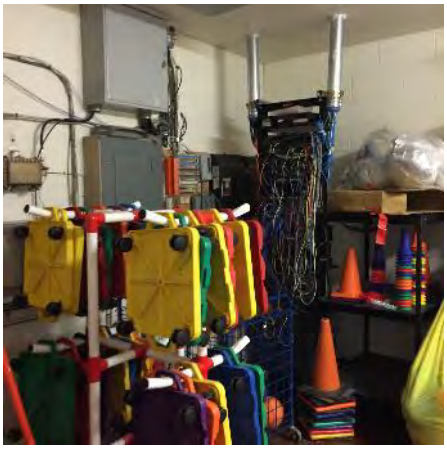


Image 51

CIVIL ENGINEERING ASSESSMENT

Nitsch Engineering has performed research of the existing site conditions at the South Row Elementary School located at 250 Boston 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 South Row Elementary School is located at 250 Boston Road, Chelmsford, Massachusetts. The site is bounded by Boston Road to the south, Aldersgate United Methodist church to the west, Mill Road and residential areas to the north, and Hoyt Drive to the east.

There are two paved driveway entrances to the site along Boston Road. There is a driveway through the site that runs from Boston Road through the site to Mill Road. There is a parking lot to the west of the building along the driveway.

There are tennis courts and play fields along the eastern side of the site along Hoyt Drive and a playground on the north side of the site.

EXISTING SITE UTILITIES

Storm Drainage

Chelmsford GIS shows that there are no public closed drainage systems in the Boston Rod adjacent to South Row School. The GIS shows a drainage system towards the northern section of the driveway through the site adjacent to Mill Road. There is a closed drainage system in Mill Road.

Stormwater runoff from the roof appears to be collected through the building or through downspouts that discharge to a below grade closed drainage system. There are a few downspouts that drain at grade from the overhang to the main entrance of the building (Image 1).

Image 1

Image 2

Image 3

Image 4

Image 5

Image 6

Image 7

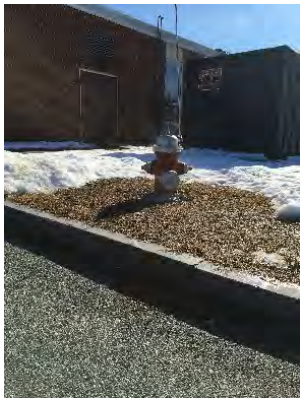


Image 8

There is a modular building to the east of the permanent building. Stormwater runoff drains towards the building and some of the ground surface beneath the modular building has started to erode away (Image 2).

Stormwater runoff from the paved parking lot to the west of the building and the driveway entrances to the south of the building is collected in catch basins and likely discharges to the stormwater system in Mill Road.

There is some ponding on site in the paved areas to the north and east of the permanent building (Image 3 and 4). Ponding and runoff has caused some erosion along the pavement edge along the east side of the building (Image 4 and 5).

SEWER

There are Town sewer mains in Mill Road and Boston Road adjacent to South Row Elementary School. Town GIS shows sewer in the northern part of the driveway that cuts through the site. The sewer flows to the town sewer system in Mill Road.

A sewer manhole was observed in the parking lot at the northwest corner of the building and likely connects to the sewer in the driveway (Image 6).

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.

There is a water main in Boston Road that the site water services likely connect to. Water valves were observed in front of the South Row School Building in Boston Road (Image 7).

One fire hydrant was observed on site and one fire hydrant was observed along Boston Road directly adjacent to the site. The hydrant on site is located along the south end of the western face of the building (Image 8).

NATURAL GAS

There is a gas meter located along the south end of the west face of the building near the mechanical and electrical rooms. A generator was also observed along the west face of the building. No gas valves were observed on site. Gas service for the building likely connects to a gas main in Mill Road or Boston Road.

ELECTRICAL

There is electrical equipment located along the southern end of the west face of the building. Electrical services enter the building along the west face of the building (Image 9).

Image 9

The modular building appears to have its own electrical services. Overhead wires go from a utility pole on Boston Road to a utility pole on site to the south of the modular building. The wires then connect to the modular building (Image 10).

Image 10

EXISTING SITE CONDITIONS

SOILS

Based on the Natural Resources Conservation Service (NRCS) Middlesex County Soil Survey the site of the South Row Elementary School property is on soil classified as Udorthents (sandy) and Windsor loamy sand.

PAVEMENT/CURBING

The asphalt pavement within the site is in generally fair condition with some areas of cracking and degradation. There is some accumulation of sediment in paved areas onsite and some areas of ponding/icing (Image 3, 4, and 11). Pavement edges are degraded in areas of the site with no curbing (Image 12)

Image 11

Walkways onsite are asphalt or concrete and are generally in fair condition with some areas of cracking/degradation. There are some areas of ponding. Walkway edges are degraded in areas of the site with no curbing. (Image 13).

Curb onsite is generally vertical granite curb although there is some concrete curb along the walkways to the south of the building. The vertical granite curb is generally in good condition (Image 13).

Image 12

Image 13

Image 14

PLAYFIELDS

The playfields at the South Row Elementary School include two basketball and four tennis courts. All of the courts are asphalt and are in good condition. There was no cracking or puddling on the courts and the infrastructure (backboards, nets, fencing) was all in good condition. There are no lights on any of the courts or adjacent fields. The field appears to be able to accommodate two full sized soccer fields. The grass fields were in good condition with good grass coverage and appear to be well drained.

PERMITTING CONCERNS

The South Row Elementary School does not appear to be within a wetland buffer zone or a FEMA flood zone. The site is within a Zone II Wellhead protection Area.

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.
- Install drains or curbing to prevent erosion along edge of pavement.
- Install drains or regrade to avoid erosion underneath the modular building.

STRUCTURAL – SOUTH ROW ELEMENTARY SCHOOL

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 and available drawings of renovations and additions constructed in 2006. During the visit we did not remove any finishes or take measurements; so, our understanding of the structure is limited.

EXISTING CONDITIONS

The original South Row Elementary school is a one-story structure constructed in the 1960's. A later renovation was completed in 1993. Modular classrooms were added in 1993.

We observed interior masonry partition walls and noted light vertical cracks.

We observed site water runoff draining toward and under the modular classroom structure. We were not able to observe the underside of the modular structure. Concrete pads at exterior doors exhibited spalls and missing railings. We did not observe any reinforcing in the pads. At one railing post base, we did not observe anchors.

On the main building façade, we observed water staining. We observed vertical control joints and noted deterioration to the joint material. Just above ground level, we observed deterioration to the masonry façade joints and in other locations we observed cracked and spalled concrete foundations. Over doors and windows, we observed steel loose lintels and noted peeling paint and light deterioration due to moisture.

We observed a steel canopy on the street-side of the building and noted light rusting and deterioration of the post-bases.

The loading dock exhibited signs of past repairs.

RECOMMENDATIONS:

There are none at this time

MECHANICAL ASSESSMENT

The South Row Elementary School was built in 1962 and is a steam heated building. For the most part all the equipment, with the exception of the boiler plant and the unit ventilators, are all original to the building. The boiler plant was replaced in 2003. The unit ventilators and cabinet unit heaters in the early 1990's. The school mostly consists of unit ventilators for all the classroom spaces, Cafeteria and the Gym with perimeter slopetop finned radiation for all other areas. Steam is distributed through utility tunnels located along the perimeter of the building. The administration area and Nurse's office are cooled by a ductless heat pump system. Exhaust air is provided throughout the building through the use of roof mounted exhaust fans. The buildings overall temperature control system is handled by Novar DDC controls for the boiler plant, unit ventilators, cabinet unit heaters and exhaust fans. Finned radiation is controlled by the original pneumatic controls.

Image 1: Steam Boilers

Image 2: Condensate Receiver/Feedwater Tank

COOLING PLANT

The building is not provided with a cooling plant. The Administration Area and Nurse's Office are cooled by wall mounted ductless air conditioners/heat pumps served by a single condensing unit mounted at grade The portable classrooms are cooled and heated by a Bard wall mounted air conditioner with electric heat.

HEATING PLANT

There are two (2) gas fired cast iron steam boilers, manufactured by HB Smith, model 28A, 13 section each with an input capacity of 4180 MBH and a gross output capacity of 3297 MBH producing 5 psi low pressure steam. (Image 1) Each boiler is fired by a Powerflame model C3-G-25 power burner firing natural gas. These two boilers were installed in 2003 and are in fair condition. Boiler B may have a slight leak, as it is wet under the boiler. Each boiler is provided with dual low water cut-offs and all operating and safety controls. Each boiler operates using its own controls. The steam distribution piping is schedule 40 black steel and is insulated with what appears to be fiberglass insulation.


Image 3: Cracked & Leaking Condensate Pump Casing


Image 4: Open Condensate Receiver Vent


Image 3 : Water Seeping Out of Boiler B

The condensate piping is schedule 80 black steel and is insulated with what appears to be fiberglass insulation. There is a pressure reducing valve and bypass on the steam header. Steam traps consist of a mixture of newer orifice traps and older F&T traps. The boilers are vented by double wall piping tied into the original common steel breeching that vents to a masonry chimney.

Combustion air is brought into the boiler room through a wall mounted louver, which consist of an open ended duct that terminates 2 ft above the floor. The opening is dampered using electric actuators. An exterior door to the boiler room also has an open door louver that provides combustion air. The current combustion air duct sizes appear to be adequately sized for this boiler plant. The boiler room was originally heated and ventilated by a horizontal heating and ventilating unit mounted high at the ceiling. We were unable to determine whether this unit is operating. There is no exhaust out of the boiler room. The condensate receiver/feedwater tank has pumps that have been replaced in the last 5 years or so (Image 2). One of the casings on one pump is cracked and is leaking. (Image 3). That pump should be immediately replaced. The vent for the feedwater tank vents vapor into the boiler room. That vent should be extended to outdoors to eliminate humidity in the boiler room (Image 4). There are also remote duplex condensate receivers, located in the steam tunnels, to pump condensate back to the boiler room. The blowdown cooler is not operable, as the piping is severed. The electric room off the boiler room has no ventilation.

Specific Issues:

1. Replace condensate pump with cracked casing
2. Investigate source of water emanating from under Boiler B (Image 5).
3. Extend condensate receiver vent piping to exterior of building. (Possibly use abandoned generator stack).
4. Add ventilation to electric room.
5. Restore piping to blowdown cooler or replace

blowdown cooler.

Recommendations:

1. Boilers should be regularly blown down to remove sediment and discharged through a blowdown cooler so as to not adversely affect the plumbing system.
2. Replace steam traps under preventive maintenance schedule, especially the older F&T traps.
3. Any and all sections of piping insulation that is missing should be replaced
4. Evaluate the steam condensate piping system and replace the sections that have deteriorated due to corrosion and age.

AUTOMATIC TEMPERATURE CONTROLS

Major building systems are controlled by a Novar direct digital control system that was upgraded in 2014. (Image 6) The DDC system controls start/stop of the boilers and exhaust fans and provides full temperature and damper control of unit ventilators and cabinet unit heaters. Exhaust fans control serve the gym, cafeteria, library and classroom central exhaust. The DDC system controls boiler start/stop, gas valve modulation and system steam pressure with inputs for boiler alarms. Most of the finned tube radiation is controlled pneumatically. The DDC system controls night setback for the pneumatic system. The controls compressor is an older Quincy 25 gal simplex compressor. (Image 7) There is no air dryer to treat the control air leaving the compressor. Control air runs through a piece of garden hose to tie the pneumatic/electric switches on the main DDC panel to the P/E switches in the central fan contactor control cabinet. (Image 8) There are many pneumatic thermostats located throughout the building that have been abandoned in place. (Image 9)

Image 4*:* DDC Controls

Image 5: Controls Air Compressor

Image 6: EF Controls Cabinet Fed with Garden Hose

Image 7*:* Pneumatic Thermostat

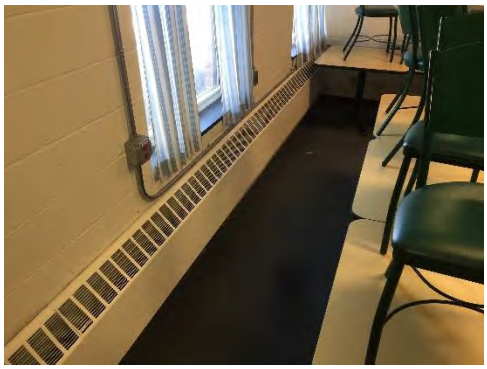


Image 10: Typical Slopetop Finned Radiation

Image 11 : Admin Area Ductless Heat Pump

Image 8– Admin Area Outdoor Condensing Unit

SPECIFIC ISSUES:

1. The pneumatic control system has been problematic requiring excessive maintenance. The remainder of this system should be replaced with DDC controls.
2. Replace garden hose supplying air to exhaust fan control panel with suitable piping.

ADMINISTRATION

The Administration Area is heated by perimeter slopetop finned radiation and generally controlled by wall mounted pneumatic thermostats. (Image 10) The Main Office and Principal's Office are controlled by DDC wall sensors. Each room is ventilated by operable windows and a ceiling exhaust register tied into a central rooftop exhaust fan. The Main Office, Principal's Office and Nurse's Office are cooled by Daikin wall mounted ductless heat pumps tied into a 2 ton condensing unit mounted at grade. (Image 11 & 12) The Coach's Office is ventilated by a ceiling exhaust register. The network server equipment is located in the Coach's Office, which, with no cooling, overheats the office at times.

Specific Issues:

1. Network head end room/coach's office overheats.

Recommendations:

2. Add air conditioning

Cafeteria

Three wall mounted vertical unit ventilators serve the cafeteria. These units provide fresh air through the use of a through wall louver system which is ducted to the back of the unit ventilator. Within the unit is a supply fan, steam coil, face and bypass damper filter rack and outside/return air dampers. Each unit ventilator is controlled via a DDC wall mounted sensor. The unit ventilators are functioning and are in good condition. The Cafeteria has ceiling paddle fans to enhance air movement. Air is exhausted via low exhaust grilles located on both sides of the stage that tie into a rooftop exhaust fan.

Image 13: Kitchen Hood

The Stage is heated by perimeter slopetop finned radiation controlled by a pneumatic thermostat.

The Faculty Dining Room is heated by perimeter slopetop finned radiation. It is cooled by a portable air conditioner that exhausts hot condenser air to the ceiling plenum. This room is exhausted by a ceiling register.

Image 9: Slid Gates Inside Kitchen Hood

KITCHEN

The kitchen functions as a warming kitchen. The hood has no Ansul fire suppression system. (Image 13). The hood has an interior panel with adjustable slide gates to adjust airflow through three slide gate openings. (Image 14) The open ended stack for the gas-fired ovens terminates under one of these openings. Partial make-up air is supplied via a horizontal ceiling mounted unit ventilator which draws in fresh air through a roof vent. The remainder of the hood make-up air is transferred from the cafeteria via open doors. The kitchen office is heated by inverted slopetop finned radiation mounted high on the wall, controlled by a pneumatic thermostat. The office is exhausted by a ceiling register.

Specific Issues:

1. The kitchen hood is starved for make-up air when all the kitchen doors are closed.

Image 10*:* Typical Classroom Unit Ventilator

Recommendations:

1. Install transfer grilles on the common wall between the kitchen and cafeteria so make-up air can be pulled in from the cafeteria.
2. Install a new kitchen hood, ductwork, rooftop exhaust fan and variable speed demand control kitchen hood control system. This system monitors the heat and smoke given off by cooking processes and adjusts hood airflow to compensate. When little cooking is taking place, the hood runs at reduced airflow saving energy.

CLASSROOMS, LIBRARY & GYM

Image 16: Gymnasium Unit Ventilator

Single wall mounted vertical unit ventilators are provided in each classroom, in the library and in the gymnasium. (Image 15) Four wall mounted unit ventilators are provided in the Gym. (Image 16) These units provide fresh air through the use of a through wall louver system which is ducted to the back of the unit ventilator. Within the unit is a supply fan, steam coil, face and bypass damper filter rack and outside/return air dampers. Each unit ventilator is controlled via a DDC wall mounted sensor. The unit ventilators are functioning and are in good condition. Maintenance staff report that there is excessive air infiltration around the louvers on the unit ventilators.

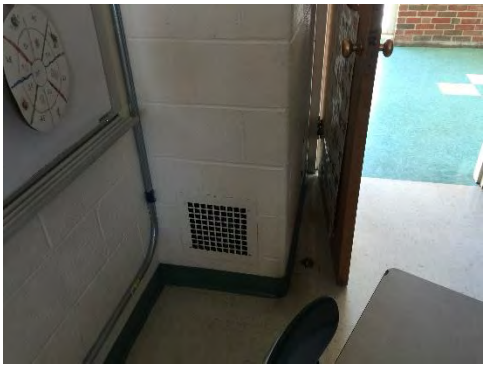


Image 17*:*Typical Low Classroom Exhaust Register

Each classroom and the library are provided with a low wall mounted exhaust register which communicates to a roof mounted exhaust fan through a galvanized sheet metal duct collection system. (Image 17) The gym is provided with two low wall mounted exhaust registers tied into a roof mounted exhaust fan.

Specific Issues:

1. Excessive infiltration around unit ventilator louvers.

Recommendations:

1. Seal around unit ventilator louvers/connecting ductwork.
2. Continue to provide routine maintenance on all the

unit ventilators such as motor and shaft lubrication, filter changes and coil cleaning.

Exhaust Systems

Throughout the building, general exhaust is provided through the use of roof mounted exhaust fans. These fans are primarily located on the roof. All the fans are associated with their own independent galvanized sheet metal duct distribution systems and all terminate within the spaces with ceiling or wall mounted grilles. The fans appear to be original to the building and appear to have reached the end of their serviceable life. Maintenance staff report that the fans are either missing back draft dampers or the dampers are stuck open, which allows cold air to infiltrate the building when the fans are off.

Specific Issues:

1. Roof fans are obsolete

Recommendations:

1. Replace fans.

Common Areas

The common areas such as corridors, vestibules, restrooms and lobbies are provided with supplemental heat through the use of wall/ceiling mounted cabinet unit heaters and fin tube radiation. Each component appears to have an original wall mounted pneumatic thermostat associated with it, however, it's unclear as to whether or not the thermostat is functioning. The corridors have minimal wall mounted exhaust registers to provide ventilation.

Specific Issues:

1. In the orange wall boy's bathroom, the thermostat is missing and control air is leaking behind the plexiglass cover over the hole in the wall.

Image 11 : Portable Classroom Walk Mounted Air Conditions

Recommendations:

1. Replace missing pneumatic thermostat and install behind vandal proof cage.
2. Provide routine maintenance on all unit heaters such as motor and shaft lubrication, filter replacement and coil cleaning.

PORTABLE CLASSROOMS

The portable classrooms are cooled and heated by a Bard wall mounted air conditioner with electric heat. (Image 18) Supply air is distributed to ceiling diffusers via an insulated sheetmetal duct system. Return is low on the wall. The units are controlled by non-programmable thermostats.

Recommendations:

1. Replace portable classroom units with a permanent well insulated addition to the building, heated by the building's gas-fired steam heating system. If the portable classrooms are to remain in use, the wall mounted units should be replaced with heat pump style units to minimize electric heating by capturing heat from the surrounding air.

ITEMS TO BE ADDRESSED IMMEDIATELY

1. Replace condensate receiver pump with cracked casing.
2. Investigate source of water under boiler B.
3. In the orange wall boy's bathroom, stop control air leak.
4. Replace the garden hose air line serving the exhaust fan contactor cabinet.
5. Pipe condensate receiver vent to outside to reduce humidity and corrosion in the boiler room.
6. Seal around unit ventilator louvers/connecting ductwork to reduce infiltration and energy loss.
7. Add backdraft dampers or motorized dampers at roof fans to reduce infiltration and energy loss. Possibly do a part of fan replacement.

ELECTRICAL ASSESSMENT

POWER DISTRIBUTION SYSTEM

The three phase primary service runs overhead on the same side of the street as the building where it transitions to underground at Pole # 79 and runs into a transformer vault in one 4" conduit. The vault has exterior access to NGrid only. Secondary service is rated at 1200 amperes, 120/208V, 3ϕ, 4w. The switchboard was manufactured by Westinghouse and is original to the 1962 building and is in poor condition. Most other panels are also original Westinghouse and are generally full and in poor condition. Newer GE panelboards have been added for receptacle upgrades during the 1997 renovations and are generally located in corridors and in good condition. Mounting space exists for additional breakers.

Figure 1 – Switchboard

The electric room doors swing out but are not equipped with panic hardware, currently required by code.

A second electric service was provided for the portable classrooms and is rated at 400 amperes, 120/240V, 1ϕ, 3w. The service runs overhead from Pole #81 to a building mounted meter combination enclosure with two 200A/2P breakers.

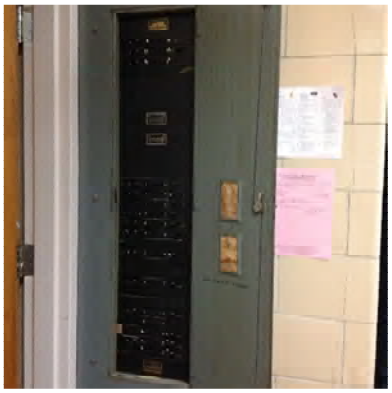


Figure 2 – Kitchen Panel

Each of two portables has a dedicated 150 amp main circuit breaker flush panelboard (Loadcenter) manufactured by Cutler-Hammer. Panels have two mounting spaces and are in good condition.

A third 100 amp, 120/240V, 1ϕ, 3w service is also mounted at the portables in a locked enclosure. The service runs underground from Pole #181/1.

Figure 3 – Panel in Corridor

Recommendations:

- The multiple services should be replaced with a single new service. The vault transformers should be replaced with an exterior pad mounted transformer. The original panelboards should be replaced with new panelboards housed in dedicated electric rooms.

Figure 4 – New Corridor Panel

Figure 5- Portable Meter/Breakers

Figure 6 – Electric Meter #3 on Portables

- The newer panelboards may be reconnected to the new switchboard and reused.

INTERIOR LIGHTING:

The corridor lights consist of 1x4 surface wraparound fixtures with acrylic lens and two T8 lamps. Corridor lights are controlled with central switches located in vestibule. Three HID mini-floods are located in lobby to highlight the display board.

Typical classroom has three rows of 1x4 surface wraps with two T8 lamps. Fixtures are controlled by row with three switches and by a wall occupancy sensor.

The gym and cafetorium have 2x4 fluorescent high bays with four T5HO lamps with lens and wire guard and integral occupancy sensors.

The kitchen has 1x4 surface wraps with T8 lamps and local switches. The hood has globes with compact fluorescent lamps with wire guards.

Stage/platform has surface wraps with two T8 lamps for house lights. Par lamp holders with halogen lamps are used for performance lighting; switch controlled locally. Switch height exceeds ADA mounting standard of 48" AFF.

Administration offices have recessed 1x4 fixtures with two T8 lamps with micro-cube louvers controlled with local switches.

Toilet rooms have wraps with two T8 lamps on a local switch.

The lighting in general is in fair to good condition. Fixtures have been replaced with wraps with T8 lamps and electronic ballasts. The existing wiring and switches were reused however. The ceilings consist of concealed spline and are not easily accessible.

The facility does not have an automated lighting control system.

Exterior Lighting

The exterior parking areas are lit with tapered aluminum poles with LED cobra heads.

The covered walkway has surface LED fixtures.

Figure 7 – Corridor Lights

Emergency Standby System

The facility has an exterior Olympian G100F3, 100kW, 120/208V, 3ϕ, 4W natural gas generator within a weatherproof enclosure. An ASCO, 200amp automatic transfer switch and panel are located in the boiler room for optional standby loads. The ATS is monitored by the fire alarm system.

A second 200amp ATS fed with MI cable is located within an emergency closet. The ATS feeds a remote panel for emergency lighting, located in the main electric room and other panels in non-rated spaces.

Figure 8 – Classroom Lights

The emergency lighting consists of a system of “Emergency Only” fixtures that are normally OFF. The gym has four “Emergency Only” par holders with incandescent lamps.

The local panel in the platform is a split-bus panel.

Exit signs generally do not have battery backup.

Exits signs in the Gym do not have wire guards.

There are no emergency lights at exterior doors.

The generator and automatic transfer switches added during the renovation are in good condition, however, beyond the transfer switches, the equipment is original and is in poor condition and not code compliant for life safety systems.

Figure 9 – Gym Lights

Recommendations:

- The original emergency system equipment should be replaced under a renovation program.

Fire Alarm System

The fire alarm system consists of an FCI E3 Series addressable control panel located in the main office.

A remote LCD annunciator is located in the main vestibule. A

local Energy Master Box #12 with lever is located at the main entrance. A knox box is located adjacent to the master box. A red strobe for general alarms is located over the knox box.

Smoke detectors exist throughout the facility for full coverage. Heats exist in boiler room, kitchen, platform and toilet rooms. Gym and Cafetorium have beam detectors.

Horn/strobes exist throughout the facility. Classrooms have strobe only signals. Current codes require voice evacuation in lieu of horns for pre-K -12 occupancy.

Pull stations exist at exterior doors with tamperproof covers.

The fire alarm system offers fair coverage and is in good condition.

Recommendations:

- Add a voice evacuation panel and replace horns with speakers for voice evacuation under a renovation program.

Figure 13 – Platform Switches

Figure 14 – Pole Lights

COMMUNICATIONS/SECURITY/MISCELLANEOUS

The facility has a recently installed roof mounted ballasted Photo Voltaic system connected to the grid.

Two 75kW, Solectria Model PVI-75-208 inverters are located on the exterior. A 600 amp SQ D PV main disconnect switch is located on exterior of building.

Telephone and cable TV originate at Pole #80 and enter the building underground in one 3" conduit to the MDF rack in the Gym office. Fire alarm originates at same pole and runs in 1" conduit to the master box with IMSA cable.

Fibre originates at Pole #81 and runs underground in one 4" conduit to the MDF rack in the Gym office.

Figure 15 – Covered Walkway Fixtures

The data cabling infrastructure is generally CAT5. The MDF rack is located in the Gym Office. The rack is not located within a conditioned dedicated room. Wireless access nodes exist throughout school. Typical classroom does not have data outlets except at teacher's station.

The school is connected to the District WAN via fibre. Cables in the MDF room are not neatly dressed.

The paging system console, located within the MDF Room, is a Rauland Telecenter MZ300, rack mounted. Paging is through a desktop digital telephone handset. Paging speakers exist throughout the school including classrooms. Each classroom has a desk mounted telephone handset to communicate with the Main Office.

The Cafetorium has a local sound system with two loud speakers. Each classroom is equipped with a sound reinforcement system. Projectors are wall mounted.

The Standard 1462 master clock system controller is located in the Main Office. A clock is located in each classroom.

There is an Aiphone video/intercom station at the Main Entrance, with two desk mounted stations with door release. CCTV exterior cameras exist with a monitor in the Main Office.

Corridors have intrusion system passive infrared, PIR sensors. A Honeywell keypad is located at the Main Lobby and Receiving.

The facility does not have a lightning protection system.

The receptacle coverage is fair in most spaces. Typical classroom has seven duplex receptacles. Kitchen receptacles are sparsely located and are not GFI protected.

The facility does not have a bi-directional antenna system used to enhance communications with portable radios by First Responders.

Figure 16 – Generator

Figure 17 – Optional ATS & Panel

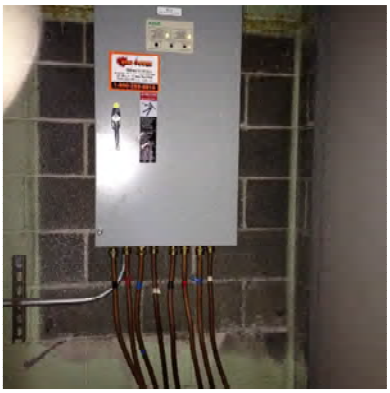


Figure 18 – Emergency ATS

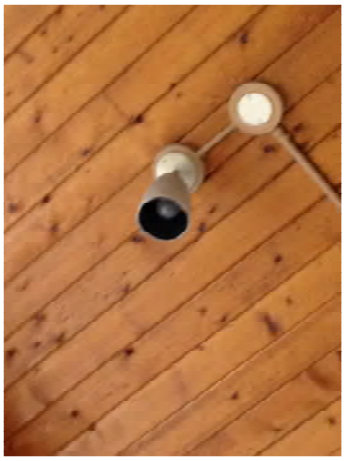


Figure 22 – Emergency only Fixture in Gym

Figure 19 – Pull Station & Horn Strobe in Gym

Figure 23 – FACP in Main Office

Figure 20 – Roof PV Panels

Figure 24 – Annunictor in Vestibule

Figure 21 – Exterior PV Inverters

Figure 25 – PV Main Disconnect

Figure 28 – Video/Intercom at Main Entrance

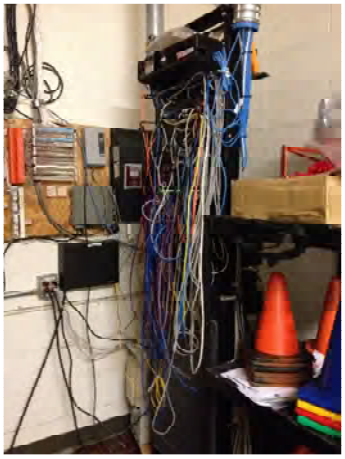


Figure 26 – MDF Rack in Gym Office

Figure 27 – Master Clock Controller

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 wall hung vitreous china with automatic sensor type flush valves. (Figure 1)

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

Lavatories are wall hung vitreous china. The lavatories are fitted with sensor type faucets. (Figure 3)

Utility sinks are wall hung enameled steel sink with wall mounted faucet. Faucets are not equipped with vacuum breakers. (Figure 4)

Drinking fountains are a mix of stainless steel wall mounted push bar type and recessed vitreous china push button type. (Figure 5, Figure 6, Figure 7)

Classroom sinks are counter mounted stainless steel with hot & cold water handle faucets and equipped with a push button bubbler. (Figure 8)

Art sinks are counter mounted stainless steel with hot & cold handle faucets and are not equipped with sediment traps. (Figure 9)

Teachers' Lounge sink is a counter mounted stainless steel sink with hot & cold water handle faucets and equipped with a waste ejector pump and an air admittance valve. (Figure 10), Figure 11)

Kitchen area fixtures are in fair/good condition. The 2 compartment pot washing sink is not piped to a grease interceptor. (Figure 12, Figure 13)

Figure 1 – Wall Hung Water Closet

Figure 2 – Wall Hung Urinal

Figure 3 – Wall Hung Lavatory

Figure 4 – Utility Sink

Figure 5 – Drinking Fountain

Figure 5 – Drinking Fountain

Figure 7 – Drinking Fountain

Figure 8 – Classroom Sink

Figure 9 – Art Sink

Figure 10 – Teacher's Lounge Sink

WATER SYSTEM

The domestic water service is located in the Mechanical Room. The service appears to be 3" in size and includes a meter. (Figure 14)

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

The building domestic hot water is generated through a gasfired storage type water heater. The water heater has a gas input of 77,000 BTUH and a storage capacity of 100 gallons. The hot water system is recirculated but no master mixing valve. (Figure 15, Figure 16)

GAS

Building is serviced by natural gas. The gas meter is located along exterior of building. Gas service is 2" in size. (Figure 17)

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. (Figure 18)

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 good condition. (Figure 19, Figure 20) Smaller pipe sizes appear to be copper for waste.

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 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. (Figure 21, Figure 22, Figure 23)

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.

- 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 & urinal are compatible with current low flow flush valves.
- 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.
- Provide new high-efficiency gas-fired domestic water heater once the existing water heater has expired.
- Install expansion tank and mixing valve at water heater.
- Remove air admittance valve at waste ejector pump and vent per Massachusetts Plumbing Code.

Figure 11 – Waste Ejector Pump

Figure 12 – 2-Compartment Sink

Figure 13 – Kitchen Equipment

Figure 14 – Domestic Water Service & Meter

Figure 15– Gas Fired Water

Figure 16 – Hot Water Recirculating Pump

Figure 17 – Gas Service & Meter

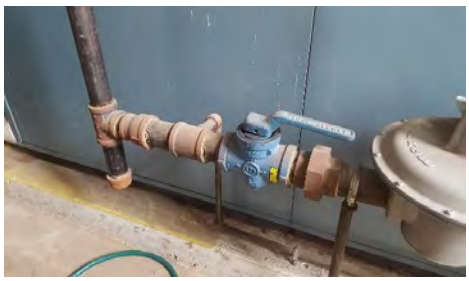


Figure 18 – Gas Piping

Figure 19 – Cast Iron Drainage Piping

Figure 20 – Cast Iron Vent Piping

Figure 21 – Pitched Roof & Downspout

figure 22 – Downspout onto Flat Roof

Figure 23 – Downspout to Below Grade

FOODSERVICE EQUIPMENT ASSESSMENT

The South Row Elementary School serves approximately 420 students in grades K through 4. As with some of the other lower schools the kitchen equipment appears to be more of a warming and serving kitchen with limited cooking capability.

The school's cafeteria kitchen serves the school lunch in two serving lines with a cash out station exiting at the center where the two lines meet. The serving and support equipment is mostly outdated. Some equipment has been covered with plastic and designated as broken. Floors and walls are constructed of the apprpriate materials but the ceilings are not complaint with current health code (Figure 2).

Figure 1

KITCHEN EQUIPMENT

The South Row kitchen is the most lacking when compared to health code standards. The original kitchen did not have a hand-washing sink in the design. Since the original construction a makeshift hand-washing sink has been added in what was once the dishwashing room. However, kitchens of this size should have a minimum two hand sinks. A reorganization of the entire kitchen is warranted.

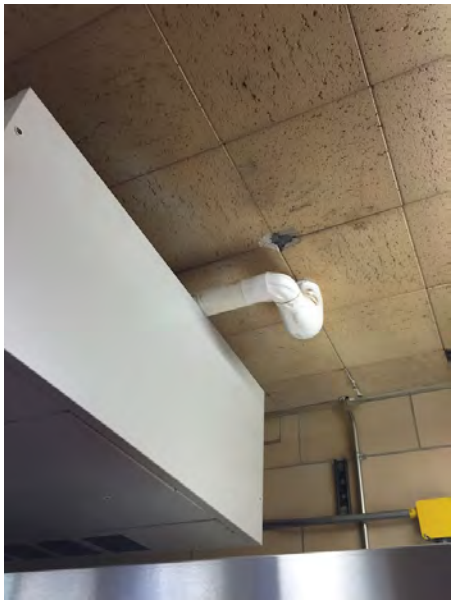


Figure 2

Another missing requirement is a dedicated food preparation sink. At minimum, a preparation sink is needed for washing fruits that are served whole, as well as other functions. For example, a bowl of apples where the peel is typically eaten should be washed in a dedicated preparation sink. The lack of a sink does not indicate that the washing is not taking place but it is unclear where that process takes place. Presumably it occurs in the pot-washing sink.

Lastly the pot-washing sink was originally a two bay sink. The health code requires a three bay sink so that one can wash, rinse and sanitize the ware that is being washed. Since the installation of the original sink a makeshift third bowl was added to the pot-washing sink. However, updated assembly lacks the required drain board mandated by the health code.

Figure 1

Figure 2

Non-Foodservice Table Figure 1:

- The table shown is not a foodservice appropriate table. It is not complaint with any health code, past or present.

Dish Room Figure 3:

- The dish room was converted into a storage room. This area is a secondary dry goods storage area to the original dry goods storage area.
- Within the converted dish washroom there is also a walk-in refrigerated room. This room is the only available bulk refrigerated storage available. All other points of refrigerated storage consist of well-worn reach-in cabinet within the kitchen.
- Lastly, the converted dish washroom has within it a sink that is used as the sole hand washing sink for the entire kitchen. A facility of this size requires at least two hand washing sinks.

Serving Figure 5:

- The food wells on the serving counter lack sneeze shields. Depending on how the food is served this may be a violation of the health code. If the food is open to air, meaning it is not in a sealed container, a shield must be used to protect the unwrapped product being served.

Recommendations:

1. Eliminate all wood surfaces and non-compliant tables and replace with appropriate stainless steel tables.
2. Consider adding a dedicated food preparation sink.
3. Replace the exhaust hood to better capture and contain the heat generated by the warming ovens.
4. Additional hand sinks are needed in order to promote frequent hand washing.
5. A pot sink with three continuous bowls and two drain boards is needed for code compliance.
6. As a stand alone full service kitchen we estimate a complete equipment fit out to cost approximately $350,000

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 South Row 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 cost 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

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

Type and Location of Material

1. Textured ceiling plaster at boiler room
2. 1' x 1' Acoustical ceiling tile at hallway
3. Expansion joint caulking at boiler room
4. Exterior unit vent grille caulking
5. Exterior door framing caulking

Samples Results

Type and Location of Material	Sample Result
1. Textured ceiling plaster at boiler room	No Asbestos Detected
2. 1' x 1' Acoustical ceiling tile at hallway	No Asbestos Detected
3. Expansion joint caulking at boiler room	No Asbestos Detected
4. Exterior unit vent grille caulking	2% Asbestos
5. Exterior door framing caulking	5% Asbestos

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. 9" x 9" Vinyl floor tile and mastic were either assumed or previously found to contain asbestos. The ACM was mostly found under newer vinyl floor tiles and carpet.
2. Hard joint insulation was previously found to contain asbestos.
3. Debris in crawl space was assumed to contain asbestos.
4. Old flange gasket on boiler was previously found to contain asbestos.
5. Insulation inside boilers was assumed to contain asbestos.
6. Exterior unit vent grille caulking was found to contain asbestos
7. Exterior door framing 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. Underground sewer pipe was assumed to contain asbestos.
11. 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.
12. 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.
13. 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.
14. 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.

15. 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	Multiple Layers of Vinyl Floor Tile and Mastic	42,000 SF	210,000.00
	Flange Gasket	1,000 Total	25,000.00
	Blackboards	Unknown	8,000.00
	Hidden ACM	Unknown	25,000.00
	Miscellaneous Hazardous Materials	Unknown	25,000.00
Boiler Room	Hard Joint Insulation	805 Total	3,500.00
	Flange Gasket	1,000 Total	25,000.00
	Boilers	2 Total	15,000.00
Crawl Space	Hard Joint Insulation	805 Total	3,500.00
	Flange Gasket	1,000 Total	25,000.00
	Debris	Unknown	15,000.00
Exterior	Doors	25 Total	2,500.00
	Expansion Joint Caulking	Unknown	25,000.00
	Transite Sewer Pipes	Unknown[1]	50,000.00
	Roofing Materials	42,500 SF	42,500.00
	Damproofing on Exterior/Foundation Walls	Unknown[1]	100,000.00
PCB's Remediation[2]			45,000.00
Estimated costs for ACM Inspection and Testing Services			8,500.00
Estimated costs for PCB's Testing and Abatement Plans Services[2]			25,000.00
Estimated costs for Design, Construction Monitoring and Air Sampling Services			71,500.00
		Total:	**750,000.00**

[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)

	SOUTH ROW 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)	Medium Priority (4-6 yrs)	Low Priority (7-10 yrs)	On Going Maintenance	Notes / Totals
	GSF 42,000													
1	**Site & Civil**													
1.01	Mill and overlay sections of pavement where cracking/degradation has occurred.			x					$30,360			**$30,360**		
1.02	Regrade paved areas to prevent ponding which can lead to ice patches in the cold weather.	x		x		x			$30,360			**$30,360**		
1.03	Install drains or curbing to prevent erosion along edge of pavement.					x			$9,715	**$9,715**				
1.04	Install drains or regrade to avoid erosion underneath the modular building.	x		x		x			$7,590	**$7,590**				
1.05	Provide crosswalks to connect to from the street sidewalk to the main sidewalk in front of the school	x	x						$20,493	x			**$20,493**	
1.06	Provide crosswalks from handicap parking spaces to the main sidewalk in front of the school	x	x	x	x				$6,831	x			**$6,831**	
1.07	Install accessible curb cut at main side walk	x	x	x	x				$2,277	**$2,277**				
1.08	Provide accessible paths to play fields	x	x	x	x				$13,662			**$13,662**		
	TOTAL									**$ 19,582**	**$ -**	**$74,382**	**$ 27,324**	**$ 121,288**
2	**Structural Elements**													
2.01	Replace joint material at vertical control joints.					x			$7,590				**$7,590**	
2.02	Repair or replace deteriorated masonry façade and concrete foundations.					x			$15,180		**$15,180**			
2.03	Sand and repaint lintels with exterior grade rust inhibitive paint.					x			$15,939		x		**$15,939**	
2.04	Sand and repaint steel canopy posts with exterior grade rust inhibitive paint.					x			$4,554		x		**$4,554**	
	TOTAL									**0**	**15180**	**0**	**$28,083**	**$ 43,263.00**
3	**Exterior Architectural Elements**													
3.01	Clean brick surfaces					x			$150,419				**$150,419**	
3.02	Repair sealants at windows as required					x			$25,047		x		**$25,047**	
3.03	Install flashing around vents					x			$3,795		x		**$3,795**	
3.04	Install screens at vents where missing					x			$1,518		x		**$1,518**	
3.05	Repair canopy over side entrance door	x		x		x			$7,590	x			**$7,590**	
3.06	Replace soffit under canopy	x		x		x			$15,180	x			**$15,180**	
	TOTAL												**$203,549**	**$203,549**

4	**Interior Architectural Elements**														
	4.01	Install a second hand-washing sink in the kitchen to meet code.	x	x						$9,108	**$4,554.00**		**$4,554.00**		
	4.02	Install sneeze shields at serving counter to meet code.	x	x						$1,139	**$569.25**	**$569.25**			
	4.03	Replace all wood surfaces and non-compliant tables in the kitchen with appropriate stainless steel tables.	x	x						$22,770	**$11,385.00**	**$11,385.00**			
	4.04	Install a dedicated food preparation sink.	x	x						$9,108	**$4,554.00**	**$4,554.00**			
	4.05	Replace the exhaust hood.	x		x					$18,216	**$9,108.00**	**$9,108.00**			
	4.06	Install a pot sink with three continuous bowls and two drain boards to meet code.	x	x						$13,662	**$6,831.00**	**$6,831.00**			
	4.07	Replace cracked VCT tile			x		x			$305,194				**$305,194**	
	4.08	Replace rubber flooring on handicap ramp			x					$1,139	x			**$1,139**	
	4.09	Replace VCT flooring on ramp in modular classrooms	x	x		x				$1,632	x			**$1,632**	
	4.10	Repair gym floor where missing seams and buckling has occurred			x					$68,006	x			**$68,006**	
	4.11	Replace carpet tile that are mismatched in the computer room and library			x					$20,948	x			**$20,948**	
	4.12	Replace wood flooring at stage and risers			x		x			$33,206			**$33,206**		
	4.13	Install proper handrail at stage	x	x	x	x				$1,518			**$1,518**		
	4.14	Install handicap lift or ramp to stage		x	x	x				$68,310			**$68,310**		
	4.15	Replace handrail at main ramp in corridor	x	x		x				$1,822			**$1,822**		
	4.16	Replace handrails at steps in corridor	x	x		x				$3,643			**$3,643**		
	4.17	Renovate front office counter to provide accessibility		x		x				$9,108			**$9,108**		
	4.18	Renovate restrooms to provide clear floor area at doors and proper clearances around fixtures		x		x				$63,756			**$63,756**		
	4.19	Install protection at all sink pipes per ADA requirements	x	x		x				$5,920	x			**$5,920**	
	4.20	Relocate restrooms accessories to meet ADA requirements		x		x				$47,362	x			**$47,362**	
	4.21	Install new drinking fountains throughout to meet ADA requirements	x	x	x	x				$15,180	**$15,180**				
	4.22	Repair gym walls and add protection pads	x		x		x			$58,018	**$58,018**				
	4.23	Repair interior brick walls cracks			x		x			$147,812	x			**$147,812**	
	4.24	Repair source of moisture infiltration causing efflorescence on brick	x		x		x			$22,770	x			**$22,770**	
	4.25	Replace ceilings throughout the building (with the exception of restrooms where ceilings have been replaced)	x		x		x			$422,012		**$422,012**			
	4.26	Review causes for moisture damage on ceiling tiles	x		x		x			$7,590		x		**$7,590**	
	4.27	Replace kitchen ceiling tiles with 'scrub able ceiling tiles'	x	x	x					$12,873	**$12,873**				
	4.28	Replace all wood doors with wire glazing - install new wood doors with proper glazing and hardware		x	x	x				$285,384			x	**$285,384**	

	4.29	Replace damaged hollow metal frames, (assumed 50% replacement)					x			$55,407			**$55,407**		
	4.30	Repair solid wood doors and replace existing hardware with ADA compliant hardware		x	x		x			$20,038	**$20,038**				
	4.31	Replace wire glazing sidelights and interior glass	x	x	x					$7,590			x	**$7,590**	
	4.32	Refinish existing cubbies			x		x			$8,425	**$8,425**				
	4.33	Replace damaged metal shelving and doors in classrooms			x		x			$44,022	**$44,022**				
		TOTAL									**$195,556**	**$454,459**	**$241,324**	**$921,347**	$1,812,686
5	**Mechanical - HVAC**														
	5.01	Boilers should be regularly blown down to remove sediment and discharged through a blowdown cooler so as to not adversely affect the plumbing system.			x		x			$1,518				**$1,518**	
	5.02	Replace steam traps under preventive maintenance schedule, especially the older F&T traps.	x		x		x			$7,590				**$7,590**	
	5.03	Replace all sections of piping insulation that is missing.			x		x	x		$15,180				**$15,180**	
	5.04	Evaluate the steam condensate piping system and replace the sections that have deteriorated due to corrosion and age.			x		x	x		$5,313				**$5,313**	
	5.05	Replace condensate pump with cracked casing.	x	x	x		x			$11,385					complete
	5.06	Find and repair source of water emanating from under Boiler B.			x		x	x		$3,795					complete
	5.07	Extend condensate receiver vent piping to exterior of building.		x			x			$1,518	x			**$1,518**	
	5.08	Add ventilation to electric room.	x				x			$6,072	**$6,072**				
	5.09	Restore piping to blowdown cooler.					x			$3,036	**$3,036**				
	5.10	Replace blowdown cooler.					x			$15,180	**$15,180**				
	5.11	The pneumatic control system has been problematic requiring excessive maintenance. The remainder of this system should be replaced with DDC controls.					x			$321,816		**$321,816**			
	5.12	Replace garden hose supplying air to exhaust fan control panel with suitable piping.	x		x		x			$1,822	x			**$1,822**	
	5.13	Add air conditioning to network head end room/ coach's office.	x	x	x		x			$18,216	**$18,216**				
	5.14	Install transfer grilles on the common wall between the kitchen and cafeteria so make-up air can be pulled in from the cafeteria.	x	x	x		x			$4,554	**$4,554**				
	5.15	Install a new kitchen hood, ductwork, rooftop exhaust fan and variable speed demand control kitchen hood control system.	x	x	x		x			$75,900	**$75,900**				
	5.16	Seal around unit ventilator louvers/ connecting ductwork.	x	x	x					$15,180		x		**$15,180**	
	5.17	Continue to provide routine maintenance on all the unit ventilators, such as motor and shaft lubrication, filter changes and coil cleaning.	x				x			$7,590		**$7,590**			
	5.18	Replace roof fans.			x		x	x		$53,130		**$53,130**			
	5.19	Replace the missing pneumatic thermostat and install a vandal proof cage.					x	x		$759	**$759**				
	5.20	Provide routine maintenance on all the unit heaters, such as motor and shaft lubrication, filter replacement and coil cleaning.					x			$7,590		**$7,590**			
	5.21	Replace the wall mounted units in the portable classrooms with heat pump style units, if portable classrooms remain in use.			x		x			$30,360			**$30,360**		
		TOTAL									**$123,717**	**$390,126**	**$30,360**	**$48,121**	**$592,324**

6	**Electrical**														
	6.01	Replace original panelboard that is in poor condition.	x				x	x		$258,060		**$258,060**			
	6.02	Install panic hardware at electric room doors as required by code.	x	x						$15,180	**$15,180**				
	6.03	Replace multiple electrical services with one new service.			x		x	x		$493,350		**$493,350**			
	6.04	Replace vault transformers with an exterior pad mounted transformer.					x	x		$75,900		**$75,900**			
	6.05	Install panelboards in dedicated electric rooms. Newer panelboards may be reconnected to new switchboard and reused.					x	x		$189,750		**$189,750**			
	6.06	Install light switches at stage/platform per ADA mounting standard.		x		x				$5,313			**$5,313**		
	6.07	Replace original emergency system equipment under a renovation program.	x	x			x	x		$159,390		**$159,390**			
	6.08	Install wire guards at exit signs in the gym.			x		x			$1,214	x			**$1,214**	
	6.09	Install emergency lights at the exterior doors.	x		x					$5,313	**$5,313**				
	6.10	Replace older ceiling mounted light fixtures			x			x		$288,420		**$288,420**			
		TOTAL									**$20,493**	**$1,464,870**	**$5,313**	**$1,214**	**$1,491,890**
7	**Plumbing**														
	7.01	Install new high-efficiency low flow fixtures (faucets & flush valves) to reduce water consumption. (If pitch of drains will allow.)		x				x		$189,750					complete
	7.02	Inspect with video to confirm integrity and correct pitch of drains.			x		x			$3,036				**$3,036**	
	7.03	Install new high-efficiency gas-fired domestic water heater when the existing water heater expires.			x			x		$27,324				**$27,324**	
	7.04	Install expansion tank and mixing valve at water heater.			x			x		$15,180			**clarify need**	**$15,180**	
	7.05	Remove air admittance valve at waste ejector pump and vent per MA plumbing code.		x						$3,036				**$3,036**	
		TOTAL									$0	$0	$0	$48,576	$48,576
8	**Fire Protection**														
	8.01	Install sprinklers throughout the building	x	x	x					$415,800			**$415,800**		
		TOTAL									$0	$0	$415,800	$0	$415,800
9	**Hazardous Material**														
	9.01	HazMat pricing - UEC report dated March 7th 2016							x	$1,035,000			**$1,035,000**		
	9.01	Remove and replace 9" x 9" Vinyl floor tile and mastic that were either assumed or previously found to contain asbestos. The ACM was mostly found under newer vinyl floor tiles and carpet.							x						
	9.02	Remove and replace hard joint insulation that was previously found to contain asbestos.							x						
	9.03	Remove and replace debris in crawl space that was assumed to contain asbestos.							x						
	9.04	Remove and replace old flange gasket on boiler that was assumed to contain asbestos.							x						
	9.05	Remove and replace insulation inside boilers that was assumed to contain asbestos.							x						
	9.06	Remove and replace exterior unit vent grille caulking that was previously found to contain asbestos.							x						

9.07	Remove and replace exterior door framing caulking that was previously found to contain asbestos.							x						
9.08	Remove and replace glue holding blackboard that was previously found to contain asbestos.							x						
9.09	Remove and replace underground sewer pipe that was assumed to contain asbestos.							x						
9.10	Remove and replace damproofing on exterior and foundation walls that was assumed to contain asbestos.							x						
9.11	Remove and replace roofing materials that was assumed to contain asbestos.							x						
9.12	Remove and replace painted surfaces that were assumed to be lead based paint.							x						
9.13	Remove and replace caulking materials that are assumed to contain PCBs.							x						
9.14	Replace various equipment such as tubes, thermostats, exit signs and switches that were assumed to contain mercury.							x						
	TOTAL								$1,035,000	$0	$0	$1,035,000	$0	$1,035,000

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