Parker Middle School

Dore & Whittier Architects Inc.

Parker Middle School

ARCHITECTURAL ASSESSMENT

GENERAL DESCRIPTION

The Parker Middle School, 75 Graniteville Road, was opened in 1967 and underwent a renovation / addition project in 2006. The renovation included updates the technology in classrooms, plumbing and lighting fixtures, fire alarm system, and provided a library addition.

The building is three-story structure, with a gross floor area of approximately 121,873 gross square feet and is situated on 27.8 acres.

The building is generally described as a concrete framed structure, with load-bearing interior and exterior walls. Expansion joints are utilized to segregate into multiple buildings, 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 sprinklers throughout all areas.

Current enrollment is approximately 717 students in grades fifth through eighth.

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

Image 1

Image 2

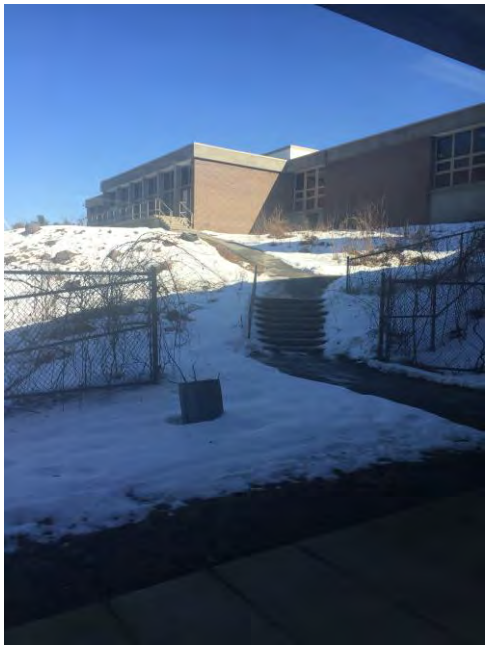

Image 3

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

At 105,000 square feet in area, a simple analysis of the building occupancy, construction type, and fire protection features, suggests that the building appears to significantly exceed the maximum allowable area for its construction type and primary use occupancy. As such, it is likely that any planned additions would require the addition of fire walls to subdivide the building, or the inclusion of a fire sprinkler system throughout in order to meet current code, MGL Chapter 148. The inclusion of a sprinkler system

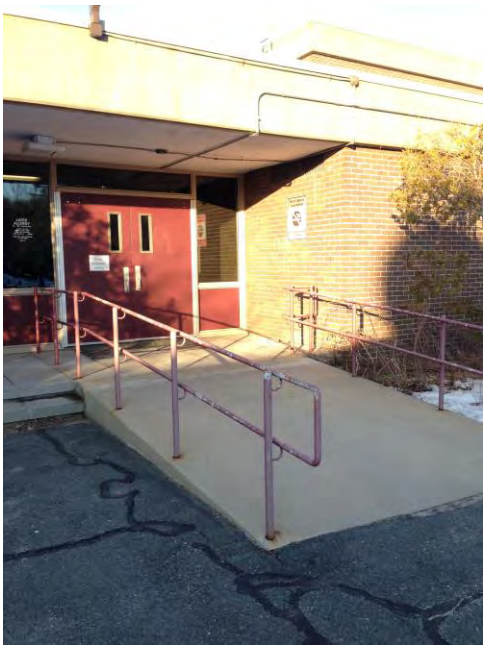

Image 4

Image 5

would also benefit the building height and area limitations previously noted.

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.

Based on the construction type, building area, and lack of sprinkler systems, the current code would require the different occupancy areas would be required to be separated.

Building codes have been modified since the building was constructed. While building codes allow the building to continue to be used for its current purpose without mandatory upgrades (unless specific items have been identified by the Building Inspector as being unsafe), school administrations and building owners often undertake renovations to bring facilities into compliance with current building codes. Any such renovations should consider the following code compliance measures as options:

- Structural upgrades triggered by additions and renovations
- Fire sprinklers system installation required with additions and renovations
- Handicap accessibility requirements triggered by upgrades

ACCESSIBILITY

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

EXTERIOR SITE AND BUILDING ENTRANCE

There is a large parking area with designated accessible parking spaces located near a rear entrance, and two accessible parking spaces are located and on an accessible path to the front door (Image 1). The front entrance provides a ramp with handrails for accessibility (Image 4).

Due to the steeply sloped landscape there are many areas and pathways around the building that are not accessible (Image 2 - 3). An enclosed lift provides access from the main level into the inner courtyard space and paved pathways provide access to areas within the courtyard (Image 5).

Many stairway handrails around the exterior of the building do not provide the proper handrail extensions (Image 6 & 7).

Image 6

An exterior wood ramp with wood handrails provides access to the "pod" classrooms. The handrail is not the correct shape or extension to meet ADA / MAAB requirements. If pod classrooms are replaced, this ramp and stairways should be replaced to meet accessibility requirements.

Image 7

INTERIOR SPACES

The building includes barriers to accessibility, as it does not include an accessible route throughout the building. The ground level north and south classroom wings at the main building are only reachable by stairs or by exiting and reentering the building through the courtyard. The installation of elevators is required to connect these lower level floors to the main level (Image 8).

The stair way connecting the main level and the lower levels do not provide the correct handrail extensions or the required "cane detection" to prevent a visually impaired person from hitting their head on the stair riser or landing (Image 8).

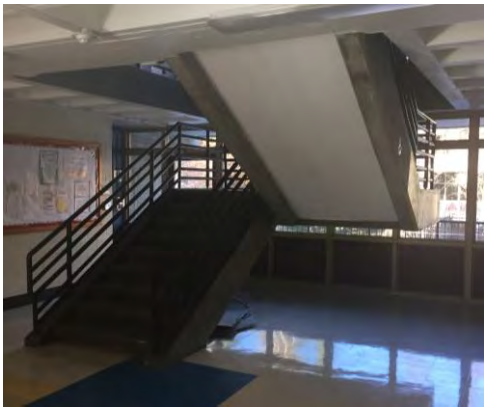

Image 8

In general, the handrails at each of the interior stairways do not meet the ADA / MAAB requirements (Image 9).

At the time of the study a lift was being installed to connect the main floor level to the TV studio.

Several restrooms were undergoing upgrades at the time of the study. In many locations where new fixtures and accessories were installed the installation meets current ADA / MAAB requirements. In a few locations the new

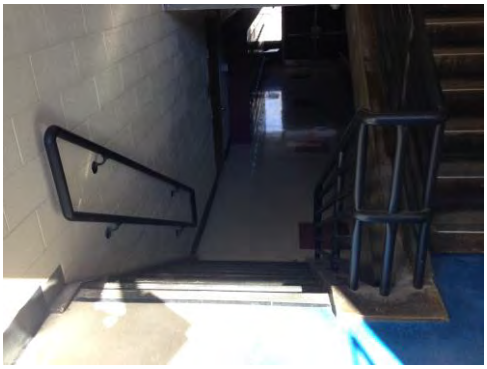

Image 9

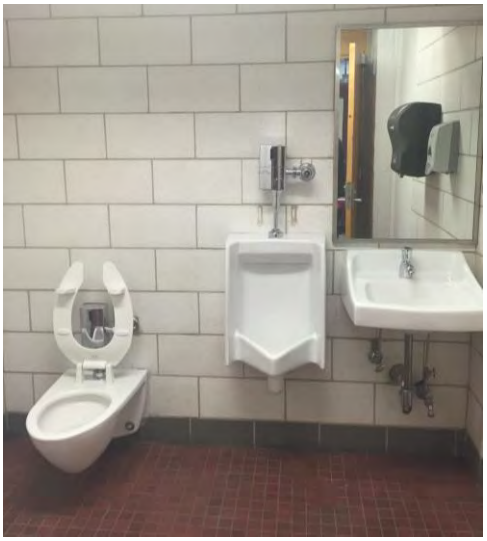

Image 10

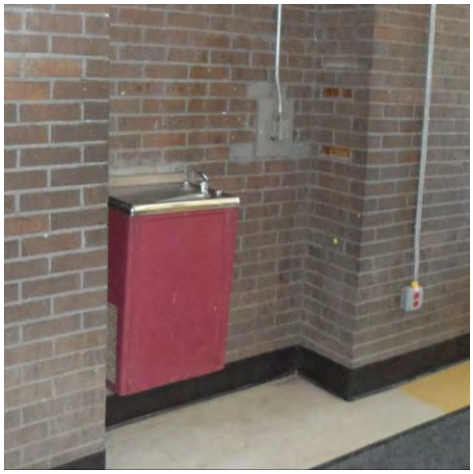

Image 11

Image 12

fixtures and / or accessories are not installed to meet accessibility requirements. An example of these conditions can be seen in Image 10 and these include: proper separation between fixtures (the urinal and sink are not the correct distance apart), proper height of controls, (the controls on the urinal are located too high), proper height of accessories (the paper towel and soap dispenser are located too high), lack of handrails and lack of insulation or shroud around the hot water piping under the sink. In other areas, such as the gang toilet rooms, all of the urinals and sinks have been installed at the same height. Accessibility requirements note that if more than one fixture is located in a restroom at least one must meet accessibility requirements.

There are several drinking fountains throughout the building that are not accessible (Images 11 & 12).

Accessible doors include lever hardware and push / pull clearances to meet guidelines. Door hardware has been upgraded throughout most of the facility and there are many conditions where the push / pull clearances meet accessibility guidelines. A few areas should be considered for upgrading if a renovation is undertaken.

Renovations and repairs throughout the building needed to meet accessibility requirements include:

- Install proper handrails at all exterior stairs and ramps
- Install an elevator in each wing to connect the lower level to the main floor level
- Install proper handrails at all interior stairs and ramps
- Install proper cane detection and guard rail near stair landings
- Review restroom fixture installations and adjust to meet proper height and location requirements
- Install new drinking fountains to meet accessibility requirements

Additional specific conditions are noted in the following sections.

EXTERIOR

FOUNDATIONS

Foundations are poured in-place concrete, grade is at the top of the foundation walls. It is assumed the foundation walls are generally in good condition.

Bulleted List of Specific Issues

- Foundation walls below grade are formed in place concrete that is in fair condition. Exposed areas are in good condition (Image 13).

Bulleted List of Recommendations

- No recommendations needed.

Image 13

WALLS

The building has a brick and mortar exterior veneer with CMU backup. Library has exterior masonry veneer with CMU backup.

Bulleted List of Specific Issues

- Exterior walls are mostly brick veneer w/CMU backup in fair condition. Some brick are showing moisture and sever cracking in contained areas (Image 14 & 15).
- Control joints are in fair condition throughout the school. Boy's Locker Room uneven brick settle with ruptured joint (Image 16).
- Some precast concrete cantilevers are spalling and exposing rebar (Image 17).
- Pod classrooms are wood/vinyl cladding and are in fair condition. Some cladding is falling off the structure (Image 18).

Image 14

Image 15

Bulleted List of Recommendations:

- Remove debris from weeps to allow proper ventilation and drainage from wall cavity.
- Further investigation is warranted to determine the cause of brick cracking.
- Repair/install a new control joint.
- Where precast cantilevers are spalling remove all the loose concrete and then patch to match profile of the cantilever.
- Re-install cladding at pod classrooms.

Image 16

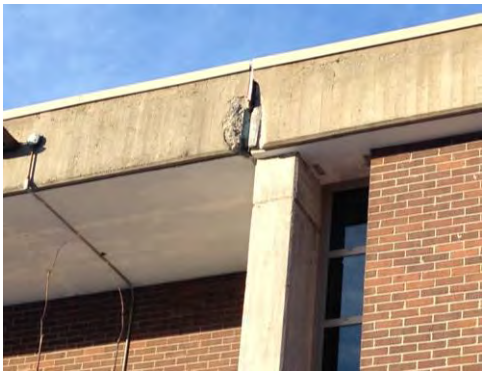

Image 17

Image 18

Image 19

Image 20

WINDOWS

The school underwent a window replacement program in 2006. The primary exterior window type is aluminum with insulated glazing with operable section.

Bulleted List of Specific Issues

- Aluminum-framed hopper/fixed windows throughout the school and Library addition are in good condition. The sealing at the windows appear to be in good condition (Image 19).

Bulleted List of Recommendations

- No recommendations needed.

DOORS

The exterior doors consist of aluminum storefront and hollow metal doors with hollow metal frames.

Bulleted List of Specific Issues

- Some doors have thresholds and approaches that do not meet current codes due to height of threshold (in excess of ½") or due to the condition of the landing surface outside the door. (Image 20)

Bulleted List of Recommendations

- Repair and replace thresholds at doors that exceed ½" in height at egress exits.
- Install an approach pad that meets all current MAAB / ADA code requirements.

LOUVERS / VENTS / OTHER OPENINGS

The louvers are a combination of aluminum fin construction and simple steel mesh construction. There are vents and openings around the building that are in fair to poor condition and some have become nesting areas (Image 18).

Bulleted List of Specific Issues

- Aluminum-framed louvers throughout the school are in fair condition.

Bulleted List of Recommendations

- Clean and repair vents and louvers.

ROOF

Due to recent snow, the team did not attempt to get on the roof for surveying (Image 21).

Bulleted List of Specific Issues:

- Recent replacement of roof with an adhered membrane system.
- Recent installation of photo-voltaic cells on roofs.
- Some ceiling tiles were found with stains, indicative of a possible roof leak, yet the age of the stains is unknown.
- Overflow scuppers appear clogged, or the connection between the wall and downspout is not correctly attached to the walls (Image 21).

Bulleted List of Recommendations:

- Investigate areas where ceiling tiles are stained to verify source.
- Review scuppers and repair down spouts

Image 21

INTERIOR

FLOORING

VCT is predominate flooring type in all the classrooms, corridors, and the cafeteria. Carpet tiles are used in the Library, Band, OP/PT. There is tile is in the bathrooms and exposed concrete in the kitchen. All of the custodial and storage spaces are a combination of exposed concrete, sealed concrete, and epoxy painted concrete. A sports flooring system is used in the gymnasium.

Bulleted List of Specific Issues

- Sports resilient flooring system in gymnasium is in good condition.
- Corridors in original building have VCT floors in fair condition.
- Corridor stairs have metal treads in fair condition. Stairs do not have slip resistant membrane (Image 22).
- Classrooms, offices, and cafeteria have VCT generally in fair condition. Some classrooms VCT seams and tiles are popping or separating (Image 23).
- Toilet rooms have porcelain tile in fair condition.

Image 22

Image 23

Image 24

Image 25

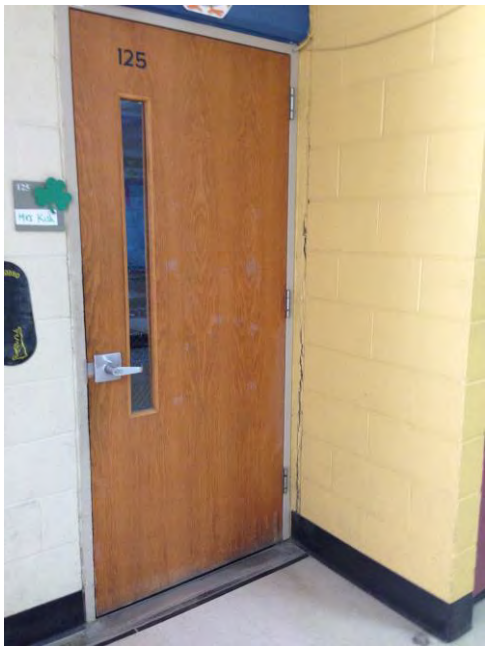

Image 26

- Locker rooms and athletic offices have sealed/painted concrete in fair condition.
- Library carpet is generally in fair condition.
- Custodial closets and storage rooms have sealed/painted concrete in fair condition.
- The kitchen and servery are exposed concrete with no slip-resistant flooring (Image 24).

Bulleted List of Recommendations

- Install non-slip material at the stairs to meet current codes.
- Install rubber flooring on stairways or replace concrete topping
- Patch and repair VCT or install new VCT in classrooms
- Install non-slip flooring at the kitchen and servery to meet current codes.
- Replace broken flooring tiles in restrooms

WALLS AND PARTITIONS

The interior walls consist mainly of load bearing CMU walls. Most interior walls on the first floor terminate at the underside of the second floor precast floor planks, and most of the second floor walls terminate at the underside of the precast roof deck planks. A few make-shift demising walls have been constructed to the underside of the ribbed concrete ceiling. Folding partition walls are in poor condition.

Bulleted List of Specific Issues:

- Corridor walls are largely painted CMU/tile in good condition.
- Locker Rooms have cracking at the soap tile walls (Image 25).
- In some classrooms and corridor walls the CMU walls have severe cracking in the corners (Image 26 & 27).
- Gypsum wallboard partitions are in generally good condition.
- Wood paneling in gym is in poor condition (Image 28).
- Folding partition walls are in poor condition (Image 29).

Bulleted List of Recommendations

- In areas where the cmu/tile is cracking or separating further investigation is warranted to determine the cause. Repair is required.
- Replace wood paneling in gym, add padding to walls for safety
- Remove folding partition walls and replace with gypsum wall board partitions that provide proper acoustical separation between spaces
- In spaces where partitions have been installed that do not extend to the underside of the slab and do not provide proper acoustical separation between classrooms extend walls to the underside of the deck or provide dropped ceilings on both sides of the wall.

Image 27

CEILINGS

The primary ceiling type throughout the school is painted concrete, 1x1 adhered ceiling tile, and 2x4 acoustical ceiling

Bulleted List of Specific Issues

- Acoustic ceiling tile (1x1), adhered to underside of waffle slab, in classrooms/corridors are in fair condition.
- Acoustic ceiling tile and grid in the Library is in fair condition.
- Several ceiling tiles throughout the building have water stains due to roof or equipment leaks above the ceiling (Image 30 & 31).
- Gypsum soffit boards are generally in good condition.

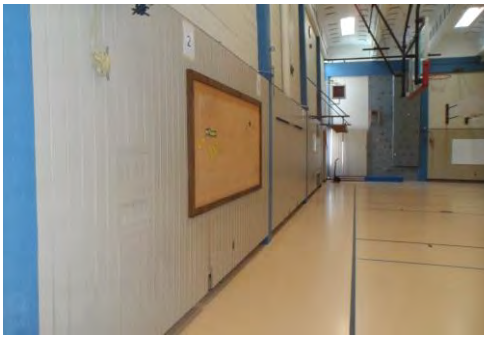

Image 28

Bulleted List of Recommendations:

- Further investigation is warranted to determine the cause of water leaking, repair source and replace ceiling tiles.
- Several ceiling tiles are cracked and damaged and should be replaced.

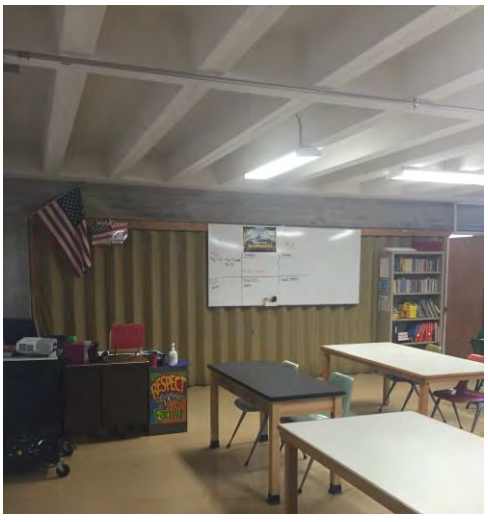

Image 29

Image 30

Image 31

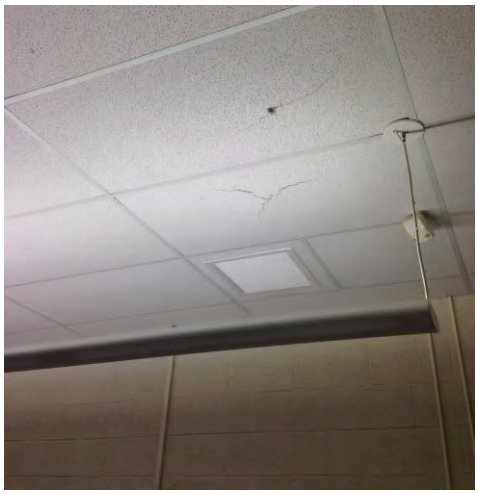

Image 32

DOORS

The interior borrowed lights have hollow metal frames and a combination of clear and wired glazing throughout the building. Most of the interior doors are wood with hollow metal frames, a few of the doors are hollow metal with hollow metal frames. Door panel types vary; some are solid, others have different sized vision panels and louvers. Generally, the doors and frames appear to be in good condition.

Bulleted List of Specific Issues

- The base of some doors and frames have water damage or rust as a result of floor cleaning
- Some of the corridor wood doors with sidelight have wired glass (Image 33).

Bulleted List of Recommendations

- Add kick plates to the bottom of doors to prevent further damage
- Repair rusting at the base of door frames
- Remove all wired glass panels from the interior doors, sidelights and interior glazing. Replace with tempered glass.

FIXTURES & FURNITURE (BUILT IN)

There are wood shelves located near the cafeteria, and display cases located in the hallways. There are solid wood teacher wardrobes throughout the school. Some classrooms have built-in wood casework base cabinets with sinks.

Bulleted List of Specific Issues

- Shelving units near cafeteria appear worn
- Display cases are in fair condition and protrude into the hallway beyond the allowable distance per accessibility codes (Image 35)
- Showers in the locker rooms did not meet current code accessibility requirements. These rooms do not appear to be used on a regular basis (Image 36).

- Casework, shelving, counters and sinks in classrooms are original to the building and are in poor condition (Image 37 & 38).
- Teacher wardrobes are original to the building and in poor condition (Image 39).
- Lockers in both the corridors and locker rooms do not provide accessible lockers.

Bulleted List of Recommendations:

- Replace display cabinets in hallway and provide cane detection to meet accessibility requirements.
- Install new casework in classrooms.
- Install accessible lockers in both the corridors and in the locker rooms.

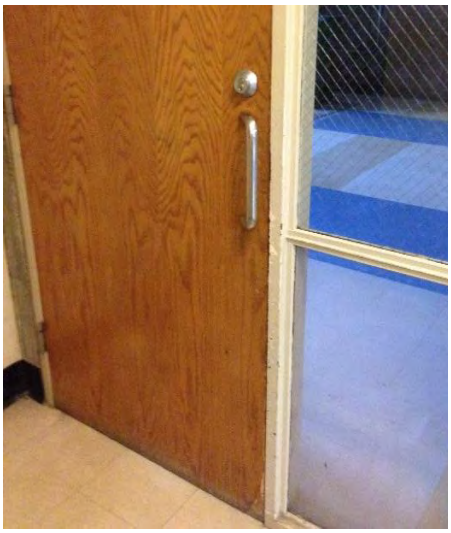

Image 33

Image 34

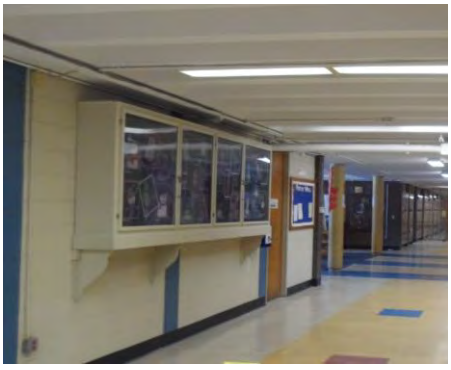

Image 35

Image 36

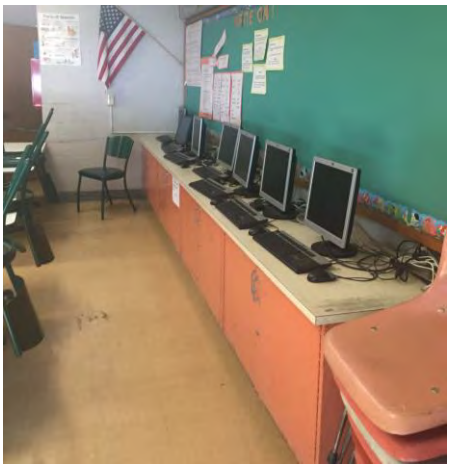

Image 37

Image 38

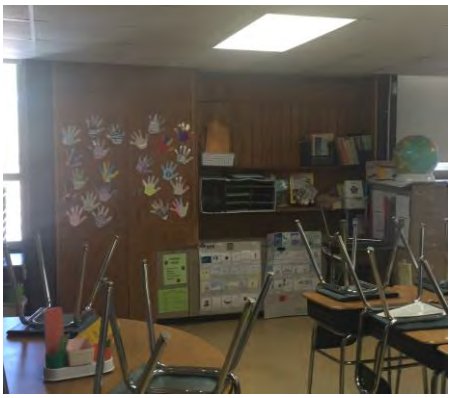

Image 39

CIVIL ENGINEERING ASSESSMENT

Nitsch Engineering has performed research of the existing site conditions at the Parker Middle School located at 75 Graniteville 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.

Image 1

GENERAL SITE DESCRIPTION

The site is bounded by Crooked Spring Road to the north, Richardson Road and Graniteville Road to the east, Graniteville Road to the south, and residential and wooded areas to the west.

There are two paved driveway entrances to the site along Graniteville Road and a paved entrance to a parking lot for the site along Crooked Spring Road. There are two modular buildings located on site as part of the school. There is one modular building along the west side of the permanent building and one modular building along the north side of the permanent building. There are play fields along the eastern side of the site.

A stream enters the south side of the site along Graniteville Road and runs underneath the building and through the courtyard (Image 1 and 2). The stream exits the site to the north of the building through the wooded area (Image 3).

Image 2

Image 3

EXISTING SITE UTILITIES

STORM DRAINAGE

Chelmsford GIS shows that there are no public closed drainage systems in the streets adjacent to Parker Middle School. Stormwater onsite appears to drain to the stream running through the site.

The modular buildings are drained by downspouts that discharge at grade (Image 4). There was an addition constructed at the school in 2005. Stormwater runoff from the roof of the addition is collected in downspouts and piped underground to two drywells (Image 5). Stormwater runoff from the rest of the roof is likely collected and discharged into the stream.

Image 4

Image 5

Image 6

Image 7

Image 8

The two drywells on ite are located in a parking lot on the west side of the building (Image 5). Stormwater runoff from the parking lot and driveway entrance are collected in catch basins and piped to the drywells for recharge.

Stormwater runoff from the parking lot along Crooked Spring Road is collected in catch basins and directed to a bioretention basin located between the parking lot and the wooded area (Image 6). The bioretention basin appears to overflow to the wooded area.

SEWER

There are town sewer mains in Crooked Spring Road and Richardson Road. A sewer main crosses from Old Farm way, across Graniteville Road and flows through the school site and joins the sewer main in Crooked Spring Road.

Sewer services for the Parker Middle School building likely connect to the Town sewer main where it crosses through the site.

No grease trap was observed onsite. Architectural plans show a kitchen at the northwest corner of the building. A grease trap is located in 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.

There does not appear to be a water main in Graniteville Road, however there are hydrants located along Richardson Road and Crooked Spring Road that indicate the presence of a water main.

Two fire hydrants were observed onsite. One of the hydrants is located along the edge of the parking lot to the north of the school building and the other hydrant is located along the driveway loop to the south of the building.

NATURAL GAS

No gas meter was observed onsite and there were no dig safe markings to indicate the location of the gas service through the site.

ELECTRICAL

There is a transformer located to the north of the building along the parking lot (Image 8).

It appears Parker Middle School has a solar energy supply in addition to a conventional electric source (Image 7).

Electrical services enter the building along the north face of the building.

EXISTING SITE CONDITIONS

SOILS

Based on the Natural Resources Conservation Service (NRCS) Middlesex County Soil Survey the site of the Parker Middle School property is on soil classified as Udorthents (sandy), Windsor loamy sand, ridgebury fine sandy loam, and saco mucky silt loam.

PAVEMENT/CURBING

The asphalt pavement within the site is in generally fair condition with some areas of cracking and degradation (Image 9). There is some accumulation of sediment in paved areas onsite and some areas of ponding/icing (Image 10 & 11).

Walkways onsite are asphalt and are generally in fair condition. The walkways around the modular building were iced over and difficult to walk on. The walkways along the northeast face of the building were snowy and icy and difficult to walk on (Image 12).

There is a timber guardrail separating the bio-retention basin from the parking lot to the north of the building. The timber guardrail appears to be good condition.

Image 9

Image 10

Image 11

Image 12

PLAYFIELDS

The Parker Middle School has a large grassed playfield area adjacent to the site. The field is fairly level with patchy grass cover. The grass cover in the field areas closer to the school is much sparser than in those areas farther from the school. The field has the remnants of two baseball or softball fields with backstops located in opposite corners of the field. The field is generally level and suitable as a practice or playfield. There is lighting along the Graniteville Road side of the field and there appears to be some limited irrigation on the field. A ropes course is located along the northern edge of the field.

PERMITTING CONCERNS

The Parker Middle School sits directly on top of a stream and has regulated buffer zones onsite. Work onsite will 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.

STRUCTURAL – PARKER 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 Parker Elementary school is a two-story cast in place concrete structure clad in masonry veneer. The building was constructed in 1965 with renovations and additions in 2006.

On the roof, we observed various roof drains that appeared to be clear of debris.

We observed the exterior façade of the building above the main entrance and noted various small areas of rust staining. We observed the concrete façade along the roof line within the courtyard and noted small spalls that are not a structural concern.

We observed 3/8" step cracking in the red brick masonry façade at the southwest corner of the building; we did not observe a vertical control joint where the height of the masonry changes. At ground level, we observed deterioration to the masonry façade due to moisture. Facility personnel reported cracking in the south façade of the gym.

We observed the underside of the second floor structure and noted various hairline cracks in the cast in place concrete beams that appear to be due to shrinkage and are not a structural concern. Small spalls were observed at the underside of the concrete slab which are not a structural concern.

We observed the corridor flooring and noted areas where various cracking and curling has occurred.

We observed the exposed structure adjacent to the stair access to the café and noted various cracks in the cast in place concrete wall.

In the kitchen, we observed light cracking in the slab on grade and various cracks in the masonry walls.

The gym roof construction consists of precast double tees; at the joints, we observed some rust staining.

At the first floor walls, at the interface between interior masonry walls and cast in place concrete columns, we noted signs of separation between the two materials that appears to be due to shrinkage. In other similar locations, we observed larger gaps between the materials up to ¾".

We observed the masonry walls between rooms 117 and 119 and noted a full-story vertical crack. A view from the other side of the wall indicates that the crack runs through the full-thickness. We measured the crack to be 3/8" wide in one location. The crack branches off at the underside of a structural concrete beam that crosses through the top of the wall. At the underside of the roof, we observed additional light cracking at the wall-roof interface.

Modular classrooms and a new library were constructed in 2006 and the observable structure appeared to be in sound condition for the most part. We observed perceivable vibration in the floor structure due to footfall. We noted cracks in the laminate flooring. We spot-measured a 7 degree slope in the access ramp to the north modular wing.

HVAC ASSESSMENT

The Parker Middle School was built in 1965. The mechanical systems were repaired in 2006, as the building was converted from pneumatic to DDC control. The building also underwent a library/computer lab addition at that time. The building received new condensing hot water boilers while the unit ventilators and air handlers were repaired, receiving new controls, new motors, new switches, and new actuators. The boiler room was converted from steam to hot water with new condensing boilers and pumps being installed. The original hot water distribution piping remains in use in the crawlspaces. The school mostly consists of unit ventilators for all the classroom spaces. The library is served by a rooftop unit with gas heat and full air conditioning. The gym is served by horizontal unit heaters and heating and ventilating units. The cafeteria is served by heating and ventilating units. Exhaust air is provided throughout the building primarily through the use of roof mounted exhaust fans. The only air conditioning is in the administration area, library, elevator machine room, portable classrooms and some scattered classrooms and administrative areas. Most of the unit ventilators are near the end of their serviceable life, as the repair only extended their life. Bearings, dampers, and other moving parts are wearing out.

Image 1 – Teacher's Lounge Oversized Air Conditioner

COOLING PLANT:

The building is not provided with a central cooling plant. The Administration area is served by dedicated through the wall air conditioners at some perimeter offices and by ductless wall mounted air conditioners in the main office and in the offices at the front of the building as part of a VRF heat pump system. The library is cooled by a 17.5 ton Trane rooftop unit with DX cooling. The two computer labs are cooled by 5 ton ducted horizontal unit ventilators with an add-on DX coils. The teacher's lounge has the main distribution frame server racks, so is cooled by an oversized 7-1/2 ton Liebert DX computer room style air conditioner (Image 1). The portable classrooms are cooled by rooftop units with DX cooling. The

Image 2 – Classroom Ductless Air Conditioner

elevator machine room is cooled by a 3 ton Daikin ductless air conditioner.

There are a few classrooms that are cooled by wall mounted ductless air conditioners or by portable air conditioners (Image 2).

Image 3 – Aerco Condensing Boilers

Specific Issues:

1. R-22 refrigerant is being phased out, making it more difficult and more expensive to obtain.

2. The refrigerant piping insulation has deteriorated at the condensing units.

Recommendations:

1. Consider replacing all cooling equipment that utilizes R-22 refrigerant.

2. Reinsulate exposed refrigerant piping serving condensing units. Wrap closed cell insulation with a UV light rated jacket.

HEATING PLANT:

There are four (4) gas fired condensing boilers manufactured by Aerco, model Benchmark 2.0, each with an input capacity of 2,000 MBH and a gross output of 1760 MBH (Image 3). These four boilers were installed in the late 2000's and are in excellent condition. Each boiler is provided with dual low water cut-offs and all operating and safety controls. The boilers are sequenced from an Aerco boiler management system controller. There are no motorized isolation valves at each boiler, which allows system return water to circulate through idle boilers and mix with the hot water coming out of the active boilers. This mixing reduces overall system water supply temperature, which makes the overall heating plant less efficient. Hot water expansion is handled through the use of horizontal style expansion tanks. There is also a five gallon chemical shot feeder in the system for chemical treatment of the piping system. The heating hot water piping itself is schedule 40 black steel and is insulated with fiberglass insulation and possibly with asbestos in the crawl

Image 4 – Combustion Air Damper w/ Gap


Image 5 – Boiler Combustion Air Ducting

spaces and tunnels. The boilers are vented into a common double wall stainless steel breeching and stack.

There is a 12" tap on the breeching for a future condensing boiler or water heater.

Combustion air is brought into the boiler room through two wall mounted louvers, with a high opening and a low opening that terminates 2 ft above the floor. The openings are dampened using electric actuators. There is a gap in the upper damper that allows outside air to infiltrate into the boiler room (Image 4).

In addition, combustion air is directly ducted to each boiler from a louver installed in the inactive leaf of a door (Figure 5). Heating hot water is circulated throughout the building in a variable primary pumping scheme using two (2) Bell and Gossett 15 HP base mounted end suction pumps. These pumps are variable speed pumps, controlled by Yaskawa variable speed drives. Each pump is served by its own tangential air separator which is uninsulated (Figure 7). There is no ventilation in the boiler room. There is still some abandoned equipment, pumps and valves in the boiler room from the old steam system. Some of the steam piping has been abandoned in place at the ceiling.


Image 6 – Heating System Pumps

Specific Issues:

1. The boilers do not have motorized isolation valves which allow for mixing and reduced overall system supply water temperature.
2. Lack of ventilation in the boiler room.


Image 7 – Uninsulated Air Separators

Recommendations:

1. Install motorized isolation valves at each boiler to close when that boiler is idle.
2. Add exhaust fan to boiler room for ventilation.

AUTOMATIC TEMPERATURE CONTROLS

The building is served by Novar/Trend Tridium based direct digital controls. The school is nearing the end of a controls upgrade that started in 2014. Trend combination temperature sensors/CO2 sensors are being retrofitted to each classroom to provide demand control ventilation at each unit ventilator. In the boiler room, the Trend system monitors HWS temp, HWR temp, OA temp, HW differential pressure and boiler alarms.

The Trend system controls pump start/stop and speed, differential pressure bypass valve position, and split air conditioner start/stop. The boilers are sequenced and operate via the stand alone boiler management controller. Boiler faults are picked up by the Trend system.
There are still some pneumatic controls remaining. The controls compressor is a Curtis 60 gallon duplex compressor which appears to be of late 70's vintage. Control air is conditioned through a Hankinson air dryer (Image 8). The portable classrooms are controlled by trend wall mounted sensors.


Image 8 – Controls Compressor & Air Dryer


Image 9 – Admin Area Air Conditioner

Utility type spaces and toilet rooms are controlled by local controls with no night setback capability. The boiler plant is equipped with an automatic outdoor air reset control function which provides energy savings when the building load does not require high temperature water due to warmer outdoor conditions.

Recommendation: Continue converting pneumatic controls to DDC. Expand on functional control points.

ADMINISTRATION

The Administration area is heated by hot water slope-top baseboard radiation. Each room has its own temperature control. The perimeter offices of the administration area are cooled by through the wall air conditioners (Image 9) and via wall mounted ductless air conditioners as part of a central VRF heat pump system. The main office is cooled by a wall mounted ductless air conditioner and ventilated by a propeller fan located in a transom window that communicates with the lobby. The main office is also heated by a horizontal unit heater and by slope-top baseboard radiation. There is no mechanical ventilation in any office.

Image 10 – Cafeteria Wall Grilles

Image 11 – Canopy Kitchen Hood

Image 12 – Kitchen Make-up Air Ductwork

Specific Issues:

1. Lack of ventilation in the administrative area

Recommendations

1. Install a roof mounted energy recovery unit to provide ventilation

CAFETERIA

The cafeteria is served by two heating and ventilating units that are ducted to high sidewall grilles over the serving line (Figure 10). These H&V units are supplemental sources of make-up air for the kitchen hood, as air is drawn into the kitchen through open doors. Within the heating and ventilating units is a supply fan, hot water coil, face and bypass dampers, a filter rack and outside/return air dampers. The H&V units are controlled via a standalone wall mounted sensor tied into the Trend DDC control system. The cafeteria is exhausted through low wall grilles tied into a central exhaust fan. There are ceiling mounted paddle fans to aid in air movement.

The faculty dining room/conference room is provided with a wall mounted vertical unit ventilator and slope-top finned radiation

KITCHEN

The kitchen functions as a warming kitchen. The canopy hood does not Ansul fire suppression system (Figure 11). The hood is ducted to two roof fans with motorized dampers in each dedicated duct. Partial make-up air is supplied by both a ducted make-up air unit and a ducted unit ventilator (Figure 12). Within these units is a supply fan, hot water coil, face and bypass dampers, a filter rack and outside air/return air dampers. The remainder of the hood make-up air is transferred from the cafeteria via open doors to the cafeteria. The kitchen is heated by a small horizontal unit heater when the air units are not running. The kitchen office is heated and ventilated by a wall mounted unit ventilator and ventilated by a wall exhaust register.

Specific Issues:

1. Lack of make-up air for kitchen hood.
2. Kitchen hood unnecessarily runs at full speed wasting energy

Recommendations:

1. Install transfer grilles in the common wall between the cafeteria and kitchen so the hood has make-up air when the doors are closed.
2. Install a 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

Single wall mounted vertical unit ventilators (Image 13) and pedestal type baseboard heat under the windows (Image 14) are provided in each classroom.

The unit ventilators provide outside 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, hot water coil, face and bypass dampers, a filter rack and outside/return air dampers. The unit ventilators are provided with electric actuators. Each unit ventilator is controlled via the standalone wall mounted sensor tied into the Trend DDC control system. This combination temperature/CO2 sensor provides demand control ventilation to more closely match fresh air damper

Image 13 – Classroom Unit Ventilator

Image 14 – Typical Pedestal Baseboard

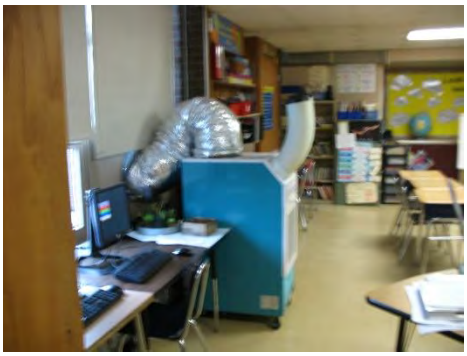

Image 15 – Portable Air conditioner

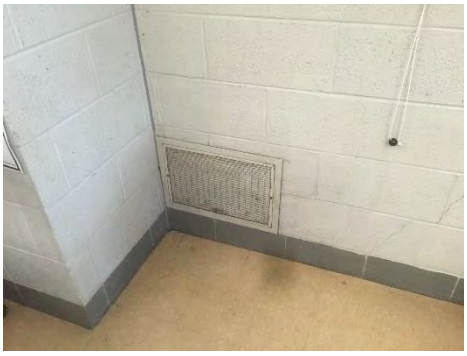

Image 16 – Tfypical Classroom Low Exhaust Grille

Image 17 – Library rooftop unit

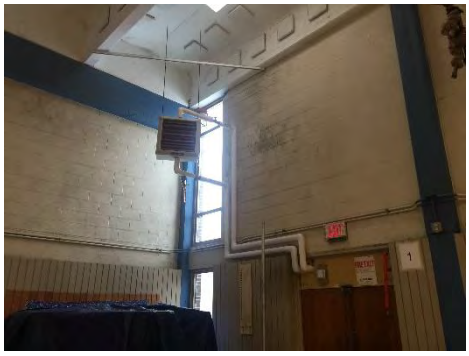

Image 18 – Gym Unit Heater

ventilation settings with actual room occupancy. Some of the classrooms are cooled by portable air conditioners that duct hot condenser air to a window (Image 15).

Each classroom is provided with a low wall mounted exhaust grille which communicates to a central roof mounted exhaust fan through a galvanized sheet metal duct collection system. (Image 16).

Recommendations:

1. Continue to provide routine maintenance on all the unit ventilators such motor and shaft lubrication, filter changes, and coil cleaning.

LIBRARY:

The library is served by a 17.5 ton constant volume roof top unit which consists of a supply and exhaust fan, filter section, gas furnace and direct expansion cooling coil (Image 17) This roof top unit is associated with a galvanized sheet metal duct distribution system which delivers and returns conditioned air to and from the spaces via ceiling diffusers and grilles. The unit delivers a mixture of outside air and return air, which is then conditioned through the unit's gas furnace or DX cooling coil. The library is broken into 6 temperature zones. Duct mounted electric heating coils further heat/reheat the tempered air being supplied by the rooftop unit to their respective zones. Electric baseboard heat is run along the perimeter of the library as supplemental heat. The fresh air damper at the rooftop unit is controlled by CO2 sensors in the space to match fresh air damper ventilation settings with actual room occupancy.

The toilet rooms outside the library are heated by wall mounted convectors controlled by self-contained thermostatic valves.

COMPUTER LABS:

The computer labs are served by concealed horizontal unit ventilators that are ducted to ceiling diffusers and registers. Each unit provides outside air through the use of a roof mounted intake hood which is ducted to the back of the unit ventilator. Within the unit is a supply fan, hot water coil, face and bypass dampers, direct expansion cooling coil, filter rack and outside/return air dampers. The unit ventilators are

provided with electric actuators. Each unit ventilator is controlled via the standalone wall mounted sensor tied into the Trend DDC control system. This combination temperature/CO2 sensor provides demand control ventilation to more closely match fresh air damper ventilation settings with actual room occupancy. The computer labs have full air conditioning via a 5 ton condensing unit mounted on the roof.

Image 19 – Gym H&V Unit

GYMNASIUM:

The main gym is now heated by two horizontal unit heaters (Figure 18). The gym was originally heated and ventilated by concealed Nesbitt vertical heating and ventilating units located in each corner of the gym (Figure 19). These H&V units are ducted to wall grilles (Figure 20). These units still have pneumatic damper operators. It appears as if these units are no longer operating.

Image 20 – Gym H&V Unit Wall Grilles

The locker rooms are served by exposed horizontal unit ventilators, and hung from the ceiling free blowing supply air. The locker rooms and storage rooms are exhausted via ceiling mounted exhaust registers tied into a central rooftop exhaust fan.

Specific Issues:

1. Lack of ventilation in the gym.

Recommendations:

1. Replace H&V units at gym corners and add general exhaust.

Image 21 – Typical Roof Fans

EXHAUST SYSTEMS:

Throughout the building, general exhaust is provided through the use of roof mounted exhaust fans (Image 21). These fans serve areas such as toilet rooms, storage rooms, custodial closets, mechanical spaces and electric rooms. All the fans are associated with their own independent galvanized sheet metal duct collection systems and all terminate within the spaces with ceiling or wall mounted grilles. Overall the fans appear to be functioning. The fans appear to be have been replaced in the early 2000's and are in good condition.

Image 22 – Portable Classroom Corridor Damaged Electrical Baseboard

Recommendations:

1. Provide routine maintenance on all exhaust fans such as replacing belts and lubricating their motors and shafts. Replace fans as necessary.

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, fin tube radiation and wall mounted convectors. Utility type spaces are heated by horizontal unit heaters. These units are the original Nesbitt units. The corridors do not have any ventilation air provided, which is not code compliant.

Specific Issues:

1. Lack of ventilation air in corridors
2. No ventilation in main copy room
3. No ventilation in small 2nd floor conference room

Recommendations:

1. Provide routine maintenance on all unit heaters such as motor and shaft lubrication, filter replacement and coil cleaning.
2. Provide ventilation air to corridors through the use of ceiling mounted hot water fan coil units with ducted outdoor air connections.
3. Provide exhaust in the main copy room.
4. Provide ventilation in 2nd floor conference room.

PORTABLE CLASSROOMS:

The portable classrooms and their corridors are air conditioned, heated and ventilated via rooftop units. The rooftop units are provided with electric heat. The connector corridors leading to the portables is heated by heavily damaged electric baseboard (Image 22) The central corridor is also heated by ceiling mounted electric heaters, used when the RTU's are shut down. The portable classrooms are poorly insulated, resulting in high energy costs.

Recommendations:

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

Items to be addressed immediately for energy savings:

1. Add motorized valves to each boiler to prevent the dilution of supply water temperature due to circulation through idle boilers. The energy savings from the efficiency of higher supply water temperatures will result in short payback.
2. Insulate refrigerant lines on the roof that have deteriorated or are missing insulation. The energy savings will result in short payback.

ELECTRICAL ASSESSMENT

EXISTING SYSTEMS

The existing systems of this facility range from original vintage, to upgrades and/or add-ons recently installed including fire alarm, branch circuit panelboards, lighting, and photovoltaics. Although, new devices, equipment, and fixtures were provided, generally the existing wiring, raceways, and boxes were reused. While the facility is well maintained and clean, the systems do not reflect, nor do they 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 MOST of the electrical systems for this facility under a renovation program including generator, fire alarm system, original panelboards and lighting.

ELECTRICAL DISTRIBUTION SYSTEM

There are multi-services to the building. One service is the utility service main disconnect switch located in the electric room and two National Grid Utility Company disconnect switches located at the building exterior wall.

An 800 ampere, 277/480 volt, 3 phase, 4 wire service serves the building. The main service equipment is located within the building's boiler room. The service consists of an enclosed main breaker and main distribution panels. The equipment is of original vintage and manufactured by Westinghouse. New energy efficiency Powersmiths transformers have been provided throughout the building (Image 1 & 29)

Branch circuit panelboards vary from original Westinghouse panelboards that are in poor condition to recently installed Cutler Hammer panelboards that are in good condition. There has been some additional branch circuitry added throughout the school (Image 2 & 3).

Image 1 — Main Disconnect

Image 2 — Original Panels

Image 3 — Updated Panel

Image 4 — Corridor Lighting

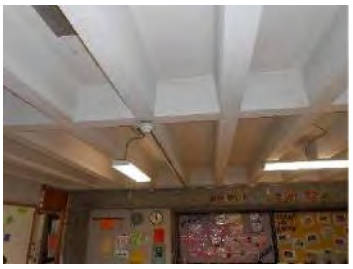

Image 5 — Classroom Lighting

INTERIOR LIGHTING

Corridor lighting consists of surface mounted fluorescent fixtures with acrylic lenses. Corridor lighting is controlled via line voltage switches at the ends of the corridor (Image 4).

Classroom lighting consists of surface mounted wraparound fluorescent fixtures with acrylic lenses. Light levels appear adequate in the classrooms. Each classroom has been equipped with an occupancy sensor and two local switches for the light fixtures. Some classrooms have a 2'x4' recessed prismatic lens fixtures (Image 5 & 11).

Toilet rooms contain ceiling mounted wraparound fixtures and 2'x2' recessed fluorescent fixtures. (Image 9).

Gym lighting and cafeteria lighting consists of high output, 2x4 fluorescent high bays. Light levels seem adequate. It was noted that one fixture in the gym was not working (Image 6 & 8).

Incandescent track heads are used to light the area in the cafetorium for performances (Image 7).

In general, most of the interior lighting is in fair condition. Most classrooms have been provided occupancy sensors. Multiple rooms were noted that they did not have an occupancy sensor (Image 10).

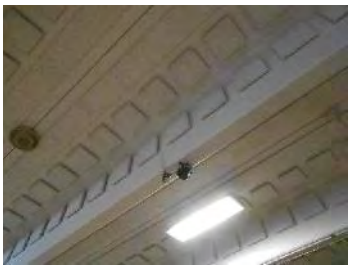

Image 6— Cafetorium Lighting

Image 7 – Track Lights

Image 8— Gym Lighting

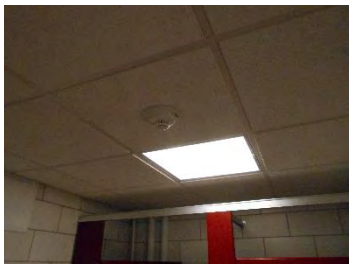

Image 9— Toilet Rooms

Image 10— Occupancy Sensor Switch

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).

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

EMERGENCY STANDBY SYSTEM

An interior natural gas Generac 97A02142 generator, 65 kW, 120/208 volt, is installed in the boiler room. The generator feeds an ASCO transfer switch and serves emergency lighting, as well as other loads. The emergency system does not comply with current electrical code as the emergency equipment is not separated from normal equipment. Exit signs are provided throughout the building (Image 15 & 16).

FIRE ALARM SYSTEM

The fire alarm system consists of an addressable Gamewell control panel. The control panel is located in the lobby. Horn/strobes are ADA compliant and located throughout the school. Manual pull stations also seem to be compliant (Image 17, 18, & 19).

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

An exterior master box and knox box are located at the main entrance (Image 20).

LIGHTNING PROTECTION SYSTEM

The facility does not have a lightning protection system.

PHOTOVOLTAIC SYSTEM

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

DATA/TELEPHONE/CLASSROOM INTERCOM/CLOCK SYSTEM

There are IDF racks and a MDF rack. The MDF rack is located in the corridor and serves each IDF rack located in the Teacher's Room and Main Office.

Image 11- Classroom Switches

Image 12— Pole Mounted LED Flood

Image 13— Building Mounted LED Flood

Image 14— Canopy LED Fixture

Image15 — Generator

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 (Image 21, & Image 22).

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

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

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

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 23).

Image 16 — Automatic Transfer Switch

Image 17— Fire Alarm Control Panel

Image 18 — Horn/Strobe

Image19 — Pull Station

Image 20 — Master Box & Knox Box

Image 21— IDF

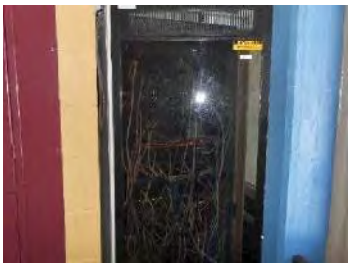

Image 22— MDF

Image 23 — A/U Control System

Image 24 — CCTV Cameras

Image 25 — Aiphone Intercom

SECURITY

The building contains an Aiphone intercom door communication system at the main entry that is in fair condition (Image 25 & 27).

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

The intrusion system is a Honeywell system and is operational; however, appears to be in poor condition (Image 26 & 28).

CCTV cameras are located on the exterior covering the building perimeter. They are connected to an S2 video management system; the head-end is located at the central administration office (Image 24).

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 central administration office.

Image 26 — Intrusion Keypad at Main Entrance

Image 27 — Intercom Master Station

Image 28 — Intrusion System Control Panel

Image 29 — Transformer

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 or automatic sensor type flush valves (Image 1).

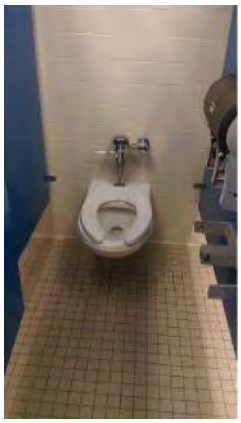

Image 1 — Wall Hung Water Closet

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

Image 2 — Urinals

Lavatories are wall hung vitreous china. The lavatories are fitted with metering faucets (Image 3).

Janitors sinks are floor mounted mop receptors. Faucets are equipped with vacuum breakers. (Image 4).

Utility sinks are wall hung enameled steel sink with wall mounted faucet. Faucets are equipped with vacuum breakers (Image 5).

Drinking fountains are vitreous china recessed type (Image 6).

Electric water coolers are stainless steel surface mounted or stainless steel hi low fixtures with recessed chiller (Image 7 & 8).

Art sinks are counter mounted stainless steel with dual lever faucets and are not equipped with sediment traps (Image 8).

Science sinks are epoxy resin type with gooseneck faucet not equipped with vacuum breakers. Science sinks are not fed with non-potable water per code and the drainage is not acid resistant piping. The drainage is not directed to an acid neutralization system (Image 9).

Image 3 — Wall Hung Lavatories

Image 4 — Janitor's Sink

Image 5 — Utility Sink

Image 6 — Drinking fountain

Showers include terrazzo bases with floor drains. Individual hot and cold water supplies feed each institutional shower head. Gang showers include single tempered water supplies and institutional shower heads. The tempered water is delivered from a master mixing valve (Image 10).

Kitchen area fixtures are in fair condition. The pot washing sink is piped to a floor mounted grease interceptor (Image 11).

WATER SYSTEM

The domestic water service is located in the Mechanical Room. The service appears to be 4" in size and includes a meter (Image 12).

Piping is copper tubing with sweat joints. The majority of piping is insulated. In general, the original gate valves are in fair condition. In portions of the building that have been recently renovated the piping is insulated, labeled and the ball valves are in good condition (Image 13).

The main Building domestic hot water is generated through a gas-fired standard efficiency non-condensing storage tank type water heaters. The water heater has a natural gas input of 77,000 BTUH and a water storage capacity of 100 gallons (Image 14).

In a recently renovated area of toilet rooms, hot water is generated through a 9 kW electric water heater with a storage capacity of 20 gallons (Image 15).

A thermostatic mixing valve is not provided for the building domestic hot water system. The domestic hot water system is recirculated.

At the renovation water heater the domestic hot water does run through a mixing valve and the hot water is recirculated back to the water heater by means of a recirculation pump.

GAS

Building is serviced by an elevated pressure natural gas service. The gas service, regulator and meter is located inside the Boiler Room. Gas service is 3" in size (Image 16).

Gas is supplied to heating boilers, water heater, kitchen equipment, Science Classroom turrets and an emergency generator.

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

SANITARY DRAINAGE SYSTEM

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

In the boiler room the floor drains are directed to a duplex sewage ejector installed in floor. The basin appears to be vented. Two (2) 4" pump discharge lines are valve at floor then combine and the line is directed to a gravity drain (Image 17).

ROOF DRAINAGE SYSTEM

The flat roofs are collected by roof drains and interior cast iron rain leaders. The roof and drains are in fair condition. Portions of the horizontal rain leader piping is insulated. There is evidence of sections of the original cast iron rain leader piping which has been replaced (Image 18).

RECOMMENDATIONS

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

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

- Provide reduced pressure backflow preventers at Janitor's closet soap dispenser.
- Provide plaster traps at Art classroom sinks.

Image 7 — Electric Water Cooler

Image 8 — Art Room Sink

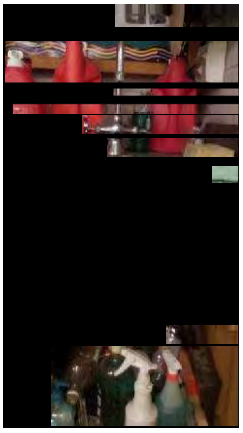

Image 9 — Science Sink

- Provide acid resistant polypropylene piping for all acid waste from Science Classroom fixtures and direct the acid waste to an acid neutralization system.
- Local sewer may require Kitchen waste be directed to exterior grease trap.
- Install a high efficiency water heater including master mixing valve, recirculated hot water and expansion tank on cold water make-up line.

Image 10 — Shower

Image 11 — Kitchen Pot Sink

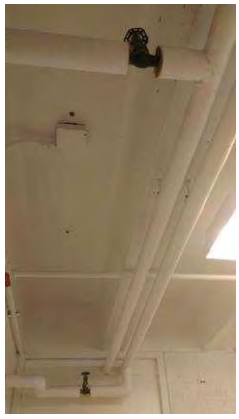

Image 13 – Water Piping

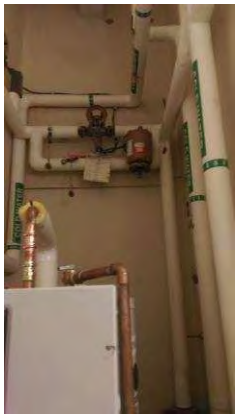

Image 15– Electric Water Heater

Image 17– Sewage Ejector

Image 12 — Water Service

Image 14- Gas Water Heater

Image 16 - Gas Meter

Image 18 - Repaired Rainleader

FOODSERVICE EQUIPMENT ASSESSMENT

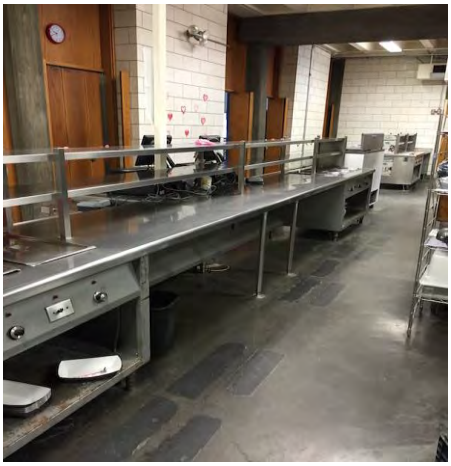

Image 1

The Parker Middle School serves approximately 710 students in grades 5 through 8. Much of the kitchen equipment is original to the original construction but there have been some new additions in recent years.

The kitchen serves the typical school lunch program in two serving lines with two cashier terminals exiting at the center of the serving lines. The serving line is rather simple and equipped with hot wells but no cold wells. The serving lines' base cabinets (Image 1) are painted galvanized steel as was common at the time of the original installation but in modern installation the bases would be stainless steel. The concern with painted galvanized steel is that the paint becomes damaged and rust and corrosion set in.

Image 2

The walls are constructed of the appropriate materials and have held up well. The floor is a sealed concrete, which must be very slippery. In fact anti skid strips have been glued onto the floor. The anti-skid strips are unsanitary but a necessity. The ceilings (Image 2) are open to the structure above. Conduits and other utility runs are exposed to the kitchen below. If built today, the current food code requires that the kitchen ceiling be of a smooth, non-absorbent, easily cleanable surface.

Other issues with open ceilings are that the hood and the walk-in refrigerated rooms are open to above. Again, the current standard requires that those items be sealed to the surfaces above and around them.

Image 3

The health code mandates all surfaces be smooth and easy to clean because deep cleaning of all the conduits and exposed heating system vents, lighting fixtures, and horizontal surfaces are not easy to clean (Image 3).

Lighting and Surfaces (Image 5):

- The lighting levels in the kitchen are too low for food service equipment. The current levels are below the code minimum for food production areas.
- This wood framed door beyond is the access point to what was once a dishwashing room. The room has since been converted to a storage room.

Work surfaces Figure 5:

- This image is of a typical table that was appropriate at a time but wood is a difficult work surface to maintain. Food debris accumulates in the gaps and effective cleaning and sanitizing a word surface is not possible.
- The table frame is a painted steel construction. Where those scratches or chips occur corrosion begins to form. The corrosion is not appropriate and paint chips can be a problem if worked into the food in some way.

Image 4

Wall shelf Figure 6:

1. The wall shelf shown here is a plywood construction of a standard hardware store wall bracket. The appropriate shelf for a kitchen environment is a stainless steel wall shelf that is easy to clean. The health code prohibits wood surfaces in kitchens.

Image 5

Recommendations:

1. Eliminate all wood surfaces and add hand-washing sinks.
2. Add appropriate mobile worktables to provide for additional work surfaces.
3. Redeploy the dish room or eliminate the equipment from the dish room to provide for additional storage. Build a wall that is constructed of easy to clean materials
4. Consider installing a lay in washable ceiling and improve the lighting levels in the kitchen
5. Add a fire suppression system for the hood system and two-burner range.
6. As complete refit of this kitchen will cost approximately $425,000. There is very little here that can be saved.

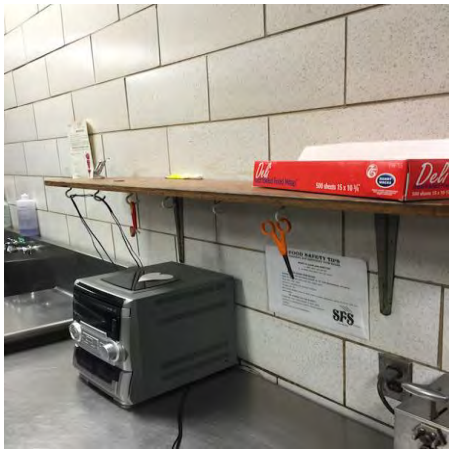

Image 6

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 Parker Middle 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. White 12” x 12” vinyl floor tile at stairwell
2. Joint compound at stairwell
3. Interior vertical caulking
4. Interior expansion joint caulking
5. Exterior unit vent grille caulking

Samples Results

Type and Location of Material	Sample Result
1. White 12” x 12” vinyl floor tile at stairwell	No Asbestos Detected
2. Joint compound at stairwell	No Asbestos Detected
3. Interior vertical caulking	3% Asbestos
4. Interior expansion joint caulking	8% Asbestos
5. Exterior unit vent grille caulking	3% 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. White pipe thread caulking was previously found to contain asbestos.
2. 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 tile and carpet.
3. Dark yellow caulking on concrete beams and columns was previously found to contain asbestos.
4. Brown glue daub on 1’ x 1’ acoustical ceiling tiles was previously found to contain asbestos.
5. Pipe and hard joint insulation was previously found to contain asbestos.
6. Black foundation damproofing was previously found to contain asbestos.
7. Ceramic floor tile adhesive was previously found to contain asbestos.
8. Old flange gasket was previously found to contain asbestos.
9. Grey/brown masonry caulking was previously found to contain asbestos.
10. Insulation inside boilers was assumed to contain asbestos.
11. Exterior crème/red expansion joint was previously found to contain asbestos.
12. Exterior unit vent grille caulking was found to contain asbestos.
13. Glue holding blackboard was assumed to contain asbestos.
14. All remaining suspect materials were found not to contain asbestos.
15. Rubber flooring was assumed to contain mercury.
16. Underground sewer pipe was assumed to contain asbestos.
17. 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.
18. 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.
19. 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.

20. 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.
21. 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	White Pipe Thread Caulking	2,000 LF	10,000.00
	Multiple Layers of Vinyl Floor Tile and Mastic	95,000 SF	475,000.00
	Dark Yellow Caulking	50,000 LF	150,000.00
	Grey/Brown Caulking	50,000 LF	150,000.00
	Glue Daub for Ceiling Tiles	19,000 SF	57,000.00
	Old Flange Gasket	20 Total	1,500.00
	Pipe and Hard Joint Insulation	Unknown	25,000.00
	Roof Drain Insulation	50 Total	2,500.00
	Blackboards	Unknown	25,000.00
	Hidden ACM	Unknown	50,000.00
	Miscellaneous Hazardous Materials	Unknown	50,000.00
Gymnasium	Rubber Flooring	6,300 SF	63,000.00
Bathrooms	Ceramic Floor Tile and Adhesive	10,000 SF	60,000.00
Boiler Room	Boilers	3 Total	25,000.00
	Pipe and Hard Joint Insulation	Unknown	50,000.00
	Old Flange Gasket	10 Total	500.00
Crawl Spaces	Pipe and Hard Joint Insulation	Unknown	45,000.00
	Old Flange Gasket	20 Total	2,000.00
Exterior	Crème Vent Caulking	40 Total	4,000.00
	Crème/Red Caulking	52,000 LF	208,000.00
	Transite Sewer Pipes	Unknown[1]	50,000.00
	Roofing Materials	105,400 SF	105,400.00
	Damproofing on Exterior/Foundation Walls	Unknown[1]	275,000.00
PCB's Remediation[2]			75,000.00
Estimated costs for ACM Inspection and Testing Services			15,000.00
Estimated costs for PCB's Testing and Abatement Plans Services[2]			35,000.00
Estimated costs for Design, Construction Monitoring and Air Sampling Services			191,100.00
		Total:	**2,200,000.00**

[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)

		PARKER MIDDLE 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) or under full renovation project	On Going Maintenance	Notes		
		126,167 GSF															
1	**Site & Civil**																
	1.01	Mill and overlay sections of pavement where cracking/ degradation has occurred.			x		x			$30,360					completed		
	1.02	Regrade paved areas to prevent ponding which can lead to ice patches in the cold weather.	x		x		x			$22,770	$22,770						
											$0						
		TOTAL									$22,770	$0	$0	$0	$22,770		
2	**Structural Elements**																
	2.01																
		TOTAL								**$0**	$0	$0	$0	$0	$0		
3	**Exterior Architectural Elements**																
	3.01	Review areas where brick walls are cracking - repair walls					x			$11,385	$11,385	x					
	3.02	Remove debris in weeps					x			$35,582				$35,582			
	3.03	Review causes of moisture infiltration into walls where efflorescence is visible					x			$18,216	x			$18,216			
	3.04	Repair or install new control joint					x			$9,715	$9,715						
	3.05	Repair spalling pre-cast cantilevers					x			$69,828	$69,828	x					
	3.06	Repair exterior cladding on pods or replace classroom pods					x			$75,900	$75,900		x				
	3.07	Review door thresholds - repair thresholds that do not meet ADA requirements		x	x	x				$5,693		$5,693					
	3.08	Install pads and ramps at doors where the transition is too great		x	x	x				$30,360		$30,360					
	3.09	Remove debris from all louvers	x		x		x			$759				$759			
		TOTAL									$166,828	$36,053	$0	$54,557	$257,438		
4	**Interior Architectural Elements**																
	4.01	Eliminate all wood surfaces and add hand-washing sinks in kitchen.		x	x					$12,144	$12,144						
	4.02	Add appropriate mobile worktables to provide for additional work surfaces to kitchen.			x					$13,283	$13,283						
	4.03	Redeploy the dish room or eliminate the equipment from the dish room to provide for additional storage. Build a wall that is constructed of easy to clean materials.			x					$22,770	$22,770						
	4.04	Install a lay-in washable ceiling and improve the lighting levels in the kitchen.	x		x					$41,047	$41,047						
	4.05	Add a fire suppression system for the hood system and two-burner range.			x					$18,216	$18,216						
	4.06	Completely refit this kitchen. There is little here that can be saved.			x					$641,355	$641,355						
	4.07	Replace VCT floors that are in poor condition	x		x		x			$269,597				$269,597			
	4.08	Install non-slip material on stairs	x		x		x			$60,720		$60,720					
	4.09	Replace library carpet			x		x			$77,873			$77,873				

	4.10	Replace non-slip strips in kitchen or install new floor throughout	x		x		x			$66,701	$66,701						
	4.11	Repair CMU cracked wall in locker room					x			$11,385	$11,385						
	4.12	Repair CMU cracked walls in classrooms					x			$16,698	$16,698						
	4.13	Replace stained ceiling tiles - investigate cause of leaking					x			$15,089	x			$15,089			
	4.14	Replace non-compliant door hardware			x	x				$72,864				$72,864			
	4.15	Replace wire glazing in doors and sidelights		x						$36,432				$36,432			
	4.16	Re-install toilet accessories that are not correctly located for accessibility		x		x				$60,720	$60,720						
	4.17	Upgrade shower rooms or remove all fixtures and re-purpose space			x	x				$121,440	$121,440						
	4.18	Review all restrooms for accessibility compliance		x	x	x				$318,780	$318,780						
		TOTAL									$1,344,538	$60,720	$77,873	$393,982	$1,877,113		
5	**Mechanical - HVAC**																
	5.01	Replace all cooling equipment that utilizes R-22 refrigerant.			x				x	$98,670				$98,670			
	5.02	Reinsulate exposed refrigerant piping serving condensing units. Wrap closed cell insulation with a UV light rated jacket.					x			$3,047				$3,047			
	5.03	Install motorized isolation valves at each boiler to close when that boiler is idle.			x			x		$15,180				$15,180			
	5.04	Add exhaust fan to boiler room for ventilation.			x					$12,144			$12,144				
	5.05	Continue converting pneumatic controls to DDC. Expand on functional control points.					x			$379,500	$379,500						
	5.06	Install a roof mounted energy recovery unit to provide ventilation.			x			x		$75,900		$75,900					
	5.07	Install transfer grilles in the common wall between the cafeteria and kitchen so the hood has make-up air when the doors are closed.			x					$15,180	$15,180						
	5.08	Install an energy-saving variable speed demand control kitchen hood control system.						x		$15,180	$15,180						
	5.09	Continue to provide routine maintenance on all the unit ventilators such as motor and shaft lubrication, filter changes and coil cleaning.					x			$22,770				$22,770			
	5.10	Replace heating and ventilating units at gym corners and add general exhaust.			x					$37,950				$37,950			
	5.11	Provide routine maintenance on all exhaust fans such as replacing belts and lubricating their motors and shafts. Replace fans as necessary.					x			$15,180				$15,180			
	5.12	Provide routine maintenance on all unit hears such as motor and shaft lubrication, filter replacement and coil cleaning.					x			$22,770				$22,770			
	5.13	Provide ventilation air to corridors through the use of ceiling mounted hot water fan coil units with ducted outdoor air connections.			x					$113,850			$113,850				
	5.14	Provide exhaust in the main copy room.	x		x					$15,180			$15,180				
	5.15	Provide ventilation in the 2nd floor conference room.	x		x					$22,770			$22,770				

	5.16	Replace portable classroom units with a permanent well insulated addition to the building, heated by the building's efficient gas-fired hot water heating system. If the portable classrooms are to remain in use, the rooftop units should be replaced with heat pump style rooftop units to minimize electric heating by capturing heat from the surrounding air.			x					$75,900			$75,900				
	5.17	Add motorized valves to each boiler to prevent the dilution of supply water temperature due to circulation through idle boilers. The energy savings from the efficiency of higher supply water temperatures will result in short payback.			x			x		$30,360				$30,360			
	5.18	Insulate refrigerant lines on roof that have deteriorated/missing insulation. The energy savings will result in short payback.					x	x		$3,036				$3,036			
		TOTAL									$409,860	$75,900	$239,844	$248,963	$974,567		
6	**Electrical**																
	6.01	Most of the existing electrical systems would need to be replaced under a renovation program in order to meet current codes. This includes generator, fire alarm, panelboards and lighting.		x						$6,128,688			$6,128,688				
	6.02	Replace original panelboards that are in poor condition.			x		x			$478,804			$478,804				
	6.03	Replace light fixture in gym that was not working.					x			$835	$835						
	6.04	Upgrade interior lighting.			x					$749,432			$749,432				
	6.05	Install occupancy sensors in rooms that don't have them.			x			x		$7,970	$7,970						
	6.06	Update exterior lighting to meet dark sky requirements.			x					$683	$683						
	6.07	Update emergency electrical system to meet current codes. Emergency equipment needs to be separated from normal equipment.		x						$416,351			$416,351				
	6.08	Upgrade the fire alarm system to be full coverage to meet code.		x						$478,804	$478,804						
	6.09	Install a fire alarm system with speaker/strobe to meet current codes.		x						$478,804			$478,804				
	6.10	Install a lightning protection system.	x		x					$95,761				$95,761			
	6.11	Upgrade the existing clock system; existing system is obsolete.			x					$143,641		$143,641					
	6.12	Update paging system.			x					$143,641		$143,641					
	6.13	Install new intrusion system; existing system is in poor condition.			x					$766,086		$766,086					
		TOTAL									$488,291	$1,053,368	$8,252,079	$95,761	$9,889,499		
7	**Plumbing**																
	7.01	Provide reduced pressure backflow preventers at Janitor's closet soap dispenser.			x					$7,590	$7,590						
	7.02	Provide plaster traps at art classroom sinks.			x					$7,590	$7,590						
	7.03	Provide acid resistant polypropylene piping for all acid waste from Science Classroom fixtures and direct the acid waste to an acid neutralization system.	x		x					$75,900				$75,900			
	7.04	Direct kitchen waste to an exterior grease trap (may be required by local sewer).	x	x	x					$22,770	x			$22,770			
	7.05	Install a high efficiency water heater, including master mixing valve, recirculated hot water and expansion tank on cold water make-up line.						x		$45,540		$45,540					
		TOTAL									$15,180	$45,540	$0	$98,670	$159,390		

8	**Fire Protection**																
	8.01	Install sprinkler system throughout	x	x						$1,249,053			$1,249,053				
		TOTAL									$0	$0	$1,249,053	$0	$1,249,053		
9	**Hazardous Material**																
	9.01	White pipe thread caulking was previously found to contain asbestos.							x								
	9.02	9"x9" Vinyl floor tile and mastic were either assumed or previously found to contain asbestos. The asbestos containing material was mostly found under newer vinyl floor tile and carpet.							x								
	9.03	Dark yellow caulking on concrete beams and columns was previously found to contain asbestos.							x								
	9.04	Brown glue daub on 1'x1' acoustical ceiling tiles was previously found to contain asbestos.							x								
	9.05	Pipe and hard joint insulation was previously found to contain asbestos.							x								
	9.06	Black foundation damproofing was previously found to contain asbestos.							x								
	9.07	Ceramic floor tile adhesive was previously found to contain asbestos.							x								
	9.08	Old flange gasket was previously found to contain asbestos.							x								
	9.09	Grey/brown masonry caulking was previously found to contain asbestos.							x								
	9.10	Insulation inside boilers was assumed to contain asbestos.							x								
	9.11	Exterior crème/ red expansion joint was previously found to contain asbestos.							x								
	9.12	Exterior unit vent grille caulking was found to contain asbestos.							x								
	9.13	Glue holding blackboard was assumed to contain asbestos.							x								
	9.14	Rubber flooring was assumed to contain mercury.							x								
	9.15	Underground sewer pipe was assumed to contain asbestos.							x								
	9.16	Damproofing on exterior and foundation walls was assumed to contain asbestos.							x								
	9.17	Roofing materials were assumed to contain asbestos.							x								
	9.18	Painted surfaces were assumed to be lead based paint.							x								
	9.19	Caulking materials were assumed to contain PCB's.							x							Haz/Mat includes cost associated with complete renovation or demolition; additional costs are included should results exceed EPA limits	
	9.20	Replace various equipment such as tubes, thermostats, exit signs and switches that were assumed to contain mercury.							x								
		HAZMAT ALLOWANCE								$2,640,000			$2,640,000		$2,640,000		

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 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.