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July 12, 2019

Mr. Brian O'Connell, Business Manager
Haverhill Public Schools
4 Summer Street, Suite 104
Haverhill, MA 01830

Re: School Building Needs Assessment
Whittier Middle School
Haverhill, Massachusetts
RBA Project No. 2019023

Dear Mr. O'Connell:

As requested, a review of the HVAC and Plumbing Systems and Structural components have been conducted at the Whittier Middle School in Haverhill, MA in the months of April through June 2019. The intent of this report is to provide an overview of existing HVAC, plumbing and structural conditions taken with a view to keeping the school in sound order and operative condition until eventual replacement of the structure, or its major renovation, in five to ten years, the impact of those conditions, and to outline repair options and the resulting construction cost estimates. The information contained below has been obtained from site visits, review of available drawings, and site observations. This section of the report covers the structural assessment. The section of the report outlining the HVAC and Plumbing can be found following this section of the report.

Overview

Whittier Middle School is a one-story building with multiple roof heights composed of wood, masonry, concrete, and steel. The building is located in Haverhill, Massachusetts, built circa 1957. Architectural and structural drawings are available, on which documentation of the discussion in this report is largely based. Floor structure is mainly 4" concrete one-way slab that creates a small crawl space below; the slabs span to concrete girders which span to concrete columns which transfer loads to the ground. The floor structures for the gymnasium and auditorium/cafeteria are both a 4" concrete slab on grade, loads are transferred directly to the ground. The roof structure is made up of laminated wood beams, of various sizes, which pitch towards roof drains, ¼" per foot. The beams span wall to wall to steel wide flange columns that are anchored to the footings below. The exterior walls are composed of concrete masonry units (CMU) block with brick facing. The interior partition walls are CMU block that are aligned with the steel columns and are abutted up to the columns. The roof is a built up roofing system with multiple plies and insulation that sits atop a 3" wide wood tongue and groove plank roof deck.

Investigation

The investigation for this report consisted primarily of a review of the existing conditions and a review of the available existing architectural and structural drawings. Physical review of existing conditions in the field was made by observations of exposed areas, both the exterior and interior areas. Floor hatches made it possible to observe crawl space areas and view slab conditions on

the underside. Information was gathered by removing ceiling tiles in the corridors and viewing conditions of exposed framing of laminated wood beams and connections. The classrooms have exposed laminated wood beams usually showing the bottom of the roof decking as well.

In a couple of areas of the structure, there was damage observed, reportedly due to a failure in the HVAC system. This appears to have occurred in a couple of locker rooms and, it was reported that the areas have been closed for quite a while. Steam was let out of the pipes and into the room and because of the exposed framing, the moisture caused deterioration and failure in the roof deck. It appears that the laminated wood beams affected may have also experienced moisture deterioration. Further investigated of the specific areas would be necessary to determine the extent of the deterioration present, however it is obvious that there has been failure of various roof deck members. Temporary shoring has been placed in these areas until repairs are made. Access to these areas should be restricted.

The chimney is another area of concern encountered during the investigation. A significant number of cracks were observed throughout the chimney from the base in the boiler room, to the top above the roof. Haverhill building staff noted that there was has been a new flue liner that was installed within the past 15 years because the chimney would leak air flow through the brick façade before making it to the top. The new flue liner may have extended its life and improved the air flow, but further investigation is needed to determine if the chimney needs to be repointed or rebuilt. It is clear there is a significant crack in the structure of the chimney at the base in the CMU wall. It is not clear if the crack stops at the roofline, or if the crack above is just the brick veneer. Further investigation is necessary at this area to determine if complete rebuilding is necessary, or if the chimney will have to be repointed.

The CMU walls are for the most part non-bearing and are aligned with beams and columns both exterior and interior. These CMU walls are abutted to the wide flange columns. End conditions of these CMU walls at top, bottom, and ends were observed and appear to not have any type of moment connection where it would be able to transfer loads it experiences to the structural framing. We would suspect the CMU walls to be connected to the steel columns with shear studs that are welded to the steel. The CMU walls do experience some live loads such as wind, rain, seismic, and internal pressure, so it is necessary to have a sufficient structural connection to the structure. The structural drawings do not call out any type of tie-ins with the columns or the slab it sits on. There were areas where the wall abuts to the top flange of the steel column and there is a little daylight between the two. Through the gap there does not appear to be any connection to each other like the shear studs. There was no evidence of significant movement or problems within the CMU walls resulting in cracking, etc. A more thorough investigation involving test cuts would need to be conducted in order to perform a complete structural analysis of the CMU wall structure both exterior and interior.

Additional minor issues were observed such as the sealant expansion/control joints. Most sealant joints have failed and are in need of replacement. Masonry mortar joints on the CMU walls and brick facing need repointing in many areas. Also, there is a connection on the steel entrance canopy that is missing bolts and appears to have been damaged by impact from a vehicle.

Available existing architectural and structural drawings are mainly complete; showing most conditions and connections. The current investigation was not conceived as a definitive study, but as a preliminary effort to map out the probable scope of problems and develop preliminary typical details and cost estimates for likely repairs. A more complete field investigation would be required in advance of any final repair design.

Building Code Review

The first edition of the Massachusetts State Building Code was not enacted until January 1, 1975. Therefore, there was no official building code in effect when this building was constructed in 1957. There have been no additions to the building since the original construction, and no significant renovations that would have triggered building code upgrades.

If there are any significant renovations or additions performed at the building, the Massachusetts State Building Code current at the time of the renovations (current code is the 9th Edition) must be followed, and many of the existing conditions will be required to be brought into conformance with that code. This will also include full compliance with the applicable MAAB codes.

Structural Concerns

The main structural concern is the areas in which were damaged by failures within the steam heating system (Locker Rooms). The roof decking should be replaced, and damaged beams repaired or replaced, in the affected areas so the temporary shoring can be removed, and the locker rooms can be restored. To allow proper installation of new roof decking, the roofing above will need to be removed and replaced above. The laminated beams in the area that were affected should be investigated further to determine the extent of moisture related rot and deterioration, to determine if the beam(s) still have the required structural capacity. The beam(s) will need to be treated or replaced based on the findings and calculations.

The chimney is the second concern, it has major cracks in the CMU at the base and major cracks in the brick veneer at the top. Further investigation would be required to determine if the cracking in the CMU has continued the up the chimney. Cracks in the CMU or back-up wall towards the top of the chimney would require the chimney to be removed and be rebuilt or repaired. The chimney is a tall, slender structure that will only get worse over time if not treated. The new flue may have slowed down deterioration, but major cracks will lead to failure.

The CMU walls have not been a problem in the past and they appear to be in good condition with some cracks mostly on the high walls in the gymnasium and cafeteria and also at doorways. The doorways have lintels that are called out in the structural drawings as masonry lintels with rebar, it doesn't specify the size or number within the CMU block. No structural information has been called out associated with the CMU walls, and investigation of end connection will need to be conducted in order to run analysis of the component. Any significant renovation would possibly trigger the requirement for structural reinforcement of these walls, to meet current building code requirements.

Masonry and expansion sealant joints are a concern. The sealant joints along the walls have dried and are cracking. The cracking has led to separation in the joint and is allowing water to enter. This should be treated before it leads to leaks and deterioration. In addition, brick veneer and CMU interior walls need repointing in various areas.

The small issues of repointing, the sealant joints, and the missing bolts in the canopy are not of high priority and can be completed after the higher priority items noted above, or in conjunction with those items.

In the opinion of the authors of this report, the existing state of the building overall, other than the specific issues noted, is in good structural condition. The biggest concern would be the deteriorated roof decking and laminated beams; the beams will need to be examined further to

conclude proper restoration. All items will be covered in the 'Structural Repairs' section below and estimate.

Structural Repairs

The issues in the locker rooms, including replacement of the roof decking and repairs to the laminated beams in the affected areas, will need to be investigated further. In areas, it appears that the roof decking has been a problem in the past (possibly due to roof leaks) and has had replacement before. Future moisture in this locker room needs to be corrected and/or proper ventilation will need to be added if this is to be used as a locker room in the future, in order for this issue to stop occurring. Once the HVAC problem has been resolved (if it has not already been completed), we recommend replacement of the affected deteriorated roof decking by tearing off the roof above. The areas of roof will be replaced and new roof decking can be installed. The extent of rot on the laminated wood beams will be determined and treated with either repairs to the existing beams, or replacement, as required.

Repair on the chimney will need to be investigated further to determine if the cracking in the CMU backup continues to the top where the brick facing is cracked. This will be investigated with test cuts in the brick. If there are significant cracks in the back-up, the chimney will need to be rebuilt from potentially the base in the boiler room to the top, above the roof. Otherwise partial repairs to the cracks, and repointing above the roof line may be warranted.

Repair or reinforcing of the CMU walls, which are suspected to be deficient under wind loads, was not specifically investigated for this report. Such investigation should be considered, especially if further study confirms the deficiency of the walls, or significant alterations to the building trigger the required code updates. The repair could involve cutting into walls at all end connections to the steel columns and adding shear studs or similar to provide a connection for the wall to transfer loads to the structure.

Minor repointing of brick and CMU are needed throughout the building, along with sealant replacement at the expansion joints on wall elevations. Missing connection bolts and damage at front entrance canopy roof should be repaired to prevent further damage.

Costs and Construction Phasing

As requested, we have developed preliminary construction cost estimates for the repairs highlighted. Structural details will need to be developed and quantified in order to produce more accurate construction cost estimates. These estimates are based on our experience with previous jobs of similar scope of work.

Our estimated costs for the Structural items noted, with further detail included in the attached spreadsheet, is **$250,000.**

As noted in the attached HVAC and Plumbing Report and Cost Estimate, the cost to bring the building up to current standards is very significant. The cost for this work would be approximately **$2,900,000.**

The estimated construction cost found above do not include costs for further engineering investigation, design and project coordination. These costs will be dependent upon the phasing of the project and amount of additional investigation undertaken, and can be discussed further, if desired.

Further Investigations

In order to perform final design of any repairs, and to further refine construction cost estimates, further field investigations would be required.

Further investigations would include test cuts within the roof system and wood components, to determine the extent of the deterioration in the locker room areas, as well as further investigation as to the securement of the CMU infill wall areas. Also test cuts through the masonry at various locations at the chimney would be performed to determine the condition of the chimney structure.

Summary

As stated above, it is the opinion of the authors of this report that the existing building overall, other than the specific issues noted, is in good structural condition. As the report indicates, the structural issues are the result of leaks (steam) in the mechanical systems, this moisture caused the laminated beams and wood plank roof plank to rot and deteriorate. Some of the issues highlighted in the mechanical/plumbing report should also be priority as the structural issues seem to have stemmed from mechanical issues.

The current exterior wall configuration does not meet current building codes and, based on current codes, could be hazardous in earthquake and high wind conditions. A more thorough investigation and subsequent design process should be anticipated if there are any expansion or significant upgrades anticipated at the school.

Following your review of this report, a review meeting should be scheduled to discuss this report and to answer any questions you may have, and any work moving forward.

Sincerely,

Andrew N. Barr, P.E.
Principal

David J. Sacco, E.I.T.
Assistant Project Engineer

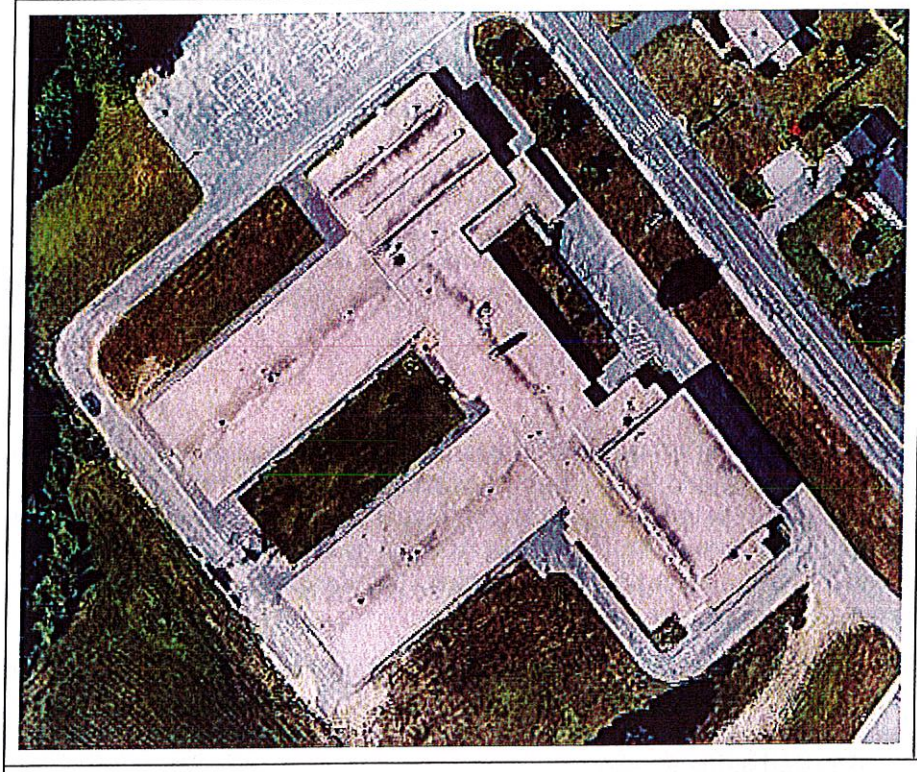

Photo No. 01

Location:
Haverhill Whittier Middle School

Description:
Aerial view of Haverhill Whittier Middle School.

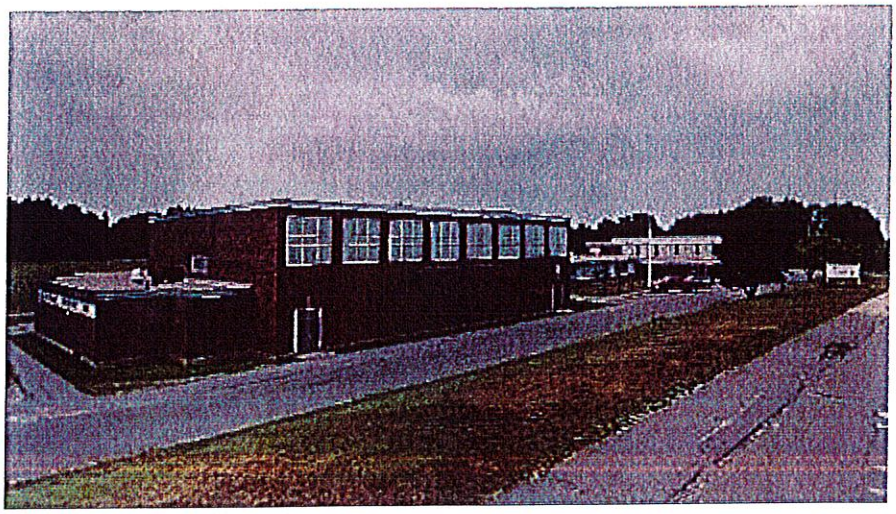

Photo No. 02

Location:
Haverhill Whittier Middle School

Description:
Street view of building.

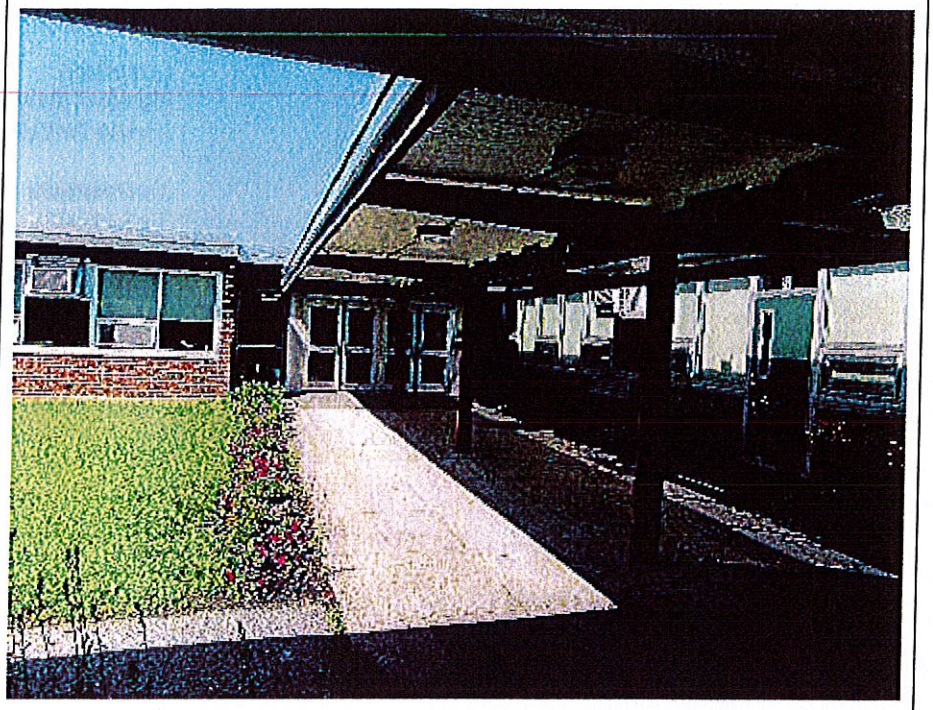

Photo No. 03

Location:
Haverhill Whittier Middle School

Description:
Main Entrance to the building.

Photo No. 04

Location:
Haverhill Whittier Middle School

Description:
View from parking lot of building (North).

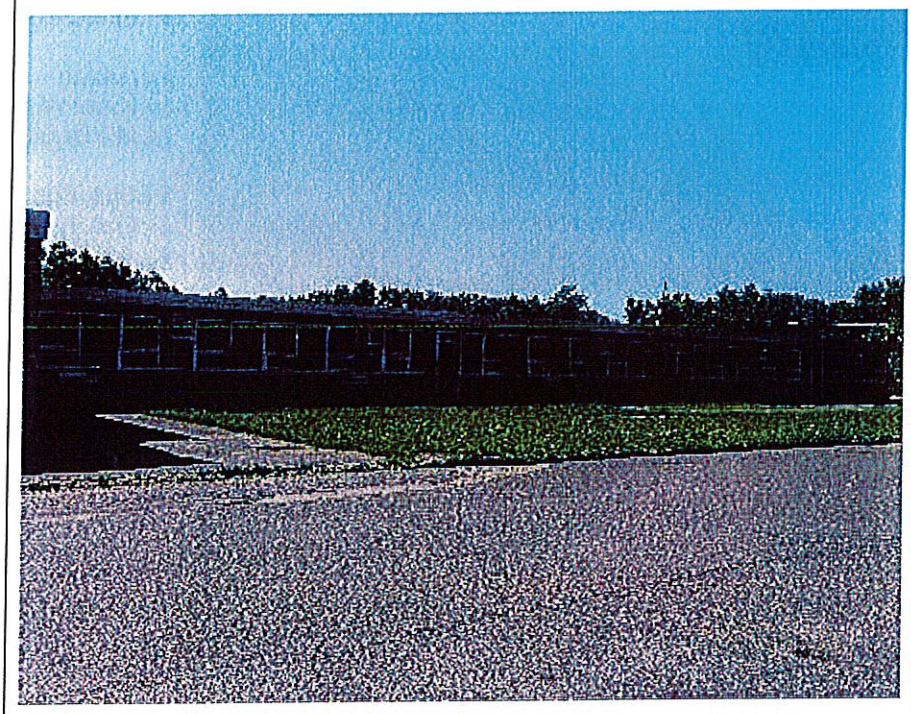

Photo No. 05

Location:
Haverhill Whittier Middle School

Description:
Typical wall elevation with half wall of brick face and windows above.

Photo No. 06

Location:
Haverhill Whittier Middle School

Description:
Expansion/control joint in masonry wall is cracked and separating.

Photo No. 07

Location:
Haverhill Whittier Middle School

Description:
Photo of typical roof area.

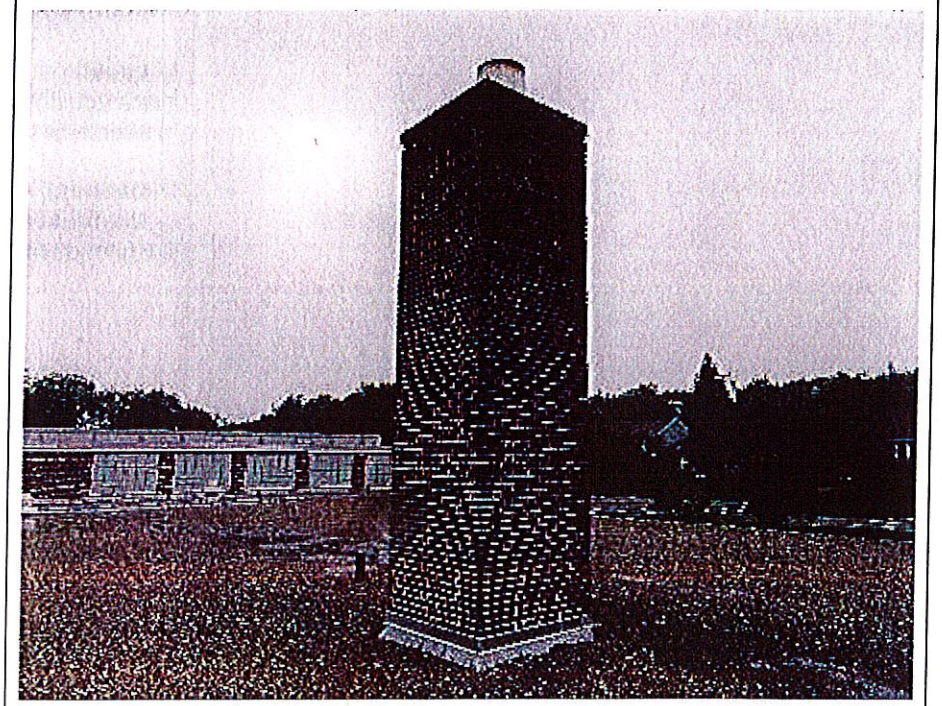

Photo No. 08

Location:
Haverhill Whittier Middle School

Description:
Photo of existing chimney that has major cracks in masonry.

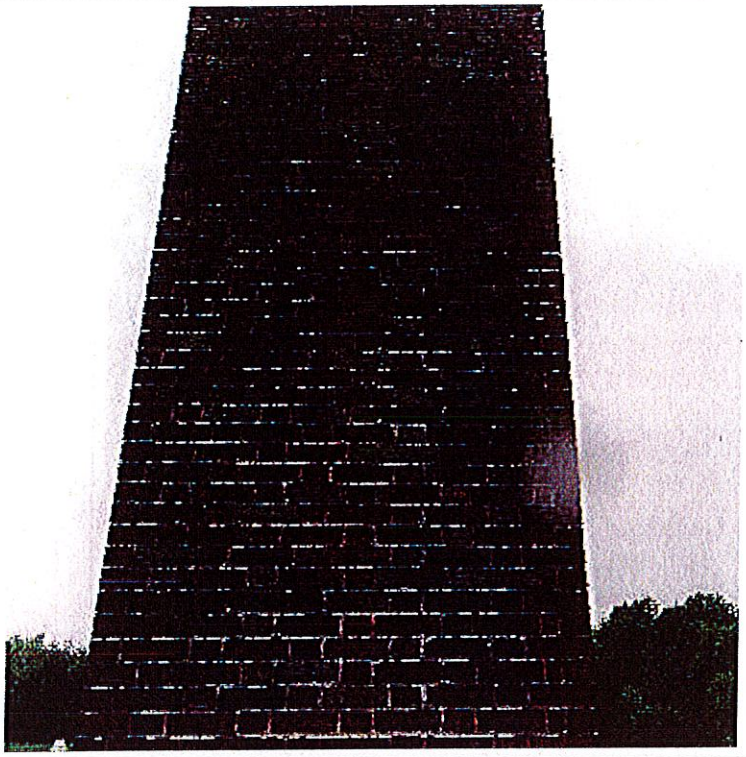

Photo No. 09

Location:
Haverhill Whittier Middle School

Description:
Close up of cracks in masonry of chimney.

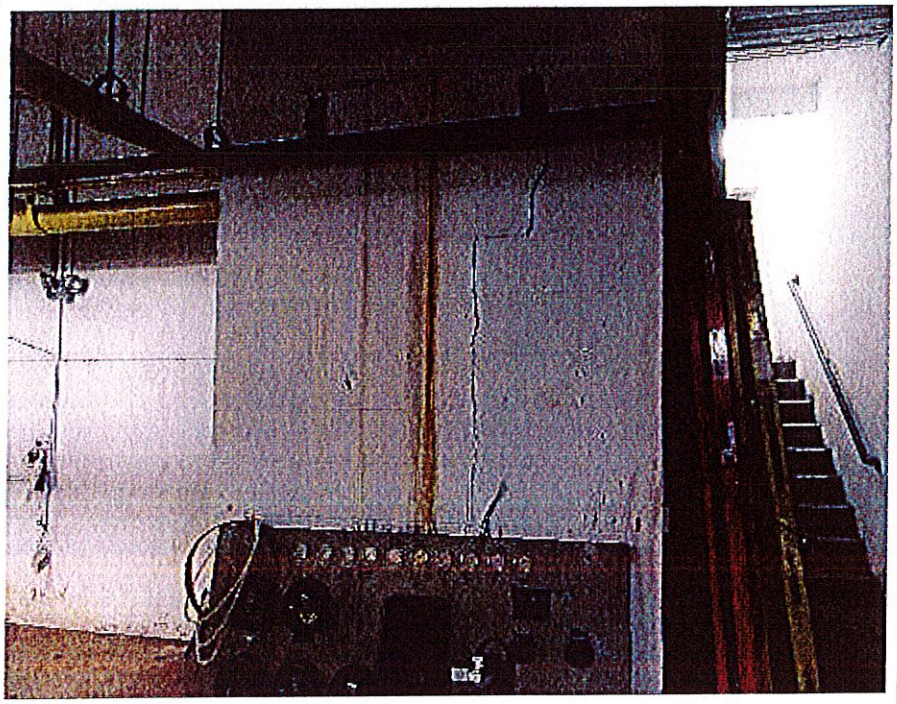

Photo No. 10

Location:
Haverhill Whittier Middle School

Description:
Crack at base of chimney masonry.

Photo No. 11

Location:
Haverhill Whittier Middle School

Description:
Missing bolt in front canopy, can lead to further damage.

Photo No. 12

Location:
Haverhill Whittier Middle School

Description:
Typical classroom which has exposed laminated wood beams and plank roof deck.

Photo No. 13

Location:
Haverhill Whittier Middle School

Description:
Typical intersection of roof joists to column with seats in interior space.

Photo No. 14

Location:
Haverhill Whittier Middle School

Description:
Typical connection of laminated wood beams to steel columns on exterior wall.

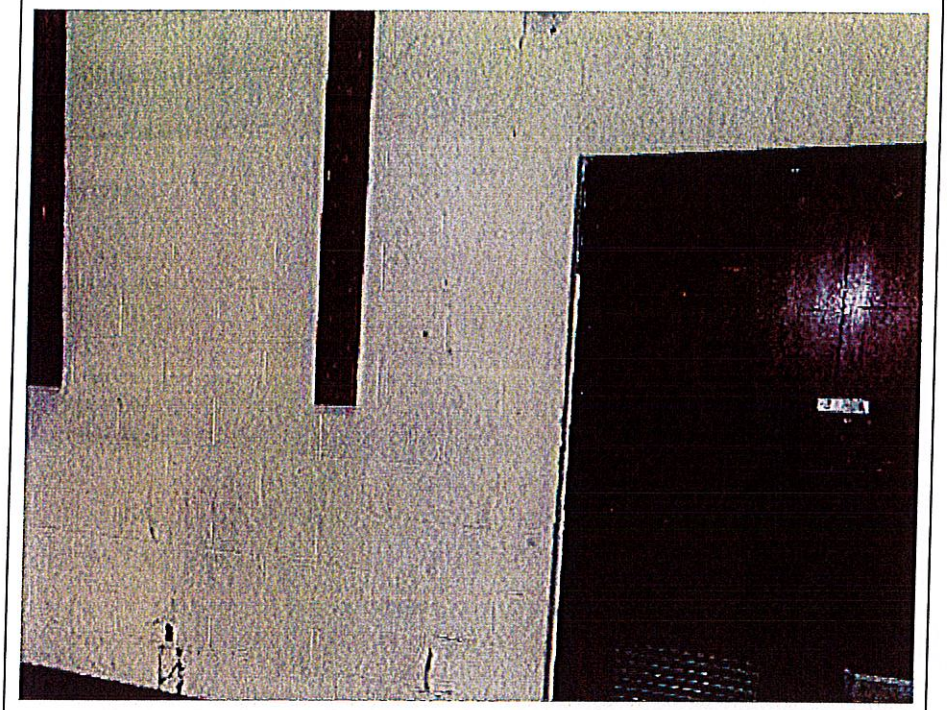

Photo No. 15

Location:
Haverhill Whittier Middle School

Description:
Typical step cracks in CMU walls.

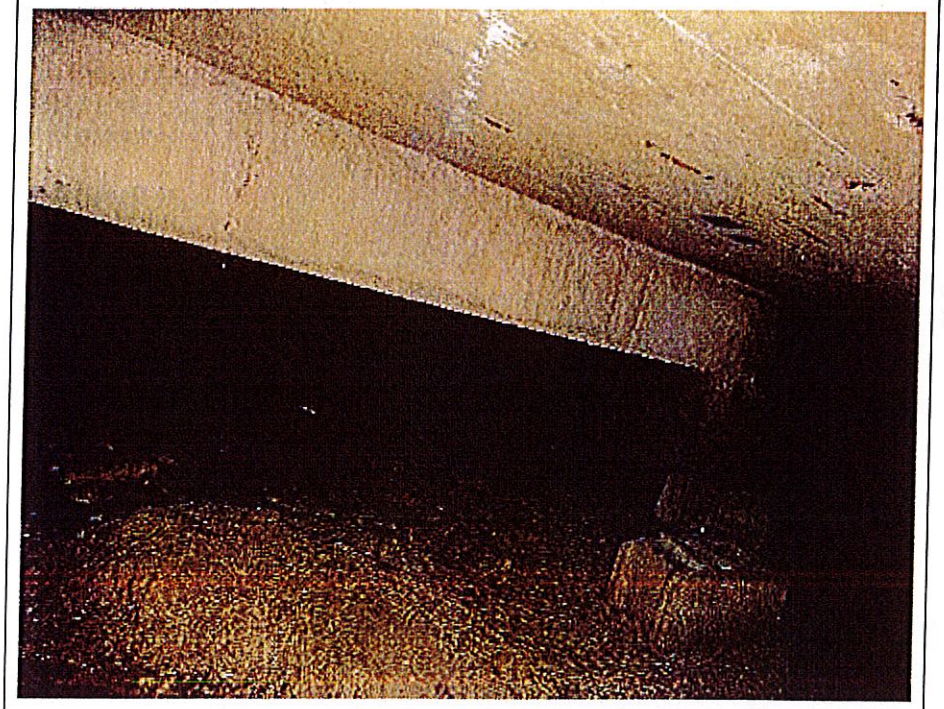

Photo No. 16

Location:
Haverhill Whittier Middle School

Description:
Typical crawl space area showing under side of concrete floor deck.

Photo No. 17

Location:
Haverhill Whittier Middle School

Description:
Girls locker room experienced steam leak causing deterioration and failure in roof decking. Temporary shoring has been installed.

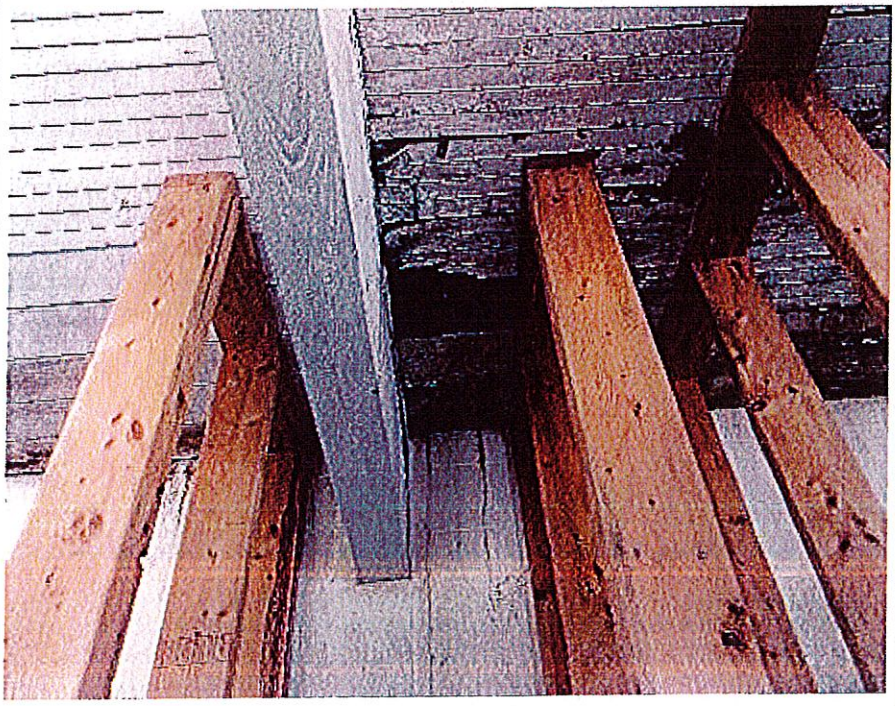

Photo No. 18

Location:
Haverhill Whittier Middle School

Description:
Another photo showing extent of deterioration in roof decking due to steam leak.

BLW ENGINEERS

Whittier Middle School
256 Concord Street
Haverhill, MA 01830

HVAC & Plumbing Evaluation

Prepared For:

Russo Barr Associates, Inc.
55 Sixth Road, Suite 6
Woburn, MA 01801

July 12, 2019

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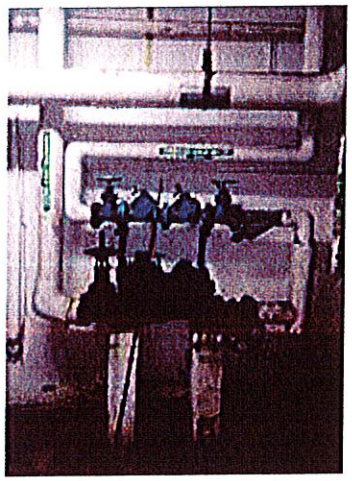
PLUMBING

Summary

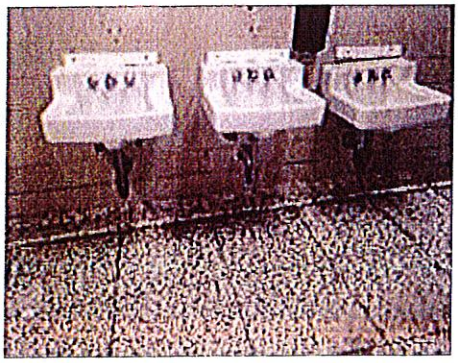
The existing building's construction, dates back to 1957. The building is a one story, 54,500 sq.ft. area. The building is housing grades 5 thru 8 and has current student occupant count of 477. The building has six, student dedicated bathroom groups, near the classrooms. Two bathroom groups are provided as a Teacher's bathrooms and two single occupant bathrooms are serving the main and the nurse's offices. The building has a gymnasium with two bathroom/shower rooms.

Plumbing Existing Conditions

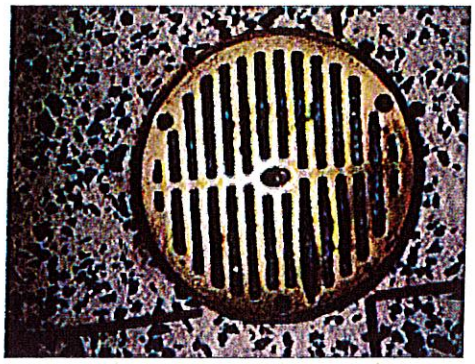
The building is currently provided with municipal domestic water and sanitary connections. The domestic water service is 4" in size with 4" compound water meter and 3" backflow preventer located at the basement level. Based on the existing drawings provided it appears that the building has multiple sanitary and storm drain connections to the street. There is a 5" sanitary connection located near the kitchen and dinig area where is also existing an 8" storm drain. There are also 8" sanitary and two 6" storm drain connections located at the opposite end of the building. The building has two gas service connections, one dedicated to the commercial kitchen and the other supplying the HVAC equipment as well as the domestic hot water equipment. All piping and the majority of the plumbing fixtures appeared original to the building construction. Currently an ongoing renovation has completed one of the bathrooms and all plumbing fixtures were updated. The bathrooms/showers next to the gymnasium are non functional and the plumaing fixtures are either removed or damaged. The domestic hot water system has been upgradet around 2003 and replaced the old heat exchanger and storage tank with 84% efficient gas fired boiler with small 60 gallon storage tank. The commercial kitchen appears to be partially functioning, and all equipment, fixtures and their connections require replacement and an upgrade. All roof drains appear obstructed and retainig water puddles around them. Some drains alaso show signs of corrosion and water damage of the rooms below.



Domestic Water Service

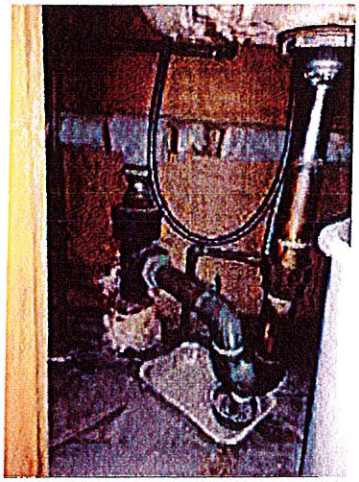


Plumbing fixtures - Lavatories



Floor Drain

Plumbing Fixtures - Water Closet



Plumibng Piping

Plumbing Piping

Plumbing Recommendations

All sanitary, storm and domestic water piping shall be replaced. The current plumbing upgrade shall be postponed and complete bathroom renovation shall be considered in order to bring them up to code meeting the accessability requirements as well as to repair the damaged bathrooms next to the gymnasium. The domestic hot water heating system is getting closer to the end of its life expectancy and shall be replaced with new, more efficient system. The water service accwssories, such as meter and backflow preventer shall be replaced. The roof drains shall be replaced, during the roof replacement. All sanitary and storm drain connections shall be hydrojetted and video inspected for potential pipe damage. The commercial kitchen shall be provided with grease interceptor and all new sinks and floor drains, in compliance with Department of Health regulations. CO detection and notification shall be added to the area around the gas fired appliances.

End of Plumbing Section

MECHANICAL

Summary

The Whittier Middle School is a 54,500 square foot building construction circa 1957.

Mechanical Existing Conditions

The boiler room is located on a lower level of the building; it provides steam for heating to the building. The gas fired steam system consists of two Smith 28A-14 cast iron sectional boilers, a duplex boiler feed tank, boiler breeching system to an existing masonry chimney, combustion air ducted down to 12" above finished floors from a wall louvers, pneumatic controls and partial DDC automatic controls that were installed in energy performance service contract. The boilers are provided with a reduced pressure backflow preventor for protected water for boiler makeup water, a boiler blow down tank with water regulating valve to temper blowdown water into the sanitary system and emergency shutdown switches in accordance with applicable codes. The steam is transported from the boilers to building heating terminal equipment through insulated steam supply piping and returned to the boiler feed tank through an insulated low pressure condensate piping system; it should be noted that there was significant that significant water was being leaked on the boiler room floor from a pipe penetration in an existing wall indicating that the existing piping system has deteriorated . The older insulation appears to be asbestos containing materials.

Classrooms are provided with unit ventilators to provide classroom heating and ventilating; the unit ventilators are original construction. Each unit is controlled by a wall mounted pneumatic thermostat. Units are provided with a steam heating coils with 2-way control valves interconnected to the stea, distribution piping system. Classroom is exhaust is through an exhaust register at the floor level on the corridor wall into a horizontal exhaust duct distribution system and exhausted to the outdoors through a roof exhaust fan. The classrooms are provided with permanently mounted through window air conditioning units.

Administration areas have been provided with steam fintube radiation for heating and through wall air conditioning units for exterior offices; ventilation is through operable windows and destratification fans.

The Library is heated, ventilated and air conditioned in the same manner as the classrooms.

The Gymnasium is provided with heating and ventilation from two (2) heating vertical air handling units at each end of the gym and utility exhaust fans located on adjacent roofs; air handling units are original construction. The space return/exhaust register is located at the floor level adjacent to each air handling unit and is either return to the air handling unit or exhausted to the outdoors through pneumatic dampers depending on the occupancy of the gym; outdoor is provided from a wall louver directly to each air handling unit and controlled by a pneumatic damper. The units are provided with steam heating interconnected to the steam distribution piping system and controlled by a pneumatic thermostat and a two-way steam control valve

Locker Rooms are provided with makeup air units and fintube radiation to provide heating and ventilating; controlled by a wall mounted pneumatic thermostat and steam control valves. Each unit is interconnected to the steam distribution piping system. Locker Room exhaust is through an exhaust register into a horizontal exhaust duct distribution system and exhausted to the outdoors through a roof exhaust fan.

The Cafeteria is provided with heating and ventilation from a steam heating air handling unit located in a storage closet and utility exhaust fan located on adjacent roof and ducted in the ceiling space to supply air diffusers; the air handling

unit is original construction. Two space return/exhaust registers are located at the floor level on each side of the cafeteria and ducted under the platform back to the air handling unit/roof exhaust fan; air is either returned to the air handling unit or exhausted to the outdoors through pneumatic dampers depending on the occupancy of the cafeteria; outdoor is provided from an outdoor air intake directly to each air handling unit and controlled by a pneumatic damper. The unit is provided with steam heating interconnected to the steam distribution piping system and controlled by a pneumatic thermostat and a two-way steam control valve.

The Kitchen/Servery has been provided with a heating/ventilating to provide space heating and ventilating and supplemental steam fintube radiation; the unit is original construction. The unit and fintube radiation are controlled by a wall mounted pneumatic thermostat and two way control valves. The heating/ventilating unit and fintube radiation are interconnected to the steam distribution piping system. The kitchen hood is provided with a duct system to roof mounted exhaust fan.

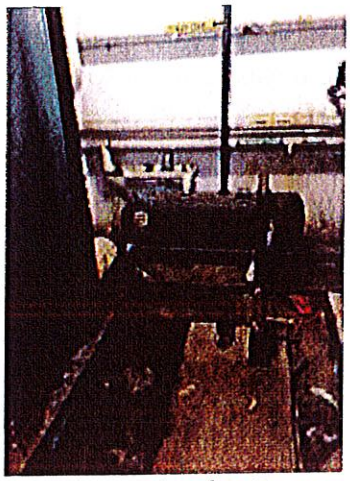
The corridors are provided with heating by convectors or cabinet unit heaters interconnected to the steam distribution piping system. Entries and vestibules are heated by cabinet heaters or fintube radiation interconnected to the steam distribution piping system; controlled by a wall mounted pneumatic thermostat and two-way control valve.

Each toilet is provided with exhaust through wall mounted exhaust register(s) to provide exhaust from the space by a roof mounted exhaust fans through a low pressure duct distribution system. Each exhaust fan operates continuously during occupied hours and be deenergized during unoccupied hours. Heating, where required, is provided by wall convectors or fintube radiation interconnected to the steam distribution piping system; controlled by a wall mounted pneumatic thermostat and two-way control valve.

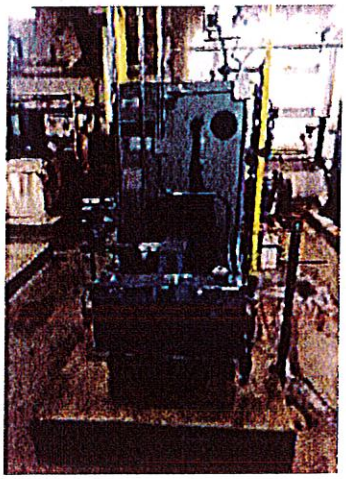
Each custodial is provided with exhaust through ceiling exhaust register(s) to provide exhaust from the space by a roof mounted exhaust fans through a low pressure duct distribution system. Each exhaust fan operates continuously during occupied hours/deenergized during unoccupied hours.

Miscellaneous spaces, such as storage rooms, are provided with hot water heating, where required, and an exhaust air system in accordance with applicable code requirements.

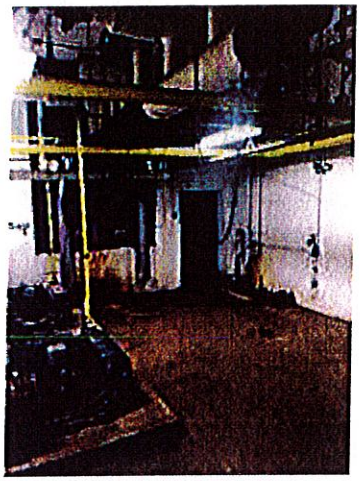
All automatic temperature controls, except new DDC controls installed in the boiler renovation project, are pneumatic.



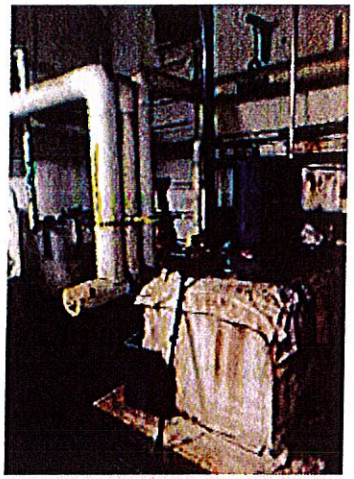
Existing Boiler Blow Down



Existing Steam Boiler



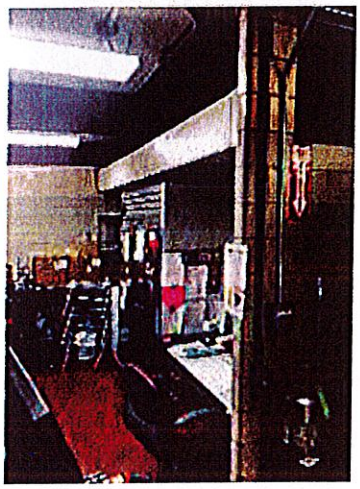
Existing Combustion Air



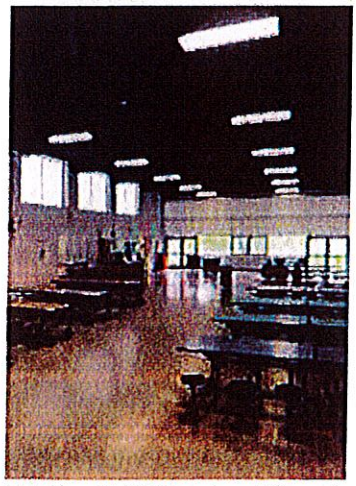
Existing Boiler Feed Unit Existing

Existing Steam Convector

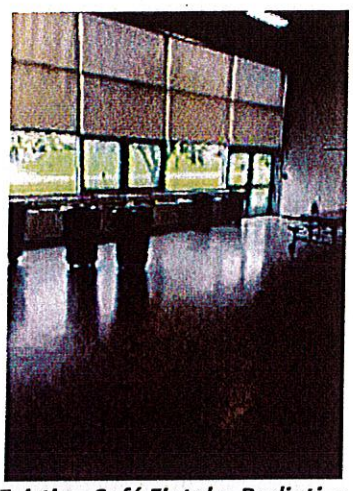
Existing Café Return/Exhaust



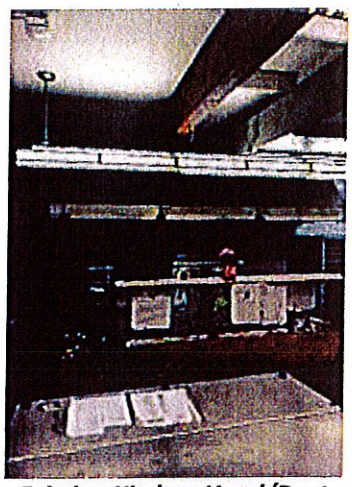
Existing Kitchen Makeup Air Duct



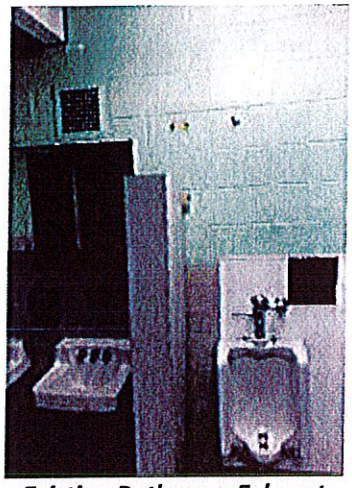
Existing Café Overhead Supply



Existing Café Fintube Radiation



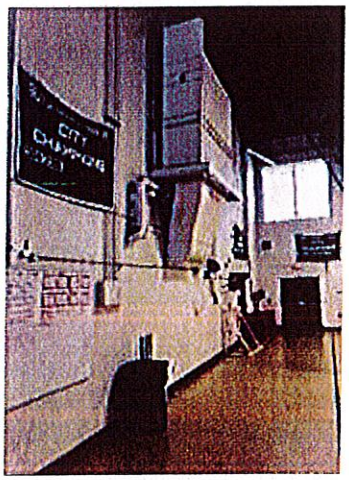
Existing Kitchen Hood/Duct



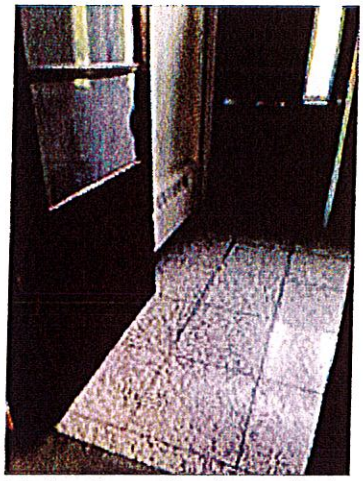
Existing Bathroom Exhaust

Existing Entry Cabinet Heater

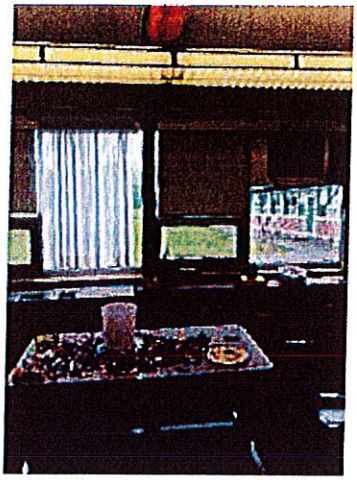
Existing Classroom Exhaust



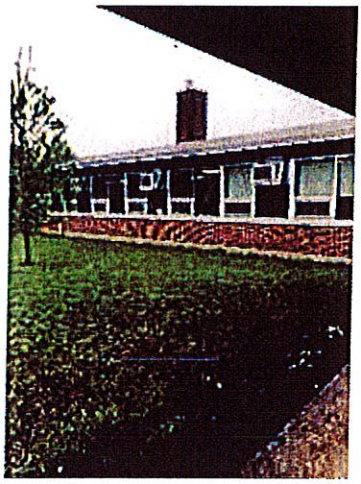
Existing Gym Unit



Existing Entry Fintube Radiation



Existing Classroom UV/AC



Existing Classroom AC Units

Mechanical Recommendations

1. The existing steam heating system has long exceeded its expected life and will require replacement in its entirety including piping systems; a new hot water heating system is recommended.
2. Replace existing steam heating system with new hot water systems including three (3) 2,000 MBH gas fired condensing boilers, two (2) hot water circulating pumps with variable speed controls, water specialties, new insulated hot water distribution piping system to new hot water terminal equipment throughout the building; and new automatic temperature controls.
3. Replace all existing unit ventilators with new hot water unit ventilators with
4. hot water coils interconnected to the new hot water distribution piping systems and DDC controls.
5. Provide new hot water heating heating/DX cooling/ventilation air handling/rooftop units for Cafeteria, Gymnasium and Administration offices with hot water coils interconnected to the new hot water distribution piping systems, new insulated duct distribution systems, air outlets and DDC Controls.

6. Provide new hot water heating ventilation units interconnected to the new hot water heating system and new DDC Controls for the locker rooms.
7. Provide new grease duct, roof upblast and hot water heating makeup air system for Kitchen.
8. Replace all existing terminal heating equipment (CUH/UH/FTR) with new hot water heating equipment and DDC controls.
9. Replace all existing roof fans with new roof fans with new DDC Controls.
10. Clean all existing ductwork to be reused.
11. Balance and Commission all new systems.

End of Mechanical Section

BLW

BLW ENGINEERS, INC.

311 Great Road, Post Office Box 1551, Littleton, Massachusesetts 01460 tel 978.486.4301 fax 978.428.0067 e-mail info@blwengineers.com

CONDITION ASSESSMENT REPORT ESTIMATED CONSTRUCTION COST

Project phase: Evaluation	**Project:** Whitter Middle School		**Sheet**
Trade Specification Section: 23 00 00	Haverhill, MA		1 of 1
			Date
By: KRB **Checked By:** KRB	**Project Number:** 19184.00		07.15.18

Description	Qty	Units	Material		Labor		Total
			Unit Cost	Total	Unit Cost	Total	
Division 23 - HVAC							
Demolition	1	LS			75,000	75,000	75,000
Condensing Boiler - 1500 MBH Input	3	EA	48,000	144,000	12,000	36,000	180,000
Boiler Pumps (144 gpm)	3	EA	2,500	7,500	750	2,250	9,750
Building Pumps (300 gpm)	2	EA	5,000	10,000	1,500	3,000	13,000
Water Specialties	1	LS	10,000	10,000	15,000	15,000	25,000
Piping, Insulation & Valves	54,500	LS	3	163,500	4	218,000	381,500
Vents & Combustion Air	3	EA	2,500	7,500	5,000	15,000	22,500
Locker Room Makeup Air Units (1600 cfm)	2	EA	15,000	30,000	5,000	10,000	40,000
Cafeteria Air Handling Unit/DX Cooling (25 tons)	1	EA	100,000	100,000	15,000	15,000	115,000
Gym Air Handling Unit/DX Cooling (12.5 tons)	2	EA	50,000	100,000	12,500	25,000	125,000
Classroom Unit Ventilators	25	EA	8,000	200,000	4,000	100,000	300,000
Roof Exhaust Fans	12	EA	3,250	39,000	1,250	15,000	54,000
FTR, CUH, UH	1	LS	75,000	75,000	50,000	50,000	125,000
Kitchen Hood Exhaust Fan	1	EA	7,500	7,500	15,000	15,000	22,500
Ductwork, Air Outlets, Insulation	1	LS	50,000	50,000	100,000	100,000	150,000
Automatic Temperature Controls	54,500	SF	4	218,000	3	163,500	381,500
Duct Cleaning	1	LS			50,000	50,000	50,000
Testing and Balancing	1	LS			37,500	37,500	37,500
Commissioning	54,500	SF			1	54,500	54,500
Subtotal				$ 1,162,000		$ 999,750	$ 2,161,750
15% Overhead & Profit							$ 324,263
Subtotal							$ 2,486,013
15% Contingency							$ 372,902
						TOTAL	$ 2,858,914

RBA

RUSSO BARR ASSOCIATES, INC.

55 Sixth Road, Suite 6, Woburn, Massachusetts 01801 tel 781.273.1537 fax 781.273.1695 e-mail info@russobarr.com

CONDITION ASSESSMENT REPORT ESTIMATED CONSTRUCTION COST

Project: Structural Assessment Estimate Construction Cost
Whittier Middle School
292 Concord Street
Haverhill, Massachusetts

Sheet 1 of 1

Date 7/12/2019

Project Number: 2019023

			Description	Materials & Labor Qty	Units	Unit Cost	Total
	Condition Assessment Report Construction Cost Estimate						
CSI DIVISION							
1	**General Requirments**						
		Permits, Bonds & Insurance			2%		$3,700
		General Conditions			10%		$18,500
		Mobilization			9%		$16,650
		Overhead & Profit			15%		$27,750
						Division 1 Sub Total	**$66,600**
2	**Existing Conditions**						
	024100 - Demolition		Bring chimney down to a structurally sound level in order to rebuild	1	LS	$15,000.00	$15,000
						Division 2 Sub Total	**$15,000**
4	**Masonry**						
	045500 - Masonry Restoration		Repoint 50% masonry	1	LS	$10,000.00	$10,000
			Rebuild chimney	1	LS	$70,000.00	$70,000
			Cmu wall connection upgrade	1	LS	$50,000.00	$50,000
						Division 4 Sub Total	**$130,000**
6	**Carpentry**						
	061063 - Rough Carpentry		Deteriorated Wood plank Deck Replacement	1	LS	$25,000.00	$25,000
			Laminate beam treatment	1	LS	$10,000.00	$10,000
						Division 6 Sub Total	**$35,000**
7	**Thermal and Moisture Protection**						
	075500 - Roofing		Built up roofing patches	1	LS	$5,000.00	$5,000
						Division 7 Sub Total	**$5,000**
			SubTotal				$251,600
			Design Contingency (not included)				$0
			Estimated Construction Cost Total				**$251,600**
TOTAL CONDITION ASSESSMENT REPORT ESTIMATED CONSTRUCTION COST							**$251,600**