W. EDWARD BALMER ELEMENTARY SCHOOL

NORTHBRIDGE PUBLIC SCHOOLS
TOWN OF NORTHBRIDGE, MASSACHUSETTS

PRELIMINARY DESIGN PROGRAM, SECTION 3.1.4

EVALUATION OF EXISTING CONDITIONS

ISSUED SEPTEMBER 11, 2017

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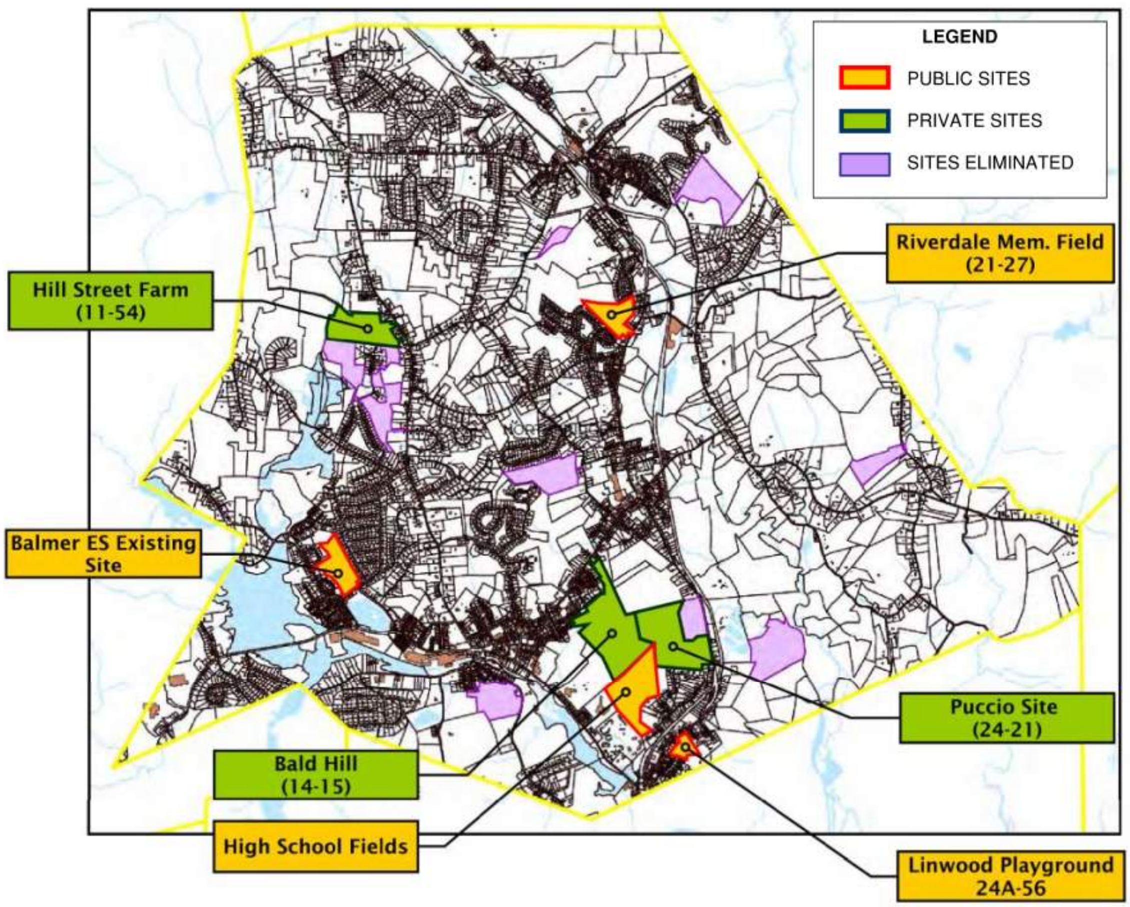
EVALUATION OF EXISTING CONDITIONS – W. EDWARD BALMER ELEMENTARY SCHOOL

Site Selection Process

The OPM assisted the School Building Committee (SBC) in identifying all public and privately-owned parcels in Northbridge of 8 acres or larger, the absolute minimum that could theoretically support the larger school size of 1,030 enrollment (Grades PK-5). In its early June 2017 meetings, the SBC down-selected using several basic criteria to four publicly-owned sites and three privately-owned sites.



Map 1 - Town of Northbridge, School Sites Under Consideration

Once the designer was hired and brought on board, the team evaluated these sites using an expanded set of criteria, assuming the need to accommodate the larger PK-5 program, which included:

- Buildable Area (Acres) – does the site have enough space to support the school program and all necessary site facilities
- Wetlands/ Riparian Buffers/ Flood Zones – does the site have potentially limiting natural features related to site drainage that would hamper its use
- Topography – does the site have a reasonable overall gradient, and limited areas of steep slopes
- Soils – does the site have soils that would be structurally suitable, and well-drained
- Parklands/ Article 97 issues – is the site currently a Public Parkland, and subject to satisfying Article 97 requirements if it were to be used for a school
- Site Utilities (Water, WW, Electric) – are all these utilities present on site or at a reasonable distance nearby
- Two-Way Access – does the site allow vehicular access from two separate and distinct directions/ road networks, or at least allow two access points at some distance away from one another to the same road or network
- Safety – does the site allow a building and outdoor play areas to be placed at a safe distance from roadways and traffic; and does it allow the building to be placed to afford a broad view of the entry points and grounds from the school
- Location/ Bussing – is the site central to a large portion of the school population/catchment area, and somewhat equidistant to all points in the catchment area
- Land Acquisition Cost – for private sites, what is the total cost to acquire the site for school development
- Potential "Fatal Flaws" – these would include presence of extremely difficult conditions, or the lack of must-have features, of any of the types listed above, or a combination of two or more of them; the known or highly suspected presence of hazardous materials or pollution; or other extremely non-advantageous criteria as determined by the School Building Committee.

The design team made site visits and documented conditions, studied available GIS maps, data and information, and interviewed Town officials and Utilities to develop a profile of each site's features, opportunities, and constraints. Nitsch Engineering provided GIS-generated maps for the following criteria for each site:

- Wetlands (MA DEP)
- FEMA Flood Zones
- National Heritage Endangered Species Program (NHESP)
- Soils (USDA, Natural Resources Conservation Service)
- Surface Water Supply Protection (MA GIS)
- Topography, Lot Coverage, Site Features, Context (MA GIS – OLIVER)

TYPICAL SITE ANALYSIS MAPS

Map 2A: DEP Wetlands Map
Existing Balmer Elementary School
Northbridge, MA

Map 3A: FEMA
Existing Balmer Elementary School
Northbridge, MA

0 250 500 1,000
Feet

Map 4 -USDA Natural Resources Conservation Service – Soils Map, Existing Balmer Site

Using this information, the seven sites were rated under each of the criteria listed above on a scale of 0 to 4, 0 being the worst and 4 the best. Scores were tallied, and it was apparent that the existing Balmer School/ Vail Field site was clearly the most advantageous site. The scoring table is featured below:

BALMER ELEMENTARY SCHOOL FEASIBILITY STUDY — **DRAFT 2**

SITE SELECTION ANALYSIS — **7/27/2017**

DORE & WHITTIER ARCHITECTS/ NITSCH ENGINEERING/ SMMA (OPM)

MAP	BLOCK	NAME	ADDRESS	ACREAGE	BUILDABLE ACREAGE	LOT SIZE	WETLAND/ RIPA/ FLOOD	TOPO/ SLOPES	SOILS	PARKLAND/ ART. 97	WATER/ SEWER	ELECTRIC	2 WAY ACCESS	SAFETY	LOCATION/ BUSSING	PURCHASE PRICE	SCORE	RANK
PUBLIC SITES																		
7	138/141	BALMER SCHOOL/VAIL FLD	21 CRESCENT STREET	29.01	16.54	4	3	3	3	4	4	4	2	4	4	4	**39**	**1**
24	205	HIGH SCHOOL FIELDS	427 LINWOOD AVE - *rear portion only*	*56.9*	*19.51*	0 [1]	4	1	2	4	2	2	0	4	3	4	**26**	**6**
24A	56	LINWOOD PLAYGROUND	~240 PROVIDENCE ROAD	10.4	6.64	0	4	3	4	0	3	4	0	2	4	4	**28**	**5**
21	27	RIVERDALE MEM FIELD	1681 PROVIDENCE ROAD	26.1	10.83	3	4	3	2	1	2	2	0	4	3	4	**28**	**4**
PRIVATE SITES																		
14	15	BALD HILL SITE "BAD LANDS"	~450 CHURCH STREET	97.3	*17.18*	4	3	2	2	4	1	1	4	4	4	0 [2]	**29**	**3**
24	21	PUCCIO SITE	~585 PROVIDENCE ROAD	71.95	*16.88*	4	4	0	1	4	1	1	2	4	4	0 [2]	**25**	**7**
11	54	HILL ST FARM	~1120 HILL STREET	41.2	*29.88*	4	4	4	4	4	0 [3]	1	3	4	2	0 [2]	**30**	**2**

SCORING: 4=MOST DESIRABLE
0=LEAST DESIRABLE

NOTES: [1] Must replace HS fields - difficult to do on this site
[2] Subject to change once purchase cost & terms known
[3] No Town sewer at this site - would need package septic treatment facility

BALMER SCHOOL (EXISTING LOCATION)

Map 5 – Buildable Area overlaid on MA GIS Topography, with Site Rating Score

Example backup data and maps supporting this analysis for the Balmer Site only are included in report Appendix X.05. Similar maps and data on the other sites is available upon request.

After review and discussion with the School Building Committee at their July 31, 2017 meeting, it was voted to continue with the study of a range of options using the grade 2-4 and PK-5 design enrollments on the Balmer site only. Study of the other six sites was suspended, pending the discovery of any fatal flaws not immediately apparent on the Balmer site.

Summary of Existing Conditions

The Balmer School is located at 21 Crescent Street in the village of Whitinsville within the town of Northbridge, MA. It is one of four schools in the Northbridge Public Schools district. Balmer School site and adjacent Vail Field front Crescent Street near Lake Street and Arcade Street in a generally residential neighborhood. The developed portion of the property is relatively flat with elevations varying by less than ten feet, generally gently sloping toward Crescent Street. A wooded area is steeply sloped on the westerly side of the property, and a moderately sloped wooded section with a wetland exists to the north and east of the existing school grounds. The Balmer School site is 21.04 acres and Vale Field is 9.04 acres. The existing building, parking requirements, site circulation, and outdoor play areas will influence and somewhat limit the proposed building locations as the intent is to continue to occupy the existing school and site throughout the construction of a new or renovated school project.

Legal Title of the Property

The 30 +/- acre lot, including the school building, one small storage shed, playground area, entrance drive, parking area, playfields, and wooded areas, is owned by the town of Northbridge. The property is made up of two parcels of land that have been purchased, taken, or given to the Town for public use. As part of the Feasibility Study for this project the School Building Committee engaged KP Law, P.C., of 101 Arch Street, Boston, MA to conduct a title research to determine if any restrictions had been placed on the parcels of land. Their research documents indicate that the property is not subject to any restrictions. A copy of the deed noting the town of Northbridge as the Owner can be found in Appendix X.06 along with the findings from KP Law, P.C.

Availability of Property for Development

Per document received from the town of Northbridge (Appendix X.06) the Balmer School property is available for development for renovations and/or with additions to the existing facility or a new school.

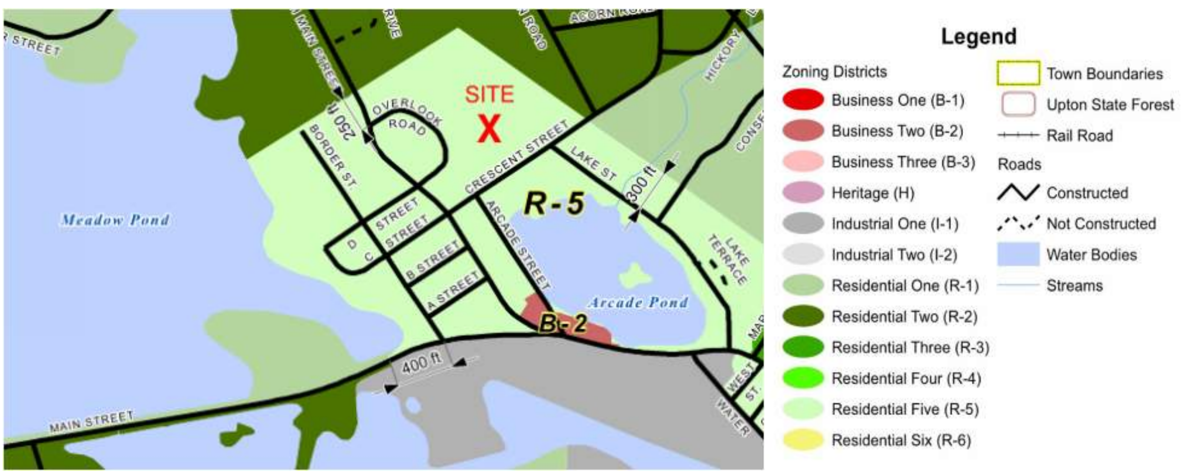
Historic Registrations

In compliance with MGL Chapter Sections 26-27C, as amended by Chapter 254 of the Acts of 1988 (950 CMR 71.00) a Project Notification Form was submitted to the Massachusetts Historical Commission

(MCH) for the Balmer School project. Per the document dated October 2, 2017 and included in Appendix X.07, the Balmer Elementary School is not included in MHC's Inventory of Historic and Archaeological Assets of the Commonwealth, nor is it listed in the National and State Registers of Historic Places. The school is not located in the Town's Historic District and is not considered of historic interest.

Development Restrictions

Development restrictions include the Town of Northbridge Zoning By-laws (Chapter 173-Zoning) as amended through November 1, 2012. The Northbridge Zoning Map dated July 2012 indicates that the existing Balmer School is located in the Residential Five (R-5) zoning district with the north end (wooded area) of the site in Residential Two (R-2).



The "Table of Height and Bulk Regulations" indicates that the maximum height permitted in R-2 is 35', with maximum 2.5 stories and 20% maximum building coverage of Lot and for R-5 the maximum height permitted is 45', with maximum 3 stories and 50% maximum building coverage of Lot. The 'Table of User

Table 2 - Dimensional Requirements per Zoning Bylaws

	Min. Lot Area (sq. ft.)	Min. Contiguous Frontage	Min. Front Yard Setback	Min. Side Yard Setback	Min. Rear Yard Setback	Max. Height in Stories	Max. Height in Feet*	Max. Percent of Total Lot Coverage
Required R-2	20,000	100	40	10	40	2.5	35	20
Required R-5	5,000	60	15	8	20	3	45	50
Existing**	1,310,285	730	30	50	310	2	23'-6"	4

*Any maximum height permitted shall not apply to a community facility provided that the side and rear yards or setbacks required in the district for the highest permitted principal structure shall be increased two feet in width for each foot by which the height of such structure exceeds the height permitted in the district.

** Exisitng calculations are based on property id: 7-138 (parcel the school building sits within.)

Regulations indicates that a school is permitted within this zone. These dimensional requirements are outlined above. As noted, the existing school complies with the dimensional requirements and setbacks. When considering a new school on the existing site, variances may be required for the height of the building and the percentage of total lot coverage.

Parking Requirements

Parking requirements for schools are identified in the By-laws in “Table of Off-Street Parking Standards” under Community facilities. This category requires one (1) parking space per 300 square feet of net floor space. Based on this calculation the existing facility requires 168 parking spaces. The current school site has 57 marked parking spaces including six accessible spaces, and an additional 20 parking spaces along the entry drive for shared use with the town athletic fields, for a total of 77 marked spaces. Overflow parking currently occurs in un-marked spaces along the driveway and on the lawn.

Proposed parking requirements are as follows:

- Grade 2-4
    - Zoning: 59,642 NSF programmed/300 = 198 spaces
    - District requested 100 (80 staff, 20 visitor)
- Grade PK-5
    - 115,230 NSF programmed/300 = 384 spaces
    - District requested 205 (165 staff, 40 visitor)

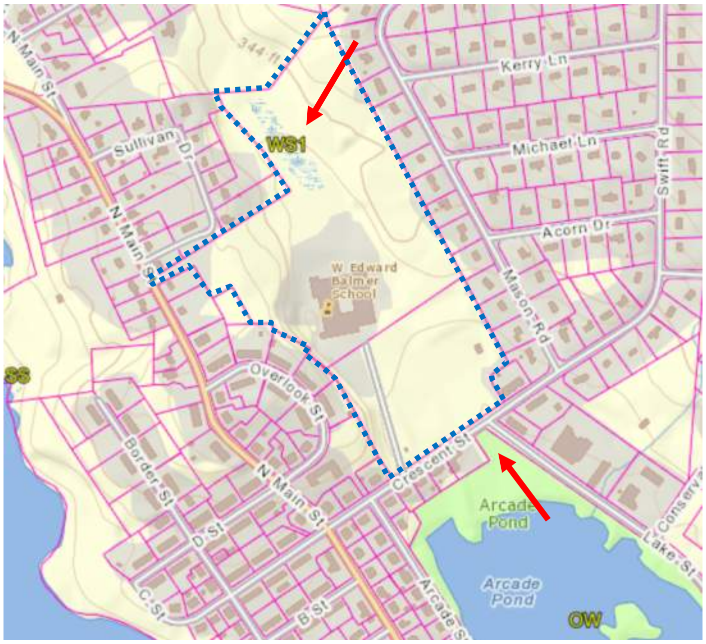
It is evident that additional parking is needed to meet the needs of a new or renovated school, but the District’s stated needs are significantly less than the Zoning-derived parking counts. It is evident a variance will be sought to reduce the number of parking spaces, and this will also support the achievement of LEED v4 Credit LT 7.

Zoning also prescribes the number of off-street loading/unloading spaces at four (4) for the larger PK-5 program. Due to the sizable District requirement for drop-off/pick up queue spaces, any of the Options under consideration are well above this count.

Environmental Conditions

A review of the MA Department of Environmental Protection (DEP) wetland layers available on the MA Geographic Information System (MassGIS) indicates that the closest wetlands are located within the site boundary in the northern wooded portion, and just across the southern site boundary at the corner of Crescent Street and Lake Street, associated with Arcade Pond. A Notice of Resources Area Delineation should be considered to confirm the 100-foot buffer zone to the bordering vegetated wetlands associated with Arcade Pond does not extend onto the Vail Field.

Balmer Site - MA GIS Map indicating the wetland area



Map 7 – Balmer Site showing wetlands

Wetlands delineation was conducted in September, 2017 and is included on the site survey plan attached (Appendix X.09). The wetlands were confirmed to be located within the northern wooded area of the site, and were determined to be somewhat larger than shown on the MassGIS map. No other wetlands were discovered on the site. A wetlands protection zone of not less than 35’ and not more than 100’ from the wetland boundary prohibits certain activities without the approval of the local and state approvals. Northbridge Conservation Commission has jurisdiction up to 100’ from the edge of wetlands.

The FEMA flood map indicates the site is considered an area of minimal flood hazard (see Map 3A, page 3.1.4-3 Above).

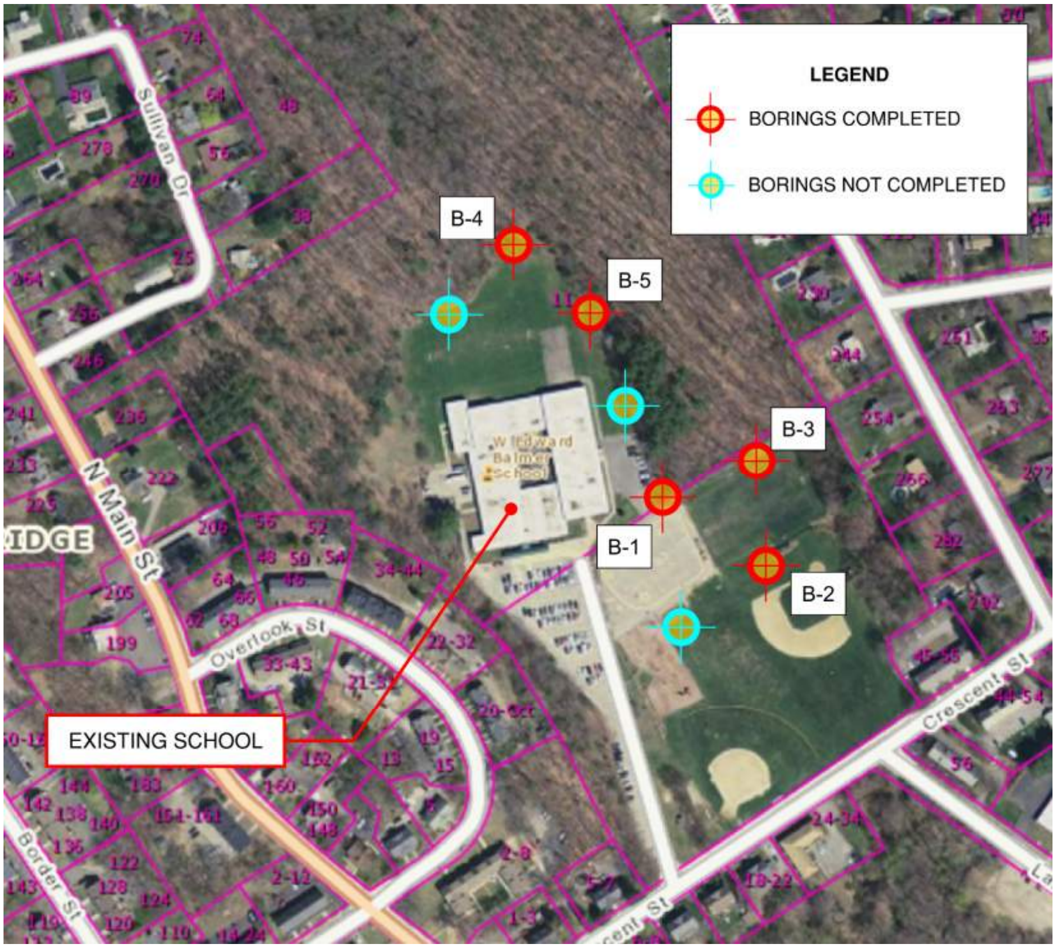
Soils Exploration & Geotechnical Evaluation

A preliminary geotechnical investigation was conducted on September 18 and 19, 2017. The full findings and report are included in Appendix X.11. Geological maps of the area identify the soils in the immediate area of the school as:

- 651-Udorthents, consisting mainly of nearly level to sloping, well drained to excessively drained sands or gravelly sands, also including fill areas
- 314B-Scituate Fine Sandy Loam, 3 to 8 percent slopes, extremely stony

(Refer to Map 4, Page 3.1.4-3)

As part of this feasibility study, eight test borings were planned in the area proposed for a new school or additions to the existing school. On September 18 and 19 five of these test borings were completed. Drilling conditions proved to be difficult as the material was very dense and contained a significant amount of cobbles and boulders. This required the drillers to switch from casing to coring multiple times. In addition, multiple sampling spoons and casings became bent due to the dense material.



Map 8 – Balmer Site showing test boring locations

The boring summary is as follows:

a. B-1: Top 2 feet was fill, encountered boulders and rock from 3.5 feet to 10.5 feet, bottom of boring at 10.5 feet
b. B-2: Top 2 feet was fill, encountered either rock or boulder in final few feet, bottom of boring at 20 feet
c. B-3: Top 2 feet was fill, encountered either rock or boulder in final few feet, bottom of boring at 10 feet
d. B-4: No fill present, boulder from 6.5 feet to 8.5 feet, bent the casing and was unable to drill deeper, bottom of boring at 9 feet
e. B-5: Top 2.8 feet was fill, encountered either rock or boulder in final few feet, bottom of boring at 15 feet

B-3 was started with a drilling method that did not induce water and ground water was measured at 4 feet below ground surface. The remaining borings were completed with a method that required inducing water so the recorded water was either at the ground surface or at a depth that could not be confirmed as the actual water table.

These findings indicate a subsurface condition that is generally amenable to a shallow foundation system. Dewatering may be required during construction due to the high water table. The District will need to approve additional testing to advance the level of understanding about the soils, with a program of test pits tailored to probable building locations as the recommended next step from the geotechnical engineers. Results will be provided with the Preferred Schematic Report.

Hazardous Material Assessment Summary

Concurrent with the geotechnical investigation, the site Geo-Environmental Consultant performed a Phase I Environmental Site Assessment (ESA) and took soil samples from the geotechnical borings for lab analysis to detect hazardous materials in the site soils or groundwater. No adverse findings were observed in the field during drilling, and the lab results all came back negative for any subsurface hazardous materials at the boring locations. It was recommended that further follow-up testing be performed in the soils surrounding the underground storage tank (UST) for presence of fuel oil. The tank is believed to be original to the building. These reports are included in Appendix X.12 of this submission.

The Hazardous Materials Consultant performed an assessment of existing conditions on the school building exterior and interior, including the collection of bulk samples for testing. Forty-six samples were collected and roughly half were found to contain asbestos. Asbestos-Containing Materials (ACM) will need to be properly disposed of during the demolition phase of the project. These include window and door frame caulking, floor mastic, old vinyl floor tile, some window glazing, pipe insulation, damp proofing, exterior sealant, and glue on the back of acoustical ceiling and wall tiles. The roofing material, damp proofing on structural beams and foundation walls, through wall flashing and underground pipes are assumed to contain asbestos and will need to be included in the abatement, demolition and disposal process. The ACM was generally found to be in good condition at the time of the investigation and does not require remediation unless disturbed.

Ballasts in light fixtures are noted with “No PCB” stickers and are assumed not to contain Polychlorinated Biphenyls. The tubes in the light fixtures, thermostats, signs and switches that are assumed to contain mercury should be disposed in an EPA approved landfill at the time of renovation or demolition as testing each of these items would be costly.

Due to the age of the building, caulking was assumed to contain PCB’s.

Lead based paint (LBP) is assumed to exist on painted surfaces. A school however is not considered a regulated facility. 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.

Airborne Mold inspection and testing was performed. The indoor airborne mold spore concentrations were lower than the outside sample, indicating no remediation is required. Based on comparisons with historical data from projects of similar type, building utilization, geographic location and season, the indoor airborne levels are considered low.

Radon was measured in six locations and the measured radon concentrations of the samples were found to be much lower than the EPA guideline of 4 pico-Curies of radon per liter of air (pCi/L). No further action is required.

A full detailed Hazardous Material Report is included in Section 3.1.4-B.12.

Impact of Existing Conditions on Alternatives

The existing site poses constraints that must be considered in the development of a new school on that site or the renovation/addition to the existing school. Some of the more important or pressing constraints include:

Wetlands limit buildable area and may impact both the design and cost of a building project. Alternatives that propose any development within the 100' jurisdictional area of the wetland buffer, will need to include additional considerations permitting and the potential need for mitigation. Specific consideration must be given to the long-term management of ground water and surface water on site.

The sloping, wooded portions of the site may need to be utilized for aspects of the proposed plan, and have development and cost impacts. Some alternatives may take advantage of this condition by stepping construction, building into the hillside, or terracing sitework to help mitigate these costs.

Consideration has been given to providing additional access to the site from the south via Crescent Street and a potential access point from the west via North Main Street. These additional access points will allow for the improvement of site circulation both during the construction phase and as part of the completed building project, but carry with them additional site development costs.

Subsurface conditions will play a role in budget considerations. More investigation is needed to better determine to what extent such factors as ledge removal, boulder removal, and groundwater will have on construction costs and schedule.

The continued use of the existing school during a construction project adds further constraints to the location of a new school or an addition to the existing school and will require additional phasing as part of the building project. Construction phasing must consider student safety, disruption of education, contractor operations and logistics, and the extension of the construction schedule.

Renovation programs inevitably add a layer of risk to any construction project, because there are so many unknowns associated with renovating a 50-year-old building. Much is already known about hazardous materials present at the site, but other discoveries are possible during construction.

CIVIL SITE ASSESSMENT—NITSCH ENGINEERING

Executive Summary

Nitsch Engineering has performed research of the existing site conditions and anticipated site permitting requirements for Balmer Elementary School renovation/building project located on Crescent Street in Northbridge, Massachusetts. Nitsch Engineering's research included conversations with Steve Von Bargen, Director of Facilities and Operations, and Mike Bedard, Maintenance Supervisor, as well as information gathered during site visits conducted by Sandra A. Brock, PE and Jarrett Zube, EIT, of Nitsch Engineering on July 13, 2017. Information included in this report is also based on compiled record drawings, MassGIS data, and other documentation gathered by Nitsch Engineering and provided to Nitsch Engineering by Dore & Whittier.

The record drawings include the following utility and site plans:

- Sheet E-1 entitled Floor Plan and A-1 Plan and Details for Balmer Elementary School dated July 1, 1998 prepared by Dixon Salo Architects.

Referenced maps provided at end of this section include:

DEP Wetlands Map

FEMA Map

National Heritage Endangered Species Program

Soil Map

Surface Water Supply protection Map

Terminology

Site Condition scale of terms used throughout this report are as follows:

"Excellent": new or nearly new condition with few or no blemishes or compromises of quality or function.

"Very Good": highly functional condition with slight wear and tear and/or minor compromises of quality or function.

"Good": median functional condition with noticeable wear and tear and/or compromises of quality or function.

"Fair": below median functional condition with significant wear and tear and/or major compromises of quality. Seriously worn parts or elements, minor structural compromise. Possible near-future safety hazard.

GENERAL SITE DESCRIPTION

Existing Site Description

The following is an overview of the general drainage patterns and collection system on the site and identified potential deficiencies and/or issues.

Specific Issues	*Recommendations/Conditions*
The developed area of the Balmer ES and Vail Park property is relatively flat with elevations varying by less than ten feet (from 323 to 333—from original record plans), generally gently sloping toward Crescent Street. The westerly side of the property is wooded and is steeply sloped—2:1 to 3:1 toward the site. The easterly property line is generally wooded and moderately sloped toward the site. The existing elementary school is 74,871 square feet. The Balmer site is 21.04 acres and the Vail park is 9.04 acres; areas from Assessors Map.	Redevelopment of the site will require manipulating the grading to create positive site drainage through out the site.
The main vehicular entrance to the school is a single driveway off of Crescent Street that leads to a parking lot in front of the school and a service area and loading dock on the west side of the building. There is a paved parking lot on the east side of the buildings. A large gently sloping lawn at the rear (north) of the building with a small paved surface on east side of the lawn. The area around the lawn and pavement is wooded. There is frontage along North Main Street which may be used as a second entrance.	The driveway and parking areas are in fair to poor conditions. See addition information under Vehicular Pavement Section. A new driveway from North Main Street would need to be studied from a grading perspective, traffic perspective, and impact to neighbors analyzed.
Vail Park has 2 baseball/softball fields with dugouts, unlined practice field, and play ground. There are several concrete slabs around fields that appear to be old light pole bases. Several utilities pass under the fields (see individual Utilities Section below).	The fields appear to be in good condition. See Landscape Section for additional information.
Balmer Elementary School (Balmer ES) and Vail Park are located off of Crescent Street near Lake Street and Arcade Street in a generally residential neighborhood. Arcade Pond and associated wetlands are located to the south of the sites and are bordered by Arcade Street, Crescent Street, and Lake Street. Whitins Pond is located to the west of the sites.	The site is in a generally residential area .

Figure A1 : View from across Vail Park

Figure A2: View from parking lot.

Figure A3: Entrance Driveway.

Figure A4: View from parking lot.

Figure A5: Vail Park

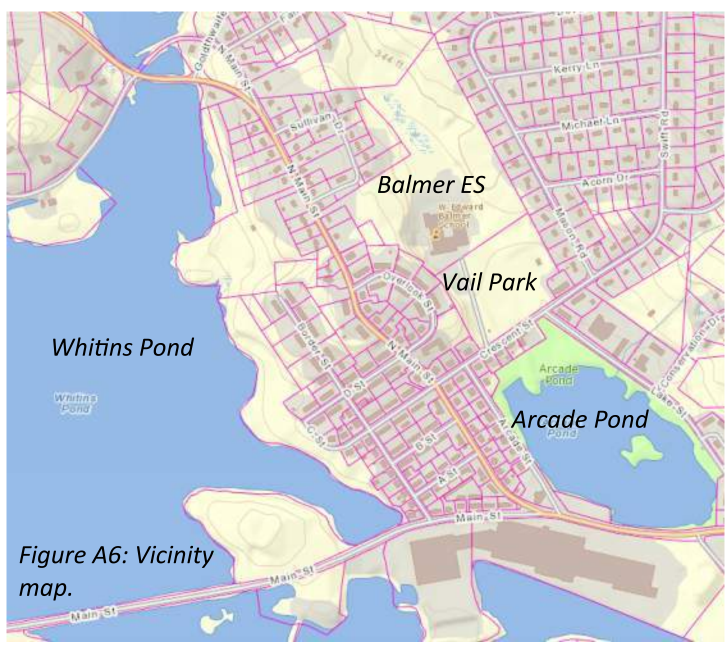


Figure A6: Vicinity map.

SITE UTILITIES

DRAINAGE

The following is an overview of the general drainage patterns and collection system on the site and identified potential deficiencies and/or issues.

Specific Issues	*Recommendations*
Drainage Collection System: The existing drainage system includes a few catch basins and a non-standard drainage inlet structure (see figure A8) that connects to a pipe drainage system in Crescent Street that appears to ultimately discharge into the Bordering Wetlands associated with Arcade Pond at the corner of Crescent Street and Lake Street from two CPP pipes at a headwall See Figure A7. The discharge point appears to have recently been reconstructed based on site observations and the adjacent erosion controls that are still in place. The majority of the site drains overland toward Crescent Street. One field and one parking lot each appear to have a stone trench collection system along the edge. Street drainage system in Crescent Street appears to have been updated and is generally catch basin to manhole system. This also appears to discharge at headwall. Based on record plans the courtyard drains to the east under the building through a 14” cast iron pipe.	The existing drainage system does not comply with current standards or Massachusetts Department of Environmental Protection (MaDEP) requirements. In general the drainage system appears to be in fair to poor condition.
Water Quantity Systems: No detention basins or infiltration systems were observed on site. There were crushed stone edges along one parking lot and one field. This may be an infiltration or collection system. Not shown on any records plans received. See Figures A9 and A10.	Stormwater design for a new school will require to meet MaDEP Stormwater Standards at a minimum.
Water Quality Systems: No water quality structures or Low Impact Development (LID) approaches were observed on site. There may be some water quality treatment in areas where the surface runoff flows over.	*Stormwater design for a new school will be required to meet MaDEP Stormwater Standards at a minimum.*
Other/Receiving Waters: There was evidence of erosion at several locations on site including in the playground and along the edge of the main parking lot and driveway. See Figure A11. The receiving water is Arcade Pond. Arcade Pond is listed as an impaired water body with a TMDL (MA51003_2008) Category 5 (Noxious Aquatic Plants).	Avoid additional flow of nutrients into Arcade Pond.

Figure A7: Discharge at Wetlands

Figure A8: Drainage Inlet at driveway entrance

Figure A9: Crushed stone at parking

Figure A10: Field stone swale

Figure A11: Erosion at Playground

Figure A12: CB in Crescent Street

Sanitary Sewer and Water

The following is an overview of the sanitary sewer and water services on the site and identified potential deficiencies and/or issues.

Specific Issues	*Recommendations*
Sanitary Sewer System: The Town of Northbridge Department of Public Works—Sewer Division provides a municipal sewer collection system of approximately 52-miles of sanitary sewer mains that flow to a 2 million gallons-per-day (MGD) wastewater treatment plan. The average daily flow is 1.1 MGD. The school connects to this system.	Information only.
Sanitary Sewer Service: The building appears to discharge by gravity to the municipal sanitary main in Crescent Street. Based on record plans from 1966, it appears that the sewer and water services cross Vail Field. An External grease trap was not observed. See Figure A13 for SMH location.	Material and size of the pipe was not identified on record plans. Additional investigation is needed if the sewer line were to be reused . Additional investigation should include video inspection of the line. It is anticipated that this line would be replaced. See MEP narrative for additional information.
Water System: The Whitinsville Water Company (WWC) provides water to Northbridge. The water supply is classified as an underground source but 5 reservoirs provide supply to the source. The two well fields are adjacent to the reservoirs and each well field has a treatment system to maintain water quality.	Information only.
Water Service and Site Hydrants: The building appears to be serviced by a water line that crosses the field in Vail Park to the front of the building. The meter for the water service is in the building. Triple gates were observed in the location of the water service from Crescent Street. See Figures A13.	Material and size of water service was not indicted on record plans. Additional research is needed to determine this information. Also, hydrant flow tests are recommended to determine adequacy of water volume and pressure in the area. It is anticipated that this line would be replaced and a dedicated fire service would be required. See MEP narrative for additional information.
Fire Hydrants: There are two fire hydrants on site and two in close proximity to site along Crescent Street. See Figures A14-A15.	Information only.

Figure A13: SMH and Water Gates.

Figure A14: Site Hydrant

Figure A15: Hydrant on Crescent Street

Other Utilities: Gas, Electric, Telecommunications, other

The following is an overview of the gas, electric, telecommunications, and fire alarm on the site.

Specific Issues	*Recommendations*
Gas: The school is serviced by gas. The gas meter is located inside the building. A gas gate was observed in Crescent Street, possible location of service line.	See MEP narrative for more information.
Electric: Based on record plans, the electric service is underground entering the west side of the building into the electric room near the loading—service area. The underground service then connects to series of poles out to North Main Street. Poles were not observed out to North Main Street. The utility pole on Crescent Street in front of the school indicates "no service" to the school from Crescent Street in what could be Dig Safe markings. See Figure A16. Transformer: Transformer is located in the service area on the west side of the school. See Figure A17.	See MEP narrative for more information.
Telecom: Based on record plans, the telecom service is underground entering the west side of the building into the electric room near the loading—service area. The underground service then connects to series of poles out to North Main Street. Poles were not observed out to North Main Street.	See MEP narrative for more information.
Fire Alarm: There is a fire alarm pull box at the front entry of the school. See Figure A18.	See MEP narrative for more information.
Unidentified Utilities or Structures: Two vaults or tanks were observed just off the pavement in the service area along with an observation well. See Figure A20. This has been confirmed as an underground fuel tank per Mark Bedard. There is a manhole located on slope in the woods on the west side of the driveway towards Crescent Street. No readable markings on cover—electric service? See Figure A21.	Additional investigation is needed on these unidentified structures.

Figure A16: Utility pole with "no ser-

Figure A17: Transformer.

Figure A18: Fire alarm pull box.

Figure A19: Old light base

Figure A20: Unknown structures

Figure A21: Unknown Manhole.

SITE ACCESS , PAVEMENT, AND SITE IMPROVEMENTS

CIRCULATION, PAVEMENT, TRASH COLLECTION, AND OTHER IMPROVEMENTS

Specific Issues	*Recommendations*
Circulation: There is single driveway access to the site off of Crescent Street. The driveway leads to a parking lot in front of the school, then to the parking lot and drop off area east of the main parking lot, and then to parking at the east side of the building. There is a service at the west side of the building that is accessed via a driveway from the main parking lot in front of the school. There is not full vehicular access around the building. The curbing on site is limited to pavement areas on the south and east side of the school and along the pedestrian sidewalk along the driveway into the school. Pedestrian access from Crescent Street includes a sidewalk along the driveway. The remaining frontage along Vail Park is fenced, and there is no access off Crescent Street. There is pedestrian access on the east side of the building and in the rear. The vehicular pavement for the driveway, main parking lot, and drop-off is in poor to fair condition with spider cracks and non-curbed edges undermined by erosion. See Figures A22, A24, and A26. The parking lot to the west of the school is in good condition. Pavement markings are in fair to poor condition with some marking unreadable.	The vehicular pavement is in fair to poor condition in general. The pavement markings are in poor conditions. The curbing is fair to poor conditions. See Landscape Architects Narrative for details on the pedestrian circulation and condition of the concrete/pavement.
ADA Accessibility: There are several handicap spaces marked and signed in the parking lots. There appears to be an accessible route from the spaces to the front entrance. Several doors are not accessible. There is temporary ramp at the rear of the building.	A complete review of the accessibility will be required.
Trash Collection and Services Area: There is a service area on the west side of the building including a trash compactor unit. See Figure A27.	*The compactor is not the same age as the school and may be able to be reused; additional investigation is needed.*
The fields in Vail Park appear to be in good shape. The existing playground did have observable erosion from runoff from the main parking lot. See Landscape Architect's narrative for more details.	See Landscape Architect's narrative.

Figure A22: Entrance drive

Figure A23: Main parking lot

Figure A24: Handicap Space

Figure A25: West side of building

Figure A26: Drive to service area.

Figure A27: Trash compactor - dump-

SITE PERMITTING

STATE AND FEDERAL SITE PERMITS

Review of the site and State and Federal Site Permit requirements, the following is a preliminary assessment of potential permit requirements.

Permit	*Recommendations/Potential Permit*
Wetlands Protection Act (310 CMR 10.00) The Wetlands Protection Act ensures the protection of Massachusetts' inland and coastal wetlands, tidelands, great ponds, rivers, and floodplains. It regulates activities in coastal and wetlands areas, and contributes to the protection of ground and surface water quality, the prevention of flooding and storm damage, and the protection of wildlife and aquatic habitat. A review of the Massachusetts Department of Environmental Protection (DEP) wetland layers available on the Massachusetts Geographic Information System (MassGIS) indicates that wetlands are located at the corner of Crescent Street and Lake Street associated with Arcade Pond, and on site north of the building within the wooded area.	Site should be walked by a wetland scientist to confirm location and extent of wetland resources areas. A Notice of Resources Area Delineation should be considered to confirm the 100-foot buffer zone to the bordering vegetated wetlands associated with Arcade Pond does not extend onto the Vail Park.
Natural Heritage & Endangered Species A review of the 13th Edition of the Massachusetts Natural Heritage Atlas prepared by the Natural Heritage and Endangered Species Program (NHESP), dated October 1, 2008, indicates that the existing Balmer Elementary School site is NOT a Priority Habitat of Rare Species or an Estimated Habitat of Rare Wildlife. No such areas appear within close proximity to the site. (See Map 4A Natural Heritage Endangered Species Program.	No further action required.
Floodplain Based on the Flood Insurance Rate Map (FIRM), information available on MassGIS the site does not fall within a flood hazard zone. (See Map 3A FEMA)	No Further Action is required
USEPA NPDES Construction activities that disturb more than one acre are regulated under the United States Environmental Protection Agency's (EPA) National Pollution Discharge Elimination System (NPDES) Program. In Massachusetts, the US EPA issues NPDES permits to operators of regulated construction sites.	Regulated projects (an acres or more of site disturbance) are required to develop and implement stormwater pollution prevention plans and submit an online Notice of Intent for a General Construction Permit. The application shall be made a minimum of two weeks before construction by the Owner and the Contractor.

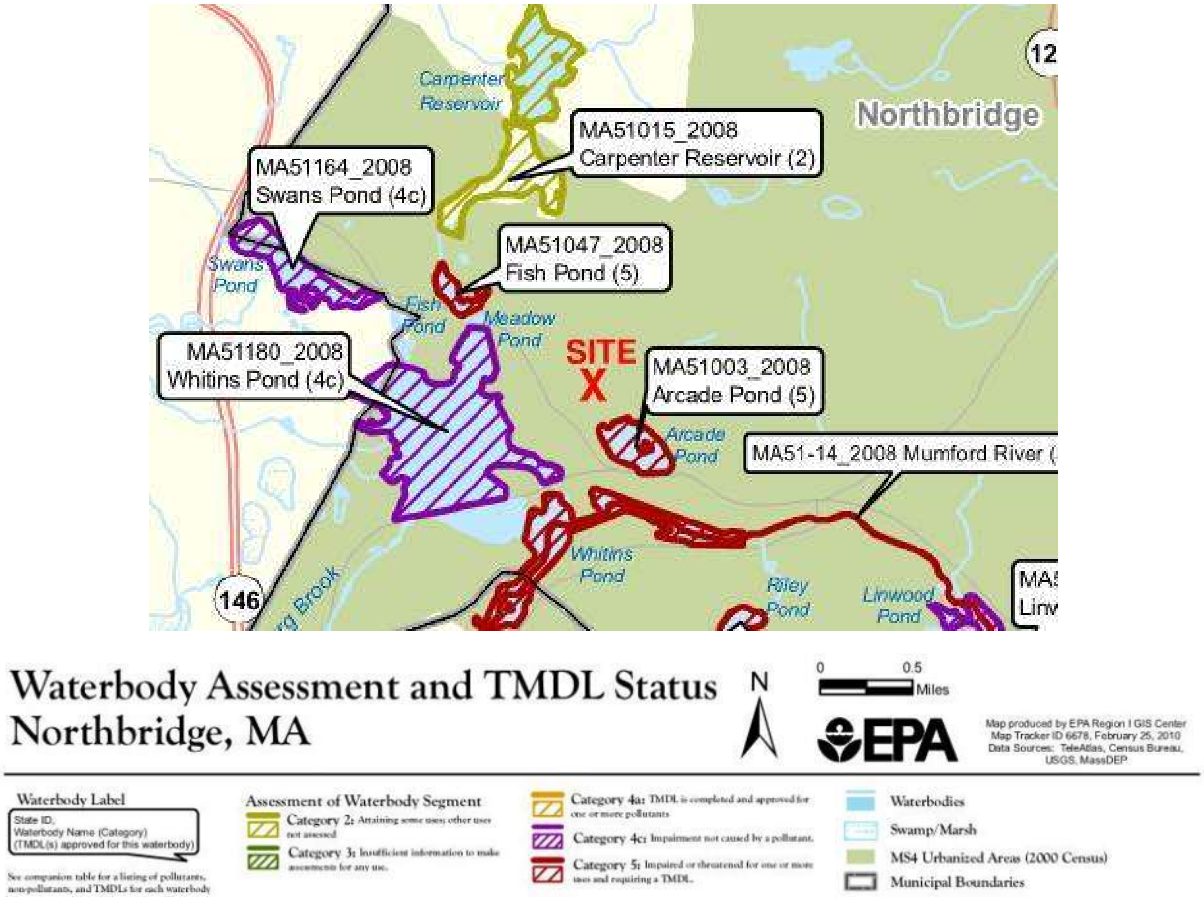


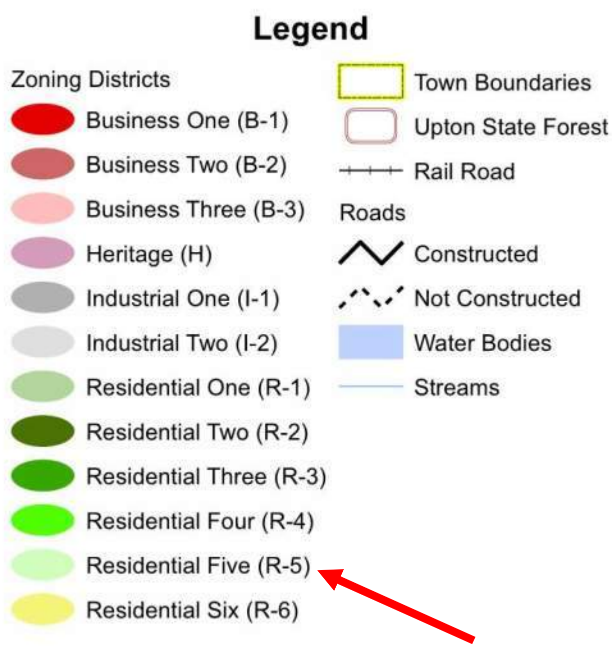
Figure A28: TMDL Map

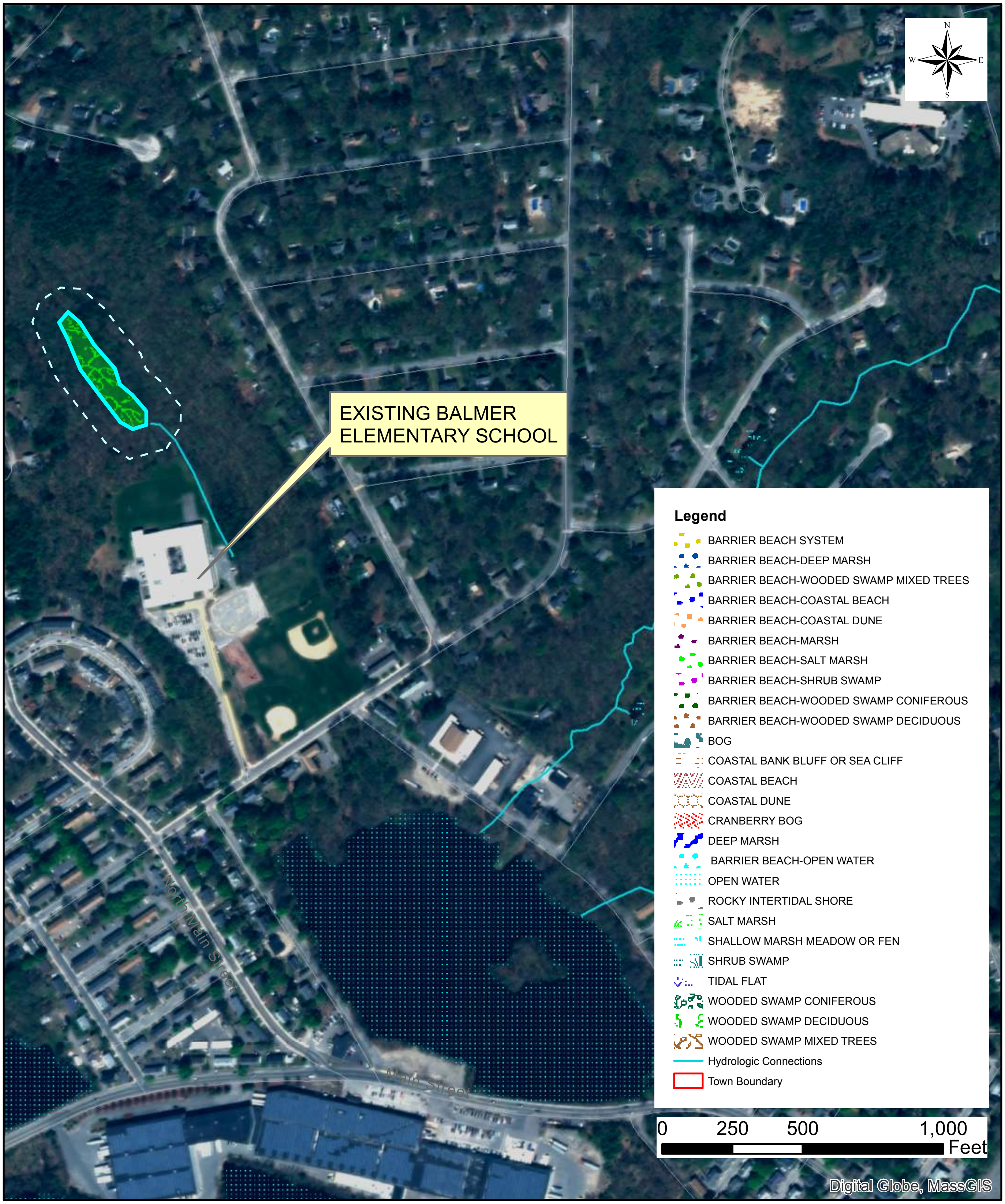
Local Permits

Review of the Town of Northbridge zoning and other regulations, the following is a preliminary assessment of potential permit requirements.

Permit	*Recommendations/Potential Permit*
The proposed school falls under the Dover Amendment. Nitsch Engineering has no comment regarding the legal interpretation of the Dover Amendment and how it applies to the permitting process for the school **Zoning:** Review of the local zoning bylaw (Chapter 173–Zoning) indicates that Educational Use sites are "permitted by right" in all Zoning Districts except for Heritage district. *Site Plan Review—Section 173-49 Site Plan Review states "A site plan for a permitted use shall be reviewed and approved by the Building Inspector." Section 173-49.1 Site Plan Review by Planning Board states "Any new structure or group of structures under the same ownership on the same or contiguous lots with at least 6,000 square feet of gross square feet or requiring the provision of 10 or more parking spaced under 173-27…"*	The school is a permitted use for R-5. Because the school falls under the Dover Amendment, Nitsch Engineering defers to counsel on the requirement of site plan review.
Department of Public Works (DPW) Curb Cut Stormwater Connections	Curb Cut Permit is required for a new or altered Curb Cut, which is to be submitted by the Contractor. Drainage Connections permit is required for connection to the municipal system. The design team will submit water, sewer, and drainage plans for review and comment to the DPW, but permits are typically obtained by the contractor.
DPW—Sewer Division	Sanitary Sewer Service permit is required for any new services. Typically obtained by the contractor.
Whitinsville Water Company	Water Service permit is required for any new services. Typically obtained by the contractor.
ARTICLE 97:Article XCVII. Article XLIX of the Amendments to the Constitution (Massachusetts) states "*The people shall have the right to clean air and water, freedom from excessive and unnecessary noise, …*" and states "*Lands and easements taken or acquired for such purposes shall not be used for other purposes or otherwise disposed of except by laws enacted by two thirds vote, taken by yeas and nays, of each branch of the general court.*"	It is suspected that Vail Park falls under Article 97. Vail Park was subsequently reviewed for Article 97 issues by the Town and their attorneys, and it was determined that Vail Park is NOT subject to Article 97.

Figure A29: Zoning Plan





Map 2A: DEP Wetlands Map

Existing Balmer Elementary School
Northbridge, MA

Data Source: MassGIS
Nitsch Project #12260

Nitsch Engineering

Map 3A: FEMA

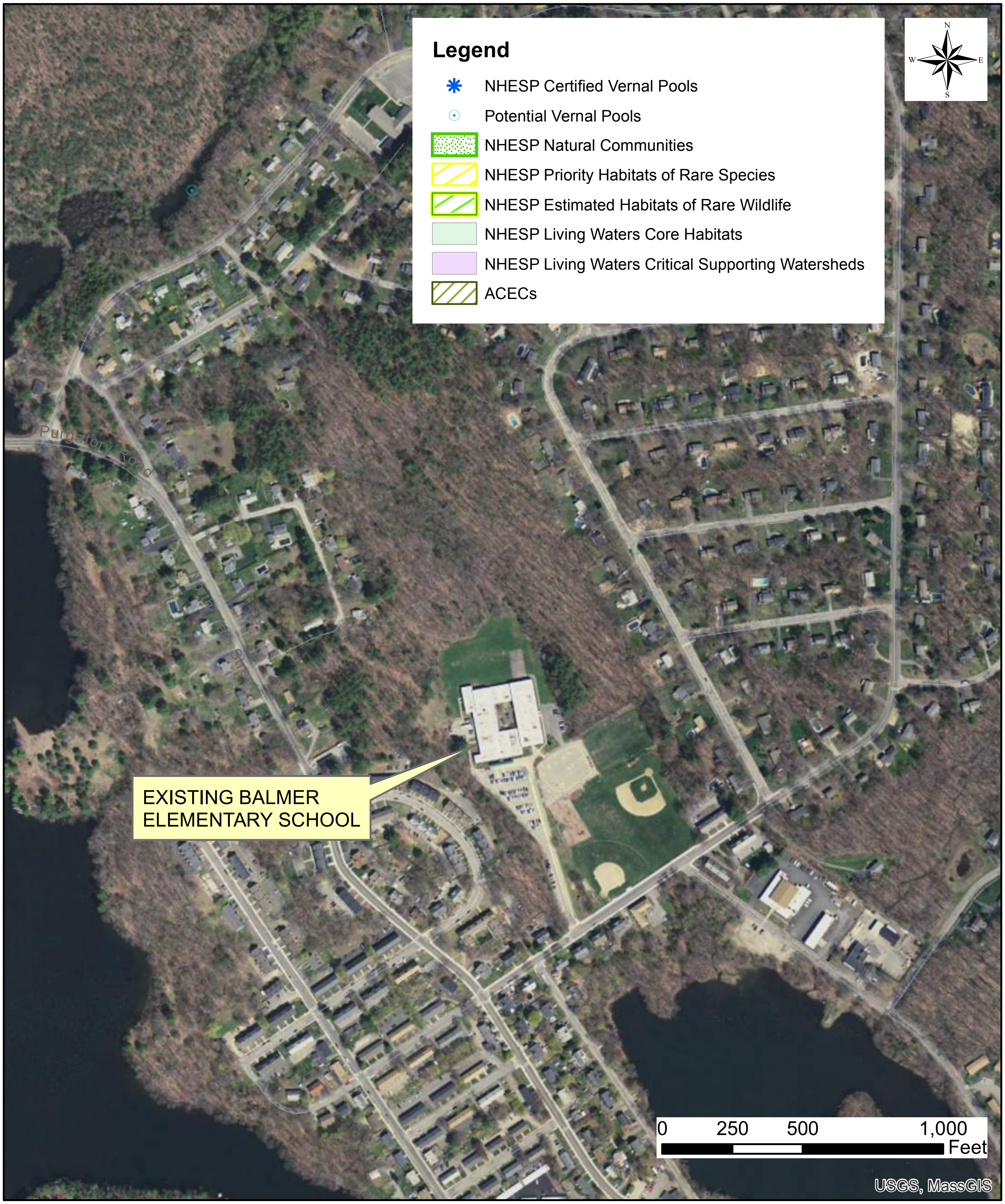
Existing Balmer Elementary School

Northbridge, MA

Data Source: MassGIS

Nitsch Project #12260

Nitsch Engineering



Map 4A: National Heritage Endagered Species Program

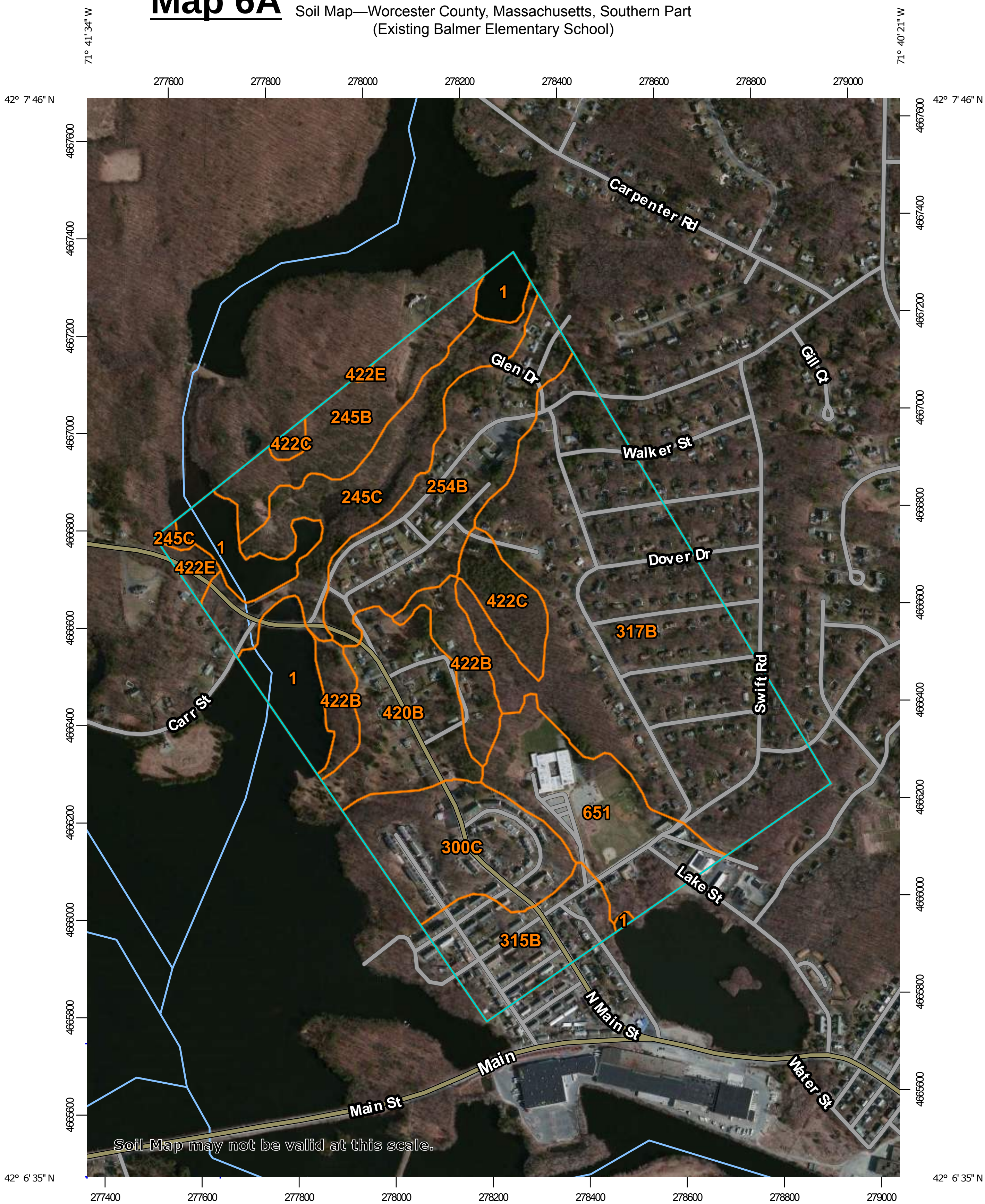
Existing Balmer Elementary School
Northbridge, MA

Data Source: MassGIS
Nitsch Project #12260

Nitsch Engineering

Map 6A

Soil Map—Worcester County, Massachusetts, Southern Part
(Existing Balmer Elementary School)



Map Scale: 1:10,800 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 150, 300, 600, 900

Feet: 0, 500, 1000, 2000, 3000

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Worcester County, Massachusetts, Southern Part
Survey Area Data: Version 9, Sep 15, 2016

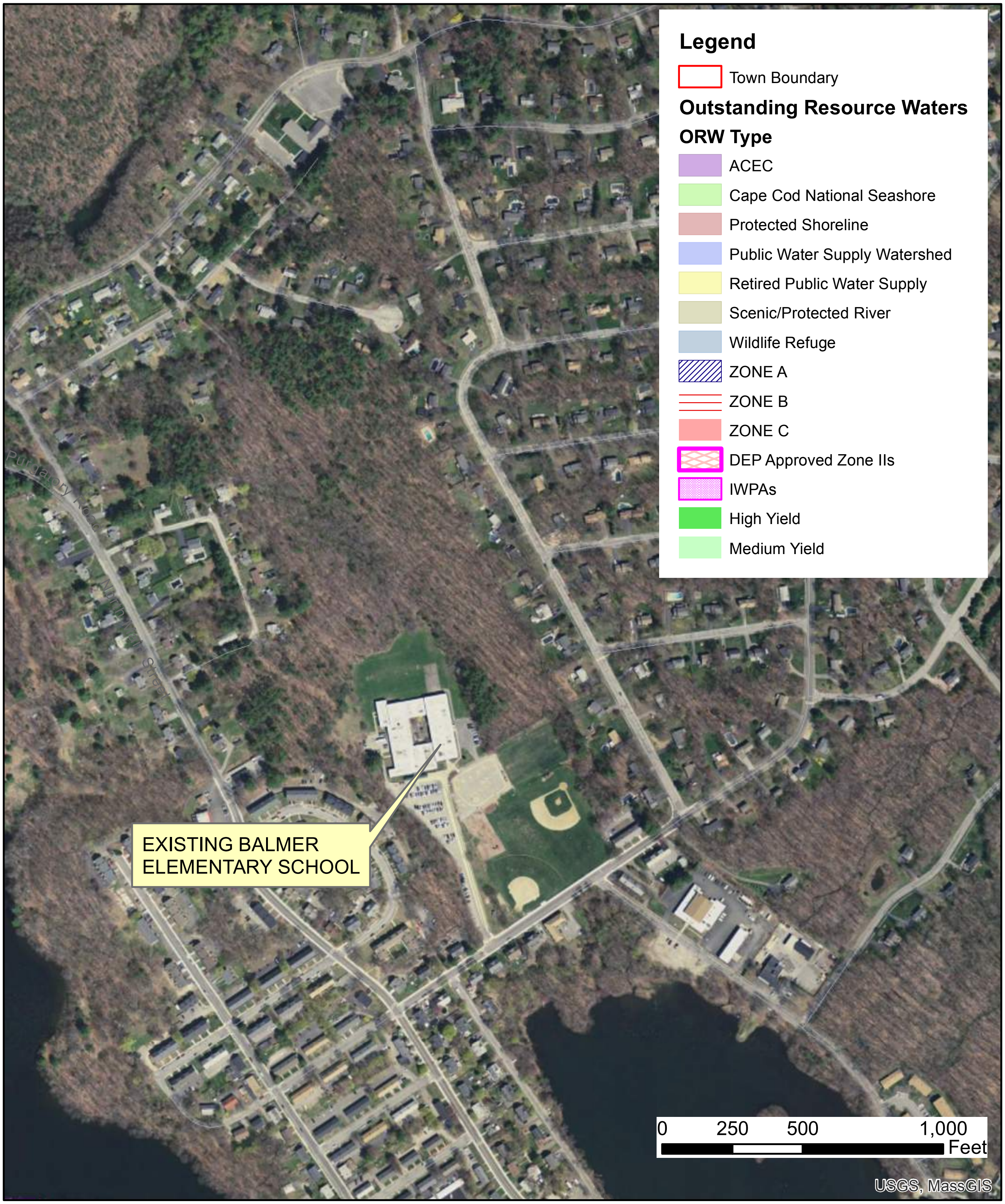
Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 8, 2011—Apr 9, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Worcester County, Massachusetts, Southern Part (MA615)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
1	Water	18.7	6.8%
245B	Hinckley loamy sand, 3 to 8 percent slopes	15.9	5.7%
245C	Hinckley loamy sand, 8 to 15 percent slopes	24.4	8.8%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	28.8	10.4%
300C	Montauk fine sandy loam, 8 to 15 percent slopes	22.1	8.0%
315B	Scituate fine sandy loam, 3 to 8 percent slopes	15.9	5.8%
317B	Scituate fine sandy loam, 3 to 8 percent slopes, extremely stony	86.7	31.3%
420B	Canton fine sandy loam, 3 to 8 percent slopes	20.1	7.3%
422B	Canton fine sandy loam, 0 to 8 percent slopes, extremely stony	10.9	4.0%
422C	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony	7.8	2.8%
422E	Canton fine sandy loam, 15 to 35 percent slopes, extremely stony	1.9	0.7%
651	Udorthents, smoothed	23.4	8.5%
Totals for Area of Interest		**276.6**	**100.0%**



Map 5A: Surface Water Supply Protection

Existing Balmer Elementary School
Northbridge, MA

Data Source: MassGIS
Nitsch Project #12260

Nitsch Engineering

LANDSCAPE ASSESSMENT

Executive Summary

The landscape at Balmer Elementary School, though ample in space, is currently underserving the needs of the school and its students. The original construction has deteriorated over time and exhibits evidence of various rehabilitation efforts that have resulted in the lack of a cohesive site. In order to meet current requirements for safety and accessibility requirements, significant upgrades, if not complete replacement or reconstruction of the majority of the elements on site would be required.

Terminology

Building Condition scale of terms used throughout this report are as follows:

- “Excellent”: new or nearly new condition with few or no blemishes or compromises of quality or function.
- “Very Good”: highly functional condition with slight wear and tear and/or minor compromises of quality or function.
- “Good”: median functional condition with noticeable wear and tear and/or compromises of quality or function.
- “Fair”: below median functional condition with significant wear and tear and/or major compromises of quality or function. Seriously worn parts or elements, minor structural compromise. Possible near-future safety hazard.
- “Poor”: nearly– or completely non-functional condition with major wear and tear and/or serious compromises of quality or usability. Missing parts or elements, major structural damage or condition. Immediate safety hazard or danger.

VEGETATION AND TOPOGRAPHY

The site itself is relatively flat, though the baseball/softball fields and adjacent playground are situated several feet below the school building and its immediate site. Around the east and west edges of the site are elevated slopes that are primarily covered with trees. In the woods to the north of the school is a designated wetland area that contains standing water and a culverted stream that appears to flow beneath the site and down into Arcade Pond but this needs to be confirmed. Though the site likely once had very good drainage, deteriorating surfaces and erosion have created drainage issues in many areas and the overall quality is fair to poor. There are significant ornamental plantings on site, though they are sparsely placed and lack of maintenance has affected their overall health. Most are in fair to good condition and would benefit from maintenance. There are a number of large shade trees on site that are relatively healthy, and require maintenance in order to ensure their longevity.

Specific Issues	*Recommendations*
Though the surrounding area is lush and wooded, the spaces immediately adjacent to the school building lack substantial foundation and shade plantings, resulting in a harsher environment and no mitigation of climatic factors. A lack of ornamental plantings to soften the environment creates unpleasant spaces and contributes to discomfort. (Figures 1, 2)	Provide foundation and shade plantings throughout the site.
Ornamental plantings are in need of maintenance including irrigation, weeding, mulching, pruning, fertilization, etc. (Figures 3, 4)	Weed and edge beds, apply new layer of mulch. Prune dead and dying branches; feed if necessary. Provide irrigation to ornamental beds. Remove failing plants and replace.
Larger shade trees exhibit signs of insect damage, possibly caterpillars (Figures 5, 6)	Identity specific pest or pathogen and pursue treatment course appropriate to specific issue.

Figure 1—Building façade lacks vegetative cover

Figure 2—Lack of foundation plantings at building

Figure 3—Many plantings under stress require removal

Figure 4-Landscape lacks proper maintenance.

Figure 5—Shade tree at ball fields

Figure 6—Insect damage on shade trees

STRUCTURES

External structures are limited on site, but there are several elements that are unique to either the school or ball fields. The gazebo is in relatively good condition (Figure 8).

Specific Issues	*Recommendations*
External storage space for athletic and recreation, as well as maintenance equipment is lacking. Only one storage shed was observed at the school (Figure 7.)	Consult with staff and teachers and provide additional storage space as needed.
Concrete-and-wood dugouts at baseball field are in poor condition. The wooden components are in poor shape. The bench is missing backrests and seatboards. The roof is missing portions. The concrete appears to be in fair to good condition. The structure lacks proper visibility for after-hours security and evidence of vandalism and drinking is present. (Figures 8, 9.)	Replace the entire structures with ones that provide better durability and security.
A storage locker positioned at the edge of the woods at the fields does not appear to be very secure, and is generally in fair condition. (Figure 12)	Provide a more substantial and secure storage system for the athletic fields, possibly combining it with the concession booth.
The concession booth at the athletic fields is in good condition and appears to be relatively new. The booth, if staffed by volunteers, is required to be accessible, and required to be accessible to the public making purchases. Neither appears to be the case, as there is a step leading into the booth, and the transaction window sill height is too high. (Figure 11)	Provide a ramp with landing at the entrance to the booth. Modify the transaction window and shutter to lower the sill to accessible height.

Figure 7—Storage shed

Figure 8—Gazebo in courtyard

Figure 9—Team dugouts in poor condition

Figure 10-Condition of dugout structure

Figure 11—Concession booth at ballfield

Figure 12—Storage at athletic fields

SITE FURNISHINGS

Overall, there is a general shortage of furnishings on site, and the school would benefit from a greater distribution of furnishings like bicycle racks, trash receptacles, benches, water fountains, etc. Most furnishings are in poor to fair quality and are in need of replacement. There is a lack of cohesive style and quality among site furnishings which detract from their visual impression on the site. There are no water fountains on site.

Specific Issues	*Recommendations*
Only one trash receptacle and no recycling receptacles was observed at the school site. The single trash receptacle was not of suitable quality for permanent exterior use. Trash and litter has accumulated in some areas. (Figure 13)	Furnish and install more trash and recycling receptacles of suitable quality for exterior use and of a uniform style and performance standards.
The amount of benches is insufficient for the number of students. Benches that are provided are of varying styles and quality. Benches are not placed in shaded or bus drop-off areas. There are insufficient benches at play areas for parents to use while supervising children at play. (Figures 15, 16)	Replace benches in poor quality. Provide an additional benches of a consistent style and quality and furnish them in waiting areas and areas of high use.
There is a significant amount of galvanized chain link fencing on and around the site, and the majority is in poor to fair condition. Many sections are missing components such as caps and midrails. There are sections that are bent, damaged or broken. (Figures 17, 18)	Replace all chain link fencing immediately adjacent to school with new black vinyl-coated chain link fencing for long term durability. Provide site-wide assessment of all fencing and replace any sections or components that are in less than good quality.
One bicycle rack was observed and was in fair condition, and was located on an unsuitable surface. The bicycle rack was bent and some areas were beginning to rust. No bicycle racks were observed at other entrances, playgrounds or ball fields. (Figure 14)	Provide more high quality bicycle racks to encourage student to bike to school and sports. Place bicycle racks on level, undamaged concrete pads for safety and accessibility. Provide bike racks at appropriate areas.

Figure 13—Inadequate quality of exterior furnishings

Figure 14—Bicycle racks are in poor shape.

Figure 15—Benches exhibit a range of styles / quality

Figure 16-Benches exhibit a range of styles / quality

Figure 17—Chain-link fencing in need of replacement

Figure 18—Chain-link fencing in need of replacement

RECREATIONAL ELEMENTS

Recreational elements observed on site exhibited a wide range of styles and quality, some require complete replacement while others would benefit from repair and rehabilitation. The inclusion of town-owned ballfields on the school site is a benefit to the school, though it increases the traffic and wear on school owned property.

Specific Issues	*Recommendations*
Athletic fields at the school itself were in good condition at the time of site visit, but require ongoing maintenance to preserve their quality. The fields at the school do not appear to have any formal athletic striping or designation despite the presence of soccer goals. The fields at Vail Playground have a higher degree of wear and compaction. (Figure 22)	Provide regular maintenance at school and playgrounds. Repair or replace turf fields at Vail playground to address compaction and erosion issues. Provide athletic striping at school fields to allow for structured athletic games.
A single pair of soccer goals were observed at the school, despite the fact that there exists at least two separate fields capable of supporting soccer play. Of the goals provided, one had broken structural members and another was missing netting altogether. (Figure 19)	Replace goals at the school. Provide new goals at playground soccer field.
Playground equipment appears to be of fair to good quality. The playground surface consists of wood chips and is in poor quality and presents a safety concern. (Figures 20, 21) The playground equipment and play surfaces are not accessible.	Conduct a playground inspection by a certified playground safety inspector and respond to specific recommendations provided within. Replace wood chip play surface with new chips or ideally a poured-in-place rubber safety surfacing. Provide accessible playground equipment and play surfaces.
A large number of painted games were observed on pavement around the site. All are have faded and are unusable or close to becoming unusable.	Provide new painted games in key areas around site.
Fabric on backstop at rear baseball/softball field is in fair to poor condition from improper use. Paint on foul pole at front field is faded and peeling. (Figures 23, 24)	Repair and paint all posts and rails. Replace damaged fabric and components and replace all missing components.

Figure 19—Goals have broken or missing components.

Figure 20—Play equipment in fair to good shape.

Figure 21—Play surface is of poor quality.

Figure 22-Athletic fields at school.

Figure 23—Baseball backstop with damaged fabric.

Figure 24—Baseball field foul pole and fencing.

Vehicular circulation and parking, service and deliveries

Parking is limited on site, with 46 spaces in the front (6 reserved for handicapped), 4 spaces on the west side, and another 7 spaces at the east side lot, for a total of approximately 57 spaces. There are separate pickup/drop-off areas for parents and buses, though parents must cross the bus staging lane when entering and exiting the parent drop-off area. There are currently 17 buses that serve the school. Deliveries occur at the west end of the building in a lot separated from the primary parking lot., which is adjacent to the school cafeteria. This lot also contains several reserved spaces for administration. There are an additional 20 parking spaces along the entry drive for shared use with the town athletic fields.

Specific Issues	*Recommendations*
Bituminous pavement surfacing across the site is in poor condition and in need of replacement. Cracks, potholes, puddling, vegetative growth, and debris are prevalent. Painted markings, including crosswalks and handicapped aisles, are faded or worn away. These issues present safety and accessibility concerns. (Figures 25—30)	Provide new top coat at all bituminous pavement surfaces site-wide. Restripe and provide new painted markings for vehicular circulation.

Figure 25—Bus drop-off at main entrance

Figure 26—Bus drop-off area

Figure 27—Bus staging area at main entrance

Figure 28-Parent drop-off area

Figure 29—Cracks in pavement.

Figure 30—Loading dock for deliveries

SIDEWALKS AND PEDESTRIAN ROUTES

Nearly all of the sidewalks and pedestrian route areas are in poor condition and need to be replaced. Accessible routes exist to access the site and building, though many are the result of remedial work and retrofitting in order to meet ADA accessibility guidelines and are not the result of a thoughtful and comprehensive approach to site design. Many of these accessible routes themselves are degraded sufficiently that they no longer meet code, as is the case with some handicapped curb cuts and accessible ramps. In some instances, ramps that are up to code are covered in debris or otherwise not properly maintained in such a way as to preserve their accessibility.

Specific Issues	*Recommendations*
Concrete sidewalks are in poor condition-spalling, heaving, cracking and crumbling were all observed. In many instances the damage has resulted in cracks or gaps in excess 1/2", rendering the routes unacceptable for MAAB or ADA access. Additionally, displacement from frost heaving has created irregularly sloped surfaces. (Figures 33, 34)	Repair or replace all damaged concrete sidewalks. Provide accessible routes where necessary at all building entrances and site amenities.
Asphalt sidewalks have been similarly damaged over time, particularly at the intersection of dissimilar surfaces, creating significant gaps. (Figure 31.)	Repair or replace all damaged concrete sidewalks . Provide accessible routes where necessary.
In some areas a lack of maintenance was further contributing to the declining quality of the conditions. Leaf debris was observed at the handicapped-accessible curb ramps at the main entrance at Crescent St (Figure 36.)	Provide regular inspection and maintenance of accessible walkways, in particular those which are used heavily by the general public.
Because the school as built prior to the implementation of current MAAB rule and ADA guidelines and design standards, renovations and retrofitting was necessary in order to meet code requirements. This results in a less efficient and less attractive landscape, and draws unnecessary attention. (Figure 34.)	An accessibility study should be performed to ensure that all code requirements are being met, and a comprehensive plan put in place to address any and all shortcomings. Universal accessibility should be a priority in all new construction.

Figure 31—Failure at joints of dissimilar surfaces

Figure 32—Lack of accessible route at primary entrance

Figure 33—Damaged concrete sidewalks

Figure 34-ADA accessible retrofit at rear entrance

Figure 35—Temporary repair at ramped entrance

Figure 36—Lack of maintenance impeding accessibility

ARCHITECTURAL ASSESSMENT

Balmer Elementary School was constructed in 1968. Overall the building is in fair condition, however it is starting to show its age, and multiple systems and elements are at or beyond their service life expectations. The building was constructed in an era when there was little attention paid to energy performance, so it is likely that the insulating values of the building envelope are substandard by today's values, and in need of improvement. Exterior curtain wall and window systems exhibit multiple issues, and the roof is beyond its warranty and at the end of serviceable life, and is due for replacement. There are many major accessibility issues present. However the building as a whole shows no major red flags or highly dangerous safety conditions.

Terminology

Building Condition scale of terms used throughout this report are as follows:

- "Excellent": new or nearly new condition with few or no blemishes or compromises of quality or function.
- "Very Good": highly functional condition with slight wear and tear and/or minor compromises of quality or function.
- "Good": median functional condition with noticeable wear and tear and/or compromises of quality or function.
- "Fair": below median functional condition with significant wear and tear and/or major compromises of quality or function. Seriously worn parts or elements, minor structural compromise. Possible near-future safety hazard.
- "Poor": nearly– or completely non-functional condition with major wear and tear and/or serious compromises of quality or usability. Missing parts or elements, major structural damage or condition. Immediate safety hazard or danger.

EXTERIOR

Foundation

Foundations are cast-in-place (CIP) concrete, typically visible 6-12” above grade. Visible portions of foundations are generally in fair condition, with weathering and areas of surface deterioration.

Specific Issues	*Recommendations*
Various areas of cracking and in some cases exposed rebar was noted around the perimeter of the 1968 building. Cracks at the surface can allow water infiltration and additional damage during freeze-thaw cycles. (Figures 1-2).	Undertake a building-wide foundation concrete repair program, to remove all loose and unstable material, protect reinforcing with an applied coating, and patch all missing or cracked concrete. Consideration should also be given to applying a protective coating such as elastomeric paint to increase the service life of the patched walls.
Concrete frost pads / concrete sidewalk leading to the frost pads have issues of spalling with some having large areas of the concrete missing (Figures 3-4).	Repair all sidewalks and frost pads. Remove loose concrete from the sidewalks and frost pads, parge concrete to match existing planer surface.
Concrete loading dock is generally in fair condition, however there are a few areas of severe spalling of concrete. Dock bumpers are corroding, and staining concrete; rusted anchors can permit water to enter the concrete wall and cause additional deterioration. (Figures 5, 6).	Remove all loose concrete from loading dock walls and slab. Modify slab edge to include galvanized steel angle embedded in concrete to protect the edge of concrete. Seal all cracks in concrete. Parge concrete to match existing adjacent surfaces. Replace dock bumpers.

Figure 1—Foundation wall showing cracking

Figure 2—Foundation wall showing cracking

Figure 3—Sidewalk at frost pad showing spalling

Figure 4-Frost pad showing spalling missing corner

Figure 5—Loading dock showing spalling concrete

Figure 6—Loading dock showing spalling concrete

WALLS

Exterior wall construction is assumed to be brick veneer with concrete masonry unit back up, with little or no insulation in the wall cavity; however there were no detailed drawings of the original construction available to confirm this. The brick is laid up in Flemish bond, suggesting that some of the brick are turned and anchored directly into the CMU back up wall, however this couldn't be confirmed. No evidence of weeps was seen at the base of wall, however there was no observed damage due to moisture buildup inside the wall assembly.

A significant portion of the exterior wall is composed of curtainwall window framing, which is not thermally efficient or high performing. Refer to the Windows and Curtainwall section of this report following for observations and recommendations.

The brick is generally in very good condition with very few issues and little wear and tear, considering the age of the building. There was evidence of isolated cracking. issues with flashings or weeps, except as noted below.

Specific Issues	*Recommendations*
There are isolated areas of minor to moderate cracking in the brick and mortar joints. These are typically indicative of minor settlement over time or due to thermal stresses from solar radiation heating south-facing walls with no control joints to absorb stresses at corners. (Figures 7-8).	Repoint the brick, replacing damaged clay units. Install a control joint in the brick veneer within 16" of the corner on the side of wall facing the adjacent entry canopy. Investigate cause of brick unit cracking; repair.
Some of the expansion joint caulking at the exterior wall is starting to dry out and crack. Open joints can allow precipitation to enter the building wall system and cause further deterioration; especially during freeze-thaw cycles. (Figures 9-10).	Undertake a building-wide caulking maintenance and replacement program to identify and replace all caulking and sealants that are at the end of their expected service life.
There are several areas on the exterior brick veneer that have some staining due to vegetative growth on the face of the brick. This issue is mainly one of aesthetics. (Figures 11-12).	Clean the masonry with a low-acid masonry cleaning detergent.

Figure 7—Cracking at masonry joint

Figure 8– Cracking at masonry joint

Figure 9—Dried up cracked expansion joint caulk

Figure 10– Dried up cracked expansion joint caulk

Figure 11—Lichen growth on exterior brick veneer

Figure 12—Lichen growth on exterior brick veneer

Windows and Curtain Wall

Window and curtainwall systems appear to be original to the building, and do not appear to have been upgraded in any significant manner. The window and curtainwall systems consist of aluminum frames with single pane glazing. The curtain wall system also includes enameled metal spandrel panels.

Generally all systems are in varied condition, ranging from good to poor. Most operating sash units appear to work properly and seal well. Generally however, the systems perform poorly from an energy conservation standpoint, as the framing does not appear to be thermally broken, and glazing is not insulated.

Specific Issues	*Recommendations*
Curtainwall framing does not appear to be thermally broken, and glazing and infill within the system is single-pane plate glass. (Figures 13, 14, 15). The presence of any Low—E coatings on the glazing could not be confirmed, however given the age of the systems, it likely has no such coatings. There appears to have been a previous attempt to reduce solar thermal heat gain by the application of a reflective coating on the glass, however this is deteriorated. The result is poor energy performance, and increased heat gain from solar incidence. The paint finish on the spandrel panels is at the end of its expected service life, and several panels are rusting through the finish, staining the system with rust. (figures 16, 17).	Replace existing window and curtainwall systems in their entirety with high-performing, energy efficient curtainwall systems with insulated glazing.
The glazing compounds and gaskets at the perimeter of the glazing units are significantly deteriorated, with some gaskets falling out of their frames and glazing compounds drying out, increasing the potential for leaks within the window and curtainwall systems. (Figure 18).	Lacking complete replacement of window and curtainwall systems, reglaze the current glazing with new sealants and gaskets to prevent further deterioration and the potential for leaks..
Caulking and sealants at the perimeter of curtainwall and window systems is at the end of its expected service life. Many joints are cracked or visibly drying out; potentially opening the potential for leaks to develop in the façade. (Figure 18)	Undertake a building-wide caulking maintenance and replacement program, identifying and replacing all sealant joints that are deteriorated.
Some windows include protective steel mesh barrier screens at the exterior, which are rusting and staining the wall construction below. (Figure 15)	Replace protective screens with new screening with corrosion-resistant coating.

Figure 13—Non Low-E coated window glazing

Figure 14—Non thermally broken windows

Figure 15—Non thermally broken windows

Figure 16—Rusting enameled metal spandrel panels

Figure 17—Rusting enameled metal spandrel panels

Figure 18—Degraded caulk at window

Exterior Doors

Entrance systems and doors appear to be original to the buidling. The doors consist of uneven leaf aluminum storefront doors. Service doors feature hollow metal doors in hollow metal frames. it is unclear if the hollow metal doors are insulated. There is also one wooden sectional overhead door.

The condition of the exterior doors varies widely, from good to fair, though most appear to function reasonably well. It is unlikely that any doors are insulated or thermally improved.

Specific Issues	*Recommendations*
The exterior aluminum storefront and curtain wall doors are in fair condition, as they function well however they are frequently missing weather-seal bottom sweeps and gaskets (Figures 19, 20).	Replace these doors as part of a building-wide curtainwall replacement project; refer to Windows and Curtainwall section listed previously in this report. Lacking the complete replacement of curtainwall systems, inspect all aluminum entrance doors for proper weather-seals, and replace or install new seals to help prevent air leakage through the openings.
The H.M. doors are generally in fair condition. It is unclear if the doors are insulated. The doors and frames exhibit some rusting along the bottom edges at the pavement, and are often missing weather stripping. The paint finish on the doors is at the end of its service life and is failing, with a chalked appearance. (Figures 21, 22).	Replace all hollow metal doors with insulated units. Treat rust on frames and paint all openigns with high -performance rust inhibiting paint. Inspect all doors for proper weather-seals, and replace or install new seals to help prevent air leakage through the openings.
The wooden overhead door is in fair condition. It is not insulated, and does not meet the current energy code for required R value. The paint finish is at the end of its service life, and is checkered and flaking. The weather stripping / caulking is falling away from the door. The door hardware is in poor condition (Figure 23).	Replace the overhead door with a new insulated steel or aluminum door system with factory-applied corrosion-resistant finish..
Caulking and sealants at the perimeter of the hollow metal door frames is deteriorating and starting to crack.	Undertake a building-wide caulking maintenance and replacement program, identifying and replacing all sealant joints that are deteriorated.

Figure 19—Exterior storefront / curtain wall doors

Figure 20—Main Entrance Doors

Figure 21—Exterior hollow metal doors

Figure 22—Exterior hollow metal doors

Figure 23—Wooden overhead door

Louvers and Other Openings

Louvers on this building are generally of two types: horizontal blade louvers which are typically used in the brick veneer, and vertical blade louvers which are used in the curtainwall spandrel panels for classroom unit ventilators. Some vertical blade louvers located near grade exhibit minor damage, which is reasonable to expect given their location.

Generally most louvers are in good condition, however vertical blade louvers do not perform as well as horizontal blade louvers in terms of preventing rain penetration of the building envelope.

Specific Issues	*Recommendations*
Louvers near grade feature some bent and split louver fins / grating at various locations on the curtain wall system (Figure 24).	With any building-wide curtainwall replacement, replace unit ventilator louvers with new horizontal-blade louvers. Lacking replacement of curtainwall, replace damaged louvers with new.
Various locations the louver fins are very soiled with dirt or a black soot like substance. (Figures 25, 26, 27).	Clean all louvers. Verify that air handling system filters are changed regularly as part of a defined system maintenance plan. Evaluate condition of adjacent site to eliminate sources of airborne dust and contamination.
Various louvers have degraded and cracking caulk around the perimeter of the louver frame (Figures 25, 27).	Undertake a building-wide caulking maintenance and replacement program, identifying and replacing all sealant joints that are deteriorated.

Figure 24—Louver damage at curtain wall

Figure 25—Stained and dirty louver fins

Figure 26—Stained and dirty louver fins

Figure 27—-Stained and dirty louver

ROOF

The existing roof membrane is a Sarnafil PVC membrane, which is not original to the building. The membrane is white in color, and is fully adhered to the susbstrate insulation. The roof insulation appears to be rigid insulation construction which is mechanically fastened to the roof deck, however the thickness of the insulation could not be confirmed.

The age of the roof could not be confirmed, however it appears to be approaching the end of its service life. The white surface of the PVC is chalking and discolored, especially in areas of frequent ponding in proximity to roof drains. There are several small patches, which are apparently due to snow shoveling activities on the roof. Flashings at high walls above roof surfaces are deteriorated and in some places the metal fascia trim at the roof edges is deteriorated or missing.

Specific Issues	*Recommendations*
The amount of insulation in the roofing system is unknown. Any reroofing project will require the roof insulation to meet current energy code requirements.	The age and condition of all roof areas, coupled with the likelihood that the roof insulation value is below the current energy code is such that we recommend total roof replacement, with a minimum R value of R-30, and a .060 EPDM fully adhered membrane roof system.
There are areas of minor ponding water on the roof in proximity to the roof drains (Figures 30, 31).	As part of a re-roof project, provide tapered insulation to provide positive drainage at drains. Lacking complete replacement, investigate any existing roof warranties for exclusions related to ponding water. Current Sarnafil warranties permit some ponding water.
There are several areas where the membrane termination bar is pulling away from the base of high roof areas (Figures 32, 33).	Remove lengths of damaged termination bar at base of high roof areas and replace with new termination bar. Also see recommendation below regarding flashings..
The flashing where the membrane meets high walls is significantly deteriorated and at the end of its service life. (Figure 34).	Remove portions of existing flashings that extend beyond the face of the brick, and install new prefinished metal flashing let-in to reglets raked out of the masonry joint in courses above the existing flashing.
There are several of the mechanical roof insulation fasteners that are coming loose and lifting and are visible through the roof membrane (Figure 35).	Refer to comments above regarding replacement of the roofing system.
Roof edge fascia is missing at multiple locations.	Provide new roof edge fascia to match existing, and to protect underlying plywood and wood materials.

Figure 28– Ponding water at and around roof drain

Figure 29– Ponding water at and around roof drain

Figure 30– Lifting and damaged termination bar

Figure 31– Lifting and damaged termination bar

Figure 32– Damaged flashing at base of the chimney

Figure 33– Visible mech. fastener through membrane

INTERIOR

FLOORING

Flooring material in classrooms and related circulation spaces consists primarily of 9" x 9" vinyl asbestos tile (VAT), which is in fair condition, with wear at high traffic areas and isolated damaged tiles. This tile is known to contain asbestos—refer to the Hazardous Materials section of this report.

The flooring in the lobby is terrazzo, which is in fair condition, and features multiple settlement cracks.

The kitchen features quarry tile flooring and base, which is in good condition.

The gymnasium features a wood strip floor system, which is in poor condition due to previous water or humidity damage.

Isolated rooms and offices such as speech therapy and counseling rooms is carpet. In some rooms the carpet is wrinkled—restretching is needed.

The flooring in the bathrooms is mosaic tile which is in fair condition. Tile is generally dated in appearance and appears to be "dingy" with soiled grout joints. Tile flooring and/or tile base is missing in various locations.

The flooring in the boiler room, receiving room, all janitorial spaces, and some storage areas is sealed concrete, which exhibit worn surface finish.

Specific Issues	*Recommendations*
VAT tile at some spaces is cracked and friable. (Figures 36, 37). At some locations the VAT is heavily worn and worn through in high traffic areas. (Figure 38).	Replace and abate all VAT with resilient flooring such as sheet linoleum or vinyl composition tile.
The wood sports floor is in poor condition, due to previous moisture damage that warped the floor. (Figure 39).	Remove the flooring system down to the substrate slab, and provide a new resilient wood sports floor system on a plastic sheet vapor retarder.
The terrazzo floor in the entrance lobby features a large crack starting at the cafetorium door and extending to the entry walk off mat. There are multiple other cracks as well, and evidence of previous "repairs" using caulking material. (Figures 40, 41).	Refer to recommendation above; with any building-wide replacement of VAT, install new resilient flooring over the terrazzo.

Figure 36—Friable VAT tile at stage

Figure 37—Friable VAT tile at stage

Figure 38—Worn down VAT tile at stairs

Figure 39—Warped gym floor

Figure 40—Crack in terrazzo floor at cafetorium

Figure 41—Crack in terrazzo floor

INTERIOR

FLOORING (CONTINUED)

Specific Issues	*Recommendations*
Mosaic tile in bathrooms is dated in appearance, and appears to be dirty due to grout being soiled. Tile is missing from floor patches in many locations. (Figures 42, 43).	Remove all bathroom tile and base and replace with new tile, with floors sloped for positive drainage where floor drains exist..
There are many areas of missing cove base in bathrooms where there is mosaic tile (Figure 44).	In bathrooms with missing cove base remove old base and install new cove base to match existing mosaic tile floor.
In most of the areas that have sealed concrete as the floor finish the sealer has worn off, exposing the concrete. In some locations the concrete has shrinkage or minor settlement cracks. (Figure 45).	Repair cracks with concrete patching compounds, and reapply a protective barrier such as concrete deck paint or other protective coatings to prevent spilled chemicals from being absorbed and trapped in the concrete.
The stage floor appears to be sound, however the finish is heavily damaged and almost consistently scuffed. (Figures 46, 47)	Strip and refinish the entire wood floor and all wood components at the front of stage steps. Refer also to the Regulatory Assessment section for discussion of providing accessibility to the stage via a wheelchair lift.

Figure 42—Large area of missing mosaic tile

Figure 43—Area of missing mosaic tile

Figure 44—Typical missing cove base at bathrooms

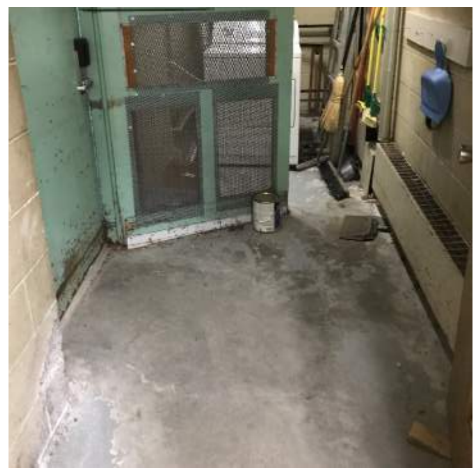


Figure 45—Sealed concrete floor worn away typical

Figure 46—scuffed and gouged stage floor

Figure 47—scuffed and gouged stage floor

Walls and Partitions

Interior walls and partitions are predominantly of CMU construction. There are some partitions in smaller rooms that are framed gypsum wall board construction. The walls in the lobby feature a vertical dimensional wood slat paneling system, presumably installed over wood furring and CMU backup. The gang bathrooms are glazed CMU to approximately 5'-6" +/- above the finish floor, with parged and painted CMU above..

Condition of most CMU and GWB partitions is in good condition, with very few cosmetic blemishes or areas of deeper damage. The glazed wall tile in the gang bathrooms are in fair to good condition. The wood slat walls in the lobby are in good condition.

Specific Issues	*Recommendations*
There are several cracks in the CMU walls in various locations throughout the school, with notabe cracks in the Audio Visual room off of the library . These appear to be due to the load-bearing nature of unre-inforced CMU construction. The cracks at this room are approximately 1/4" wide, with the CMU on each side being out of plane. (Figures 48, 49).	Repoint cracks in mortar joints. At the AV Room, replace broken CMU with new faces shells, and fill CMU cavities to the greatest extent possible with mortar and reinforcing to prevent reoccurrence of cracking.
The paint finishes throughout the school are beyond their expected life span, and are soiled and peeling in various locations. Some walls appear to be damaged from previous removal of wall-adhered fixtures. (Figures 50, 51, 52).	Undertake a building-wide repainting program to freshen the spaces.

Figure 48—Severe crack in corner of A.V. room

Figure 49—Severe crack in corner of A.V. room

Figure 50—Paint peeling off of GWB wall surface

Figure 51—Paint peeling off of CMU wall surface

Figure 52—Grimy worn out paint typical

CEILINGS

Ceilings throughout the building are typically suspended 2' X 4' Acoustical Ceiling Panel (ACP) in a metal grid system. Most ceilings throughout exhibit sagging ceiling panels with frequent staining, and corrosion on the grid framing.

The stage, receiving area and the gymnasium have exposed tectum roof decking, which is in good condition.

The Cafetorium has 12"x12" acoustic tile ceiling, which is in fair to good condition.

Specific Issues	*Recommendations*
The ACP ceiling panels throughout the building are beyond their expected service life, and exhibit significant sagging from humidity. Some tiles are no longer supported by the grid members. Several tiles throughout are stained from water damage. (Figures 53, 54, 55, 56, 57).	Replace acoustic panel ceilings throughout the school with new humidity resistant panels in grids that are corrosion resistant.
In all the bathrooms and wet areas the ceiling tile and grid system is not humidity resistant (Figure 58).	Replace ceiling grid and tiles with a moisture resistant grid and ceiling tile system.
The acoustic ceiling panels in the kitchen are a mix of styles, including moisture susceptible fissured type panels that are not washable.	Replace acoustic ceiling panels throughout the kitchen with a system with washable panels in a grid system that is corrosion resistant and approved by the USDA for use in commercial kitchens.

Figure 53—Sagging ACP ceiling

Figure 54—Sagging and damaged ACP ceiling

Figure 55—Water stained ACP tile

Figure 56—Damaged ceiling tile typical

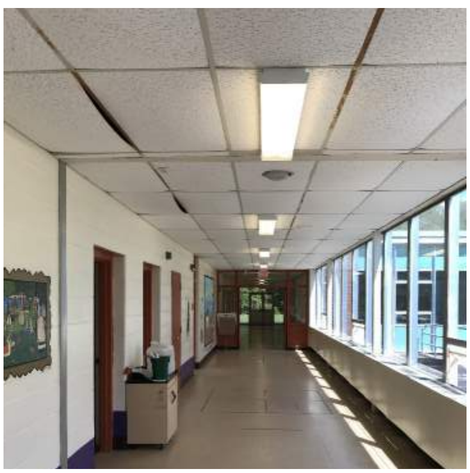


Figure 57—Rusting ceiling grid

Figure 58—Current non moisture resistant grid and tile

Interior Doors

Interior doors throughout the building are typically of two main types. "Public" doors are flush wood doors, typically natural finish & some painted in corridors and public spaces, and often left natural finish within classrooms. "Private," or service doors (very few) are hollow metal, painted. Frames for all doors are typically hollow metal, painted, the frames are a conventional squared shape construction. The corridor doors are a wood storefront door construction with transoms and side lites. The borrowed lites are wood construction with most having wired glass, with a few in the library having mirrored glass.

The condition of the wood "Public" doors are good to fair. The condition of the "Private" doors is good. The borrowed lites and wood corridor storefront doors are in good condition. The hollow metal frames are in good condition.

Door hardware issues have already been covered in the Accessibility section.

Specific Issues	*Recommendations*
The wood doors through out the building are nearing the end of their service life. Door finishes are showing surface isolated damage and are soiled at several locations, especially along the bottom edge where mop plates do not exist. (Figure 59).	Replace doors within the facility with new wood doors, with ratings where appropriate to the opening rating. Provide mop plates at all doors to prevent soiling. Refer to Regulatory Compliance section for discussion of accessibility issues related to doors and hardware.
Wired glass is used throughout the building in door vision panels and sidelights. Wired glass has been shown to adversely impact the fire and impact performance of the glass, and when broken the exposed wire represents a significant threat to cutting of hands and amputation of fingers. Wired glass is no longer permitted as "safety glass" in openings in impact areas such as door vision panels and sidelights. (Figure 60, 61, 62).	Replace all glazing in door vision panels, borrowed lights, and sidelights subject to pedestrian impact with tempered or laminated safety glass, with fire ratings where appropriate to the frame assembly rating.
Wood doors along corridors do not appear to include fire ratings necessary to separate corridors, especially at stairs from second floor. Refer to Regulatory Assessment for discussion of the corridor fire rating. (Figures 62, 63)	Replace doors and frames including borrowed light frames at perimeters of corridors with 1 hour rated doors, frames, and windows to improve separation of corridor.

Figure 59—Typical natural finish wood door

Figure 60—Typical door with wired glass

Figure 61—Borrowed lite system with wired glass

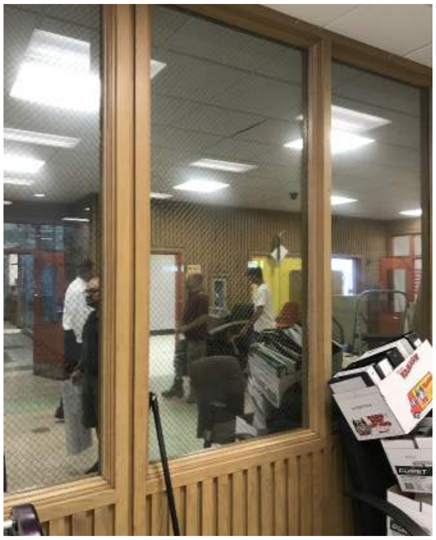


Figure 62—Borrowed lite system with wired glass

Figure 63—Wired glass corridor door system

Fixtures and Equipment

Storage in classrooms and in the building appears to be inadequate. In classrooms the tops of cabinets and shelving have been used for high-stacked storage, which can represent a hazard, however it appeared that most classrooms were in the midst of deep cleaning, so it was unclear if the storage in classrooms was "typical" for the school year.

Classrooms in the original building feature obsolete chalk boards throughout the rooms, which are no longer utilized. Marker and smart boards have been installed on top of these at many locations.

Toilet room fixtures and equipment consist of toilet compartment screens, dispensers, trash containers, towel dispensers, etc. These items range widely in condition from poor to very good Re-mounting new toilet room equipment (and accounting of that cost) is covered under accessibility improvements.

Other miscellaneous equipment include items like fire extinguishers and cabinets, corridor lockers on second floor for student personal storage, stage equipment, etc.

Specific Issues	*Recommendations*
Storage in the building appears to be inadequate for current needs. Classroom storage is piled high and densely on shelving; existing storage accommodations may not be efficient for current needs. (Figure 66)	Undertake a storage needs study for classrooms, to identify the types of storage needed for typical classrooms. Replace storage casework in classrooms with modern storage cabinets that better meet classroom needs
The metal toilet partitions on the first floor show varying types of damage. Some are bent, starting to rust, and some have been painted with brown wall paint. The partitions in classroom wings are in good condition (Figure 64).	Replace toilet compartments.
Fire extinguisher cabinets are mounted such that extinguishers within are installed too high for code. Fire extinguishers appear to be provided in insufficient quantities. (Figure 65).	Undertake a code analysis of fire extinguisher sizes and quantities building wide to confirm that sufficient extinguishers are provided. Verify all are mounted at code-compliant mounting height for size.
In general classroom casework is nearing the end of its service life. In many places, laminates are chipped or delaminating from substrate, countertop edges are delaminating, some drawer glides no longer operate smoothly. Sink cabinets do not meet accessibility requirements (Figures 66, 67)	Replace classroom casework with new units that are compliant with accessibility rules for the age of the intended users, and with a uniform appearance throughout the school.
Window sills at curtainwall systems appear to be stained plywood. Most are in poor condition, and exhibit water damage, and no clear finish on the stain such as polyurethane. (Figure 68).	Replace all window sills with new clear finished hardwood sills.
Classroom wall surfaces commonly feature chalk boards that are no longer used and create inefficient surfaces that are not compatible with modern teaching methods. The area of marker board surfaces is limited, and the current boards are mounted too high for smaller children to use effectively, which is limited by the existing chalk board trim. (Figure 69).	Remove existing chalk and cork boards and related trim from walls; provide new marker and tack boards following repair of scars at wall surfaces. Assume two new 8' marker boards and two new 6' tack boards per classroom.

Figure 64—Old metal repainted toilet partition

Figure 65—Fire extinguisher cabinet

Figure 66—integrated window casework

Figure 67—Classroom casework sink base

Figure 68—Plywood window sill

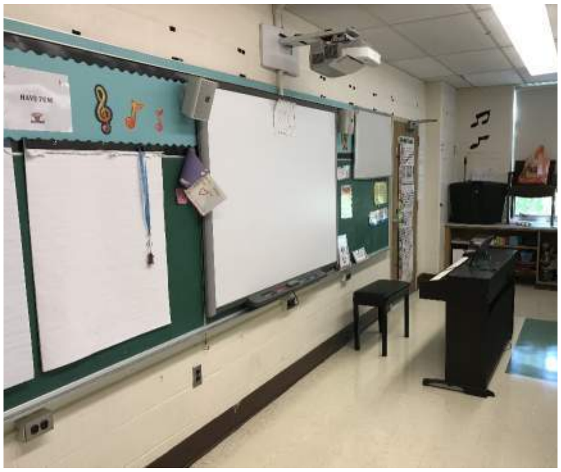


Figure 69—typical mismatched teaching wall

Fixtures and Equipment (Continued)

Specific Issues	*Recommendations*
In the Gymnasium, wall padding only exists directly below the main basketball goals. Given the close proximity of the out-of-bounds lines, the lack of wall padding can create a hazard to those playing sports on the court. It appears at one time there was more padding , however this has been removed. The wall padding that exists is in fair condition and near the end of its service life (Figure 70).	Install new wall padding at all walls of the gymnasium from 4" above floor to approximately 6' above floor.
The second floor classroom wing corridor has lockers on both sides of the corridor for the entire length of the corridor. The lockers are in fair to poor condition; many of the doors have dents, and some rust is beginning to form. Some of the locker doors have been pulled out of alignment with the face of the locker frames (Figure 71).	Remove and replace old lockers with new heavy duty locker systems.
The unit ventilators in the cafetorium are in poor condition. The metal face of the ventilators is rusting as well as the side panels are getting some scuffs and rust. The top panels are dirty and dingy (Figures 72, 73).	Remove old unit ventilators and replace with new ventilator system. Refer to the HVAC Assessment for further discussion.
At the Stage/Platform, there are no true stage lighting elements or controls in the space appropriate for an elementary level, only what appeared to be some work lights. Curtains are generally fixed, with one traveling main curtain downstage, and a traveler at the back, upstage. Fixed curtain battens are dead-hung. (Figures 74, 75).	Provide new, basic-level LED stage lighting and controls appropriate for an elementary school setting. Professionally clean and re-hang stage curtains, and adjust travelers for smooth operation.

Figure 70—Gymnasium wall padding

Figure 71—Second floor corridor lockers

Figure 72—Unit ventilators in cafetorium

Figure 73—Unit ventilators in cafetorium

Figure 74—Stage / Platform rigging

Figure 75—Stage / Platform rigging

REGULATORY OVERVIEW FOR MASSACHUSETTS

Applicable Regulations

Buildings undergoing repairs, alterations, additions, changes in use, or relocation will be permitted under the 9th edition of the Massachusetts State Building Code (780 CMR).The base code for the 9th Edition is comprised of the following 2015 International Code Council family of codes with Massachusetts amendments:

- International Building Code (IBC)
- International Energy Conservation Code (IECC)
- International Existing Building Code(IEBC)
- International Mechanical Code (IMC)

Additional building regulations, included by reference in the base code or enforceable under Massachusetts General Law include:

- Massachusetts Fire Code (527CMR)
- Massachusetts Elevator Code (524 CMR)
- Massachusetts Plumbing Code (248 CMR)
- Massachusetts Electrical Code (NFPA 70 – NEC)

Accessibility regulations applicable to the project are the Massachusetts Architectural Access Board Rules (MAAB) (521 CMR), and the 2010 Americans with Disabilities Act Architectural Guidelines. Where these two regulations are in conflict, the regulation that provides the greater accessibility should be provided.

Finally, in addition to the sprinkler protection requirement found in the building codes, certain Massachusetts General Laws (M.G.L.s) require sprinkler protection in certain types of new and existing non-residential buildings over 7,500 gross square feet.

Scoping Requirements and Thresholds for Compliance

Of the regulations described above, three of them require special consideration since they contain specific thresholds for full compliance with the regulation. These threshold-defining regulations are:

- The International Existing Building Code (IEBC)
- 521 CMR , or the Architectural Access Board (MAAB)
- M.G.L. c.148 s.26G, or the Automatic Sprinkler System Requirements

Compliance thresholds are based on either the area or cost of proposed work in comparison to the existing building area or building value and are defined in greater detail under each specific regulation description below. Generally, when the proposed scope of work does not exceed a defined threshold, only the work being performed is required to comply with the current edition of the codes. The Americans with Disabilities Act (ADA) also contains requirements for incorporating improvements to an accessible path to Primary Function areas where alterations to that area are undertaken.

INTERNATIONAL EXISTING BUILDING CODE (IEBC)

When considering changes to an existing building, the principal guiding regulation is the International Existing Building Code (IEBC), which is enforced by the local building official. The IEBC requires that any proposed work on an existing building or portion thereof first undergo an evaluation to determine the effect of the proposed work on at least the following systems: structural, means of egress, fire protection, energy conservation, lighting, hazardous materials, accessibility, and ventilation for the space under consideration. Because no specific scope of work is being proposed as part of an existing conditions survey, this report includes a Regulatory Assessment for each building under consideration in order to determine to what degree the existing building[s] and systems comply with current regulations. It should be understood that non-compliance with current regulations does not compel corrective action. Only when a scope of work is defined can the Existing Building Code be applied to determine the applicable requirements.

Following completion of an evaluation for a proposed scope of work, a *compliance path* needs to be selected for the application of building code requirements. Owners must choose either the Prescriptive, Work Area, or Performance Compliance path and apply only the provisions of the chosen compliance path to the project.

The *Prescriptive Compliance Path* provides a broad-brush approach to existing buildings. While it may be beneficial for small renovation projects, for significant renovations it could result in requiring additional work that may not be necessary under the other compliance paths, and will not be employed for this assessment.

The *Performance Compliance Path* uses a calculation based methodology to determine the general level of life safety of a building. This path assigns numeric values to various life safety features of a building to arrive at an overall building "score". Different building types require different scores to determine compliance or non-compliance with this path. This numeric value approach can be useful to evaluate the general life safety performance of an existing building as compared to current building regulations; because of this the Performance Compliance Path will be used to evaluate the general life safety condition of the existing facilities. Again, it should be noted that a non-compliant score does not compel corrective action – this methodology will be used to convey only how the existing building compares to current regulations.

The *Work Area Compliance* path typically offers the most advantageous approach to defining the code requirements for each portion of a building undergoing a significant renovation scope of work because it most closely correlates the required upgrades to building systems and components to that specific defined scope of work; for this reason, the Work Area compliance path will be the assumed compliance path for sake of any proposed work on the facilities, should they be pursued.

Work Area Compliance relies on identifying the type of work that is occurring throughout the building, and then applying the requirements for that type of work to the *Work Area*. The *Work Area*, as defined by the IEBC is:

> *That portion or portions of a building consisting of all reconfigured spaces as indicated in the construction documents. Work area excludes other portions of the building where incidental work entailed by the intended work must be performed...*

Using the definitions provided in the Code, the scope of work identified for existing buildings or portions thereof is categorized as follows:

Repairs:"...include the patching or restoration or replacement of damaged materials, elements, equipment, or fixtures for the purpose of maintaining such components in good or sound conditions with respect to loads or performance requirements..."(IEBC s. 502.1) Examples of repair would be repair or replacement of damaged plaster finishes, tiled or wood floors, replacement of wood trim, replacement of door hardware, replacement of any plumbing, heating, electrical ventilating, air conditioning, refrigerating, and fire protection equipment as well as the repair of any exterior masonry or roofing system, and repair of damaged structural elements with "in kind" elements or equipment. Chapter 6 of the IEBC is applicable to all Repairs.

Level 1 Alterations: "...include the removal and replacement or the covering of existing materials, elements, equipment, or fixtures using new materials, elements, equipment, or fixtures that serve the same purpose." This classification could be described as replacement with different systems, materials, or equipment, but providing the same function. Replacing wood flooring with a tile floor system, or proving all new kitchen equipment to replace outdated equipment would be considered Level 1 Alterations. (IEBC s. 503.1). Chapter 7 of the IEBC is applicable to all Level 1 alterations.

Level 2 Alterations: "...include the reconfiguration of space, the addition or elimination of any door or window, the reconfiguration or extension of any system, or the installation of any additional equipment." (IEBC s. 503.1). Chapter 7 and Chapter 8 of the IEBC is applicable to all Level 2alterations.

Level 3 Alterations: "...apply where the work area exceeds 50 percent of the *building area*."

Change of Occupancy: "A change in the use of the building or a portion of the building. A change of occupancy shall include any change of occupancy classification, any change from one group to another group within an occupancy classification or any change in use within a group for a specific occupancy classification."

Additions: "An extension or increase in floor area, number of stories, or height of a building structure."

Under the work area compliance path, each of the classifications of work described above require increasing levels of compliance with the building code. Repairs have the least restrictive requirements, essentially permitting replacement-in-kind for any repaired elements. Additions require the highest level of compliance and require that the addition comply with the building code as for new construction. The other classifications require increasing compliance and, for each classification, define prescriptive requirements for specific systems and elements such as means of egress, mechanical, electrical and fire protection systems, building materials, fire resistance ratings, and structural systems.

Work Areas, including Level 2 Alterations and Additions would be required to be identified on the construction documents. Repairs and Level 1 alterations, because they do not include reconfigured spaces, are not considered part of the "Work Area" defined by the code. Although there may be substantial repairs and Level 1 alterations throughout the building, this distinction is important; when the Work Area exceeds 50% of the floor area, the provisions for Level 3 alterations become applicable.

In addition to alterations that affect the building spaces and areas, it is necessary to understand how alterations affect the building structural system and elements. Where alterations change individual gravity or lateral load resisting elements, each element requires evaluation to determine if the alteration will result in additional loads and, if so, the element must be altered or replaced. For buildings with concrete or unreinforced masonry walls, when the work area exceeds 50 percent of the floor area, than all of the structural concrete or masonry walls (both gravity and lateral load resisting walls) are required to be secured to the floor or roof deck above.

Sprinkler Protection Requirements

There are two separate regulations that govern the requirements for sprinkler protection: the IEBC and M.G.L. c.148 s.26G.

In many occupancy types including schools, IEBC requirements—enforced by the building official— would require sprinklers where the *work area* (defined previously) exceeds 50 percent of the floor area and the work area is required to be provided with sprinklers in accordance with the International Building Code, Chapter 9 (provided there is sufficient water available to supply the system).

M.G.L. c.148 s.26G, which is enforced by the fire official, requires enhanced sprinkler protection in certain buildings which total more than 7,500 gross square feet in aggregate (adding all stories) floor area. This requirement is applicable when "major" alterations or modifications are occurring to a building. Because the statue is not specific about the definition of a "major" alteration, a memo issued on October 14, 2009 by the Fire Safety Commission's Automatic Sprinkler Appeals Board provides additional guidance on this subject.

This memo indicates two factors that are used to determine whether "major" alterations are taking place: a Nature of Work factor and a Scope of Work factor.

If the **Nature of the Work** is such that the effort to install sprinklers is substantially less than if the building was intact, or is the nature of work merely minor repairs and cosmetic work, or is the Nature of the Work "major" in its scope. There is no specific definition of "major", but the memo offers examples including: the demolition of existing ceiling or installation of suspended ceilings; the removal and installation of subflooring, exposing the building framing (not merely the replacement of finished flooring); the reconstruction or repositioning of walls; and the removal or relocation of a significant portion of the buildings HVAC, plumbing, or electrical systems involving penetrations of walls, floors, or ceilings.

If the **Scope of Work** affects a substantial portion of the building, or the cost of work is moderate in comparison to the total cost of work, than the Scope of Work criteria would be applicable to a project. The Scope of Work Thresholds defined in the memo are as follows:

1. Alterations or modifications are reasonably considered major when the work affects ***33 percent or more of the total gross square footage of the building*** (all floor levels combined). Again, no specific definition of alterations or modifications is provided, but we can infer from other codes and definitions that alterations relate specifically to the reconfiguration of spaces, or the "major" Nature of Work examples above.
2. Alterations or modifications are reasonably considered major when the total cost of the work (excluding costs related to sprinkler expenditure) is equal to or greater than ***33 percent of the assessed value of the subject building.***

The memo then indicates that if the Nature and Scope of work criteria and the Scope of Work (either 1 or 2) is satisfied, than the Board would consider the alterations "major" and thus require the installation of a sprinkler system.

ACCESSIBILITY

In Massachusetts, the state developed Architectural Access Board Regulations (521 CMR) replace the accessibility provisions of the building code. Like the other sections of the building code, the accessibility regulations are enforced by the building official. However, waivers or variances to 521 CMR cannot be granted by the building official. Rather, any such appeal or variance request needs to be reviewed and accepted by the Architectural Access Board.

Chapter 3 of the Architectural Access Board Regulations outlines the scoping thresholds for the applicability of accessibility guidelines for a project. Specifically, section 3.3 describes three different dollar value thresholds for any proposed *additions to, reconstruction, remodeling*, and *alterations* or *repairs* to existing buildings as compared to the buildings "full and fair cash value". The full and fair cash value is generally the assessed value of the building as recorded with the town assessor's office. This section then lists the applicability requirements for each dollar value threshold:

- For work costing less than $100,000, only the work being performed is required to comply with Accessibility regulations.
- A scope of work that is more than $100,000, but less than 30% of the full and fair cash value requires the incorporation of an accessible public entrance, toilet, telephone, and drinking fountain.
- When a scope of work costing more than 30% of the full and fair cash value is proposed, the entire facility is required to be brought into compliance with the accessibility guidelines. This threshold also clarifies that additions costing more than 30% of the current building value would require the entire existing facility to be brought into compliance.

Two additional sections in Chapter 3 require special consideration. Section 3.4 requires that when a building undergoes a change from a private use to a public use, an accessible entrance must be provided, even if no work is being performed. This is significant because it is the *only compulsory requirement* found in the building or accessibility codes when no other work is proposed or anticipated.

Finally, 521 CMR section 3.9 allows for variances to the accessibility guidelines for Historic Structures listed on the State or National Register of historic places. The process of documenting and being granted variances for a broad range of accessibility requirements based on historic status is a complicated and nuanced process that requires careful coordination with the Access Board. The Board reviews the proposed variances to ensure that people with disabilities are granted dignified access to the primary function spaces of the building with as little influence on the historic fabric of the building as is feasible.

The Americans with Disabilities Act Architectural Guidelines (ADAAG 2010) is part of a federal civil rights regulation that is also applicable to work on existing buildings depending on their intended users. ADA applicability would be under Title II for any state or local government entity, program, service, or facility whereas Title III is applicable for any places of public accommodation or commercial facilities that fall into specifically defined categories. The requirements for buildings under the ADA are enforced by the US Department of Justice, and enforcement is typically through investigations or civil lawsuits resulting from complaints filed by individuals or organizations for perceived violations of the Act. These actions can be brought against a building Owner at any time, as opposed to building codes which are typically enforced when an building permit is granted for a proposed scope of work.

Title II (State and Local Governments) of the ADA requires that all services, programs, and activities provided by state and local government entities be accessible to people with disabilities. This does not require that all existing facilities be brought into compliance, but that barriers be removed in existing buildings such that all public services or programs, when viewed in their entirety, are accessible. Any proposed work on an existing building under Title II would be required to comply with ADA guidelines to the maximum extent feasible and new facilities would be required to comply completely with the guidelines. Additionally, when work is proposed that affects a primary function of an existing facility, the path of travel to that area, including the bathrooms, drinking fountain, and telephones on that path would need be made accessible as well. There are exceptions in Title II for structural impracticability, historic buildings, certain types of spaces, and disproportionality of cost for alterations to an accessible path serving a primary function area which all require close consideration for each scope of work in each building under consideration.

Title III facilities are privately owned buildings that are either defined as places of public accommodation (business open to the public and fall into one of 12 categories listed in the ADA) or as commercial facilities (non-residential facilities that are not defined as places of public accommodation). The requirements for alterations to these facilities are similar to those as for Title II facilities, including the provisions for an accessible path serving a space that is considered a primary function. The most significant difference is that Title III existing facilities are not held to the same "removal of existing barriers" standard or program and service access standards as Title II facilities. Still, any proposed work in a Title III building would be required to comply to the maximum extent feasible, taking all of the applicable exceptions into consideration.

Energy Conservation

The 2015 International Energy Conservation Code (IECC) replaces the Chapter 13 requirements of the building code. This specialized code, also enforced by the building official, is intended to regulate the design and construction of facilities with respect to the use and conservation of energy over the life of the building. Chapter 5 of the IECC controls the alteration, repair, addition, and change of occupancy of existing buildings and has no authority to require the removal, alteration, or prevent the continued use of any existing buildings. For communities that have adopted the Massachusetts STRETCH Code, increased reductions in energy consumption beyond the baseline thresholds established in the 2009 IECC would be required for new buildings and additions to existing buildings only. Alterations to existing buildings in these communities would be subject to the requirements of Chapter 5 of the 2015 IECC, described below.

Section C501.6, states that no provisions of the code relating to the repair, alteration, restoration or change of occupancy shall be mandatory for historic structures provided a report is submitted to the building official demonstrating that compliance with the provision would threaten, degrade, or destroy the historic fabric function of the building. While this is not a categorical exemption to the energy conservation code, it does place a high degree of value on the historic fabric of the building.

Proposed additions to existing structures would be required to comply with the IECC as for new construction. Alterations to existing buildings also need to comply with the IECC as for new construction and cannot make the existing building less conforming to the code than it was prior to the alteration. In general, this means that when a building envelope or mechanical system or piece of equipment is modified as part of a scope of work, the replacement elements or systems are required to comply with the IECC for new construction. There is no provision, based on the work area or dollar value of alterations, which would require an existing facility to be brought into full compliance with the energy code.

Certain specific scopes of work that may be limited to one portion of the building, whether considered as additions or alterations to existing facilities, are required to consider the effect on the entire facility. The addition of windows or other fenestration, including skylights, needs to incorporate all of the building fenestration areas in the total allowable fenestration area. Alternatively, a project could pursue the Total Building Performance method, requiring energy modeling, but would then need to demonstrate full compliance with the IECC as for new construction. Otherwise, alteration and addition compliance requirements are limited to the work performed.

Although not part of the energy conservation code, it is important to note that in Massachusetts, M.G.L. chapter 7C, section 29 requires that for any new construction or renovation of a public facility where the cost exceeds $25,000 and includes systems or elements that affect energy or water consumption, a life-cycle cost analysis (LCCA) would be required to be performed. This analysis is required to determine the short and long term costs and feasibility of different technologies or systems considered as part of the scope of work. These systems and components would include both energy consuming equipment as well as building envelope elements or systems, since all of these elements affect energy consumption.

FIRE SAFETY CODE

In addition to the building code (780 CMR), there is also a Massachusetts Comprehensive Fire Safety Code (527) which is enforced by the local Fire Official. The Fire Code is generally enforced as a safety maintenance code, intended to prevent or remedy any conditions that may be fire hazards and to provide safety requirements to protect the public in the event of a fire. This code also regulates the installation and maintenance of fire safety equipment such as sprinkler systems and fire detection systems.

The Fire Code does apply to both new and existing conditions, but this code states that all installations of equipment completed prior to the adoption of the code are deemed to be in compliance. However, the fire official still has the authority to require compliance with the code for any condition which constitutes an imminent danger.

For the purposes of this report, it is important to note that the Fire Code also states that any provision related to the construction, alteration, movement, enlargement, replacement, repair, equipment, use, occupancy, removal, or demolition of buildings shall effectively be regulated by the building code and is subject to the jurisdiction of the Building Official. As such, this report contains minimal references to the Fire Code and will rely on the IEBC requirements outlines above for evaluation and consideration of existing conditions and any proposed scope of work.

Historic Structures

Massachusetts General Laws require that any project that requires funding, licensing, or permitting from a state agency to be reviewed by the Massachusetts Historical Commission (MHC). This review and the regulations that guide the review are designed to identify historic properties, evaluate the impact of a proposed project, and consult with the invested parties to avoid, minimize, or mitigate any adverse effects of the project. Once a general scope of work is defined, a Project Notification Form should be filed with the MHC to determine if any historical or archeological considerations will need to be addressed as part of the project.

Beyond the State of Massachusetts regulations, the US Department of the Interior has developed a set of standards and guidelines related to the maintenance, repair, replacement of historic materials, and the design of alterations or additions to historic structures. The *Standards* are a set of concepts related to these different treatments, whereas the Guidelines offer design and technical recommendations in applying the Standards.

In order to determine which Standards and Guidelines are applicable, it is necessary to determine which treatment of a historic structure would be pursued for a given facility. A proposed scope of work outlined in a Capital Improvements Plan generally falls into work that could be classified as one of the following Treatments:

- **Preservation**: the maintenance and repair of existing historic materials and retention of a property's form as it has evolved over time.
- **Rehabilitation**: recognizing the need to alter or add to a historic property to meet continuing or changing uses while retaining the properties historic character.

In working to develop a defined scope of work as well as a sustainable capital improvement plan for the future, the Standards for Preservation and Rehabilitation as well as the Guidelines for the Treatment of Historic Properties will serve as guiding documents in the development of such plans. Compliance with the Guidelines is not obligatory, but will provide the best practice approach to both maintaining the building and allowing for alterations to serve the intended end use. It also serves to demonstrate that the Owner values and wishes to maintain the historic integrity of a building, reinforcing the appropriate application of any historic structure exceptions to accessibility and building code regulations.

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INTRODUCTION

This Regulatory Assessment will seek to convey to what degree the Balmer Elementary School, in its current condition, complies with current building codes and regulations. This assessment does not attempt to define a scope of work, but rather highlight specific non-complying conditions and identify which conditions would require correction if a repair, alteration, addition, or change of use were to be proposed for the facility.

It is important to note that a building or a portion of a building does not require correction simply because it does not comply with current codes; any building that is legally occupied and adequately maintained can remain so without bringing the building into full compliance with codes and regulations. This *principal of non-conforming rights* (that a newly adopted regulation cannot impose the undue burden of compliance on legally existing occupancies) is reflected in how the codes identify to what degree existing buildings must be brought into compliance when a scope of work is proposed. The greater the scope of work, the greater the burden of compliance with a given code or regulation will be required.

For some regulations, such as 521 CMR Accessibility Rules or the Massachusetts special sprinkler provisions of MGL c.148 s.26G, these compliance thresholds are “hard lines” comprised of specific dollar value thresholds. When determining the dollar value thresholds for compliance, the cash value of the building is used as the basis for the determining the requirements for compliance. The full and fair cash value of the *building*, as determined from the Town Assessor's online database is calculated as follows:

Total Assessment (Land + Improvements)	$7,821,200
Land	-$1,193,800
Detached Improvements	-$26,208
Building Only—Full and Fair Cash Value	**$6,601,192**

This value will be used later in this Assessment to calculate the applicable compliance thresholds.

The gross floor area (GFA) of the building is 69,594 SF.

The Existing Building Code uses the type of work and the affected area to determine when increasing levels of compliance are required. When considering a proposed scope of work for the building, a careful consideration of the various degrees of compliance will need to be considered. Refer to the Regulatory Overview section of this report for a more detailed description of the various compliance paths outlined in the Existing Building Code.

THE INTERNATIONAL EXISTING BUILDING CODE (IEBC)

The Performance Compliance path described in the IEBC provides a simple yet comprehensive overview of the general life safety aspects of a building. Although designed as a building code compliance path, it can also be used as an assessment tool. This assessment will utilize the value- and scoring-based method of the Performance Compliance path to assign a score to the building as it is currently configured and maintained. The systems and basis for scoring are based on the building code for new construction (the International Building Code or IBC), and scores are determined by the degree of compliance with the IBC for various systems. Similar to previous comments, a failing score in any category as part of an assessment does not compel any corrective action - it simply indicates how the building would be viewed under current codes. It is intended to illustrated the relative general and life safety performance of the existing building.

The Construction of Balmer Elementary School is characterized generally as noncombustible exterior construction, with loadbearing interior and exterior masonry walls, and open-web steel joists supporting elevated concrete decks and wood or gypsum roof deck. Per IBC Table 601, a reasonable assumption of the construction type would be Type III-B, due to the possibility of wood fiber roof decking, lack of fireproofing on steel framing, and isolated interior walls that may be built of combustible materials.

In order to pass each of the categories for Fire Safety (FS), Means of Egress (ME), and General Safety (GS), a total score of 0 or higher is required for the category. The total values for these categories from Table 1401.7 (see previous) are reduced by the mandatory scores (MFS, MMS, and MGS below), and the resulting score is compared to the "zero" threshold. Any negative number indicates that the building fails that category.

The resulting scores for Balmer Elementary are typical of buildings of that time period.

The building egress features do not appear to be entirely code compliant, and additional investigation is needed to validate suspicions, and this is a condition that may not be easily rectified. Currently both exit stairs for the second floor classrooms exit into the first floor corridors. Current code requires at least half of the exits (stairs in this case) to discharge directly to the exterior, or the fire separation rating of the stair to be continued to the building exit.. It is unclear from the available documents if this is the case, and this can't be confirmed without extensive, potentially destructive investigation.

The most significant improvements that would increase the general life-safety of the building would be to verify and assure that corridors on the first floor that serve the second floor stairs are fire rated to a 1 hour rating with 1 hour rated opening protection at all doors and borrowed lites opening onto the corridors, and to install fire sprinkler protection throughout the building.

SPRINKLER PROTECTION REQUIREMENTS

The building is not equipped with fully automatic sprinkler systems in compliance with M.G.L. c.148 s.26G. All public schools larger than 7500 Gross Square Feet (GSF) would require a sprinkler system to be installed throughout the facility if any major alterations or any additions are planned. In Massachusetts, a building's *fire area* includes all portions of the building enclosed by the exterior walls regardless of interior sub-division with fire walls or fire barriers. This is important to understand because the sub-division of a building into separate fire areas (with fire walls and fire barriers, for example) would not be considered a strategy to avoid inclusion of fire sprinklers in Massachusetts.

In regard to future alterations or additions to the building: to be considered a "major alteration" the scope of work would have to meet both the "nature of work" and "scope of work" criteria.

Table 1401.7 Summary Sheet - Building code - *Balmer Elementary School*

Existing Occupancy	E	Proposed Occupancy	E		
Year building was constructed	1968	Number of Stories	2	Height in feet	23'-6"
Type of construction	III-B	Construction Type Factor (IEBC)	3.5		
Percentage of open perimeter increase	100%	Area per floor	53,024 / 18,645		
Completely Supressed	NO	Corridor wall rating	0 hours (doors have closers)		
		Type	CMU		
Compartmentation	No	Required door closers	Yes		
Fire resistance rating of vertical opening enclosures	0 hours				
Type of HVAC system	Unit vent	, serving number of floors	2		
Automatic fire detection	Yes	Type and location			
Fire alarm system	Yes	Type			
Smoke control	No	Type			
Adequate exit routes	Yes	Dead ends	Yes	Length in feet	45
Maximum exit access travel distance	317 feet	Elevatory controls	No		
Means of egress lighting	Yes	Mixed Occupancies	No		
Standpipes	No	Patient abilty for self preservation	N/A		
Incidental use	Yes	patient concentration	N/A		
Smoke compartment less than 22,500 sq. ft.	No	Attendant-to-patient ratic	N/A		

Safety Parameters	Fire Safety (FS)	Means of Egress (ME)	General Safety (GS)
1401.6.1 Building Height	0	0	0
1401.6.2 Building Area	-23	-23	-23
1401.6.3 Compartmentation	0	0	0
1401.6.4 Tenant and Dwelling Unit Separations	0	0	0
1401.6.5 Corridor Walls	-5	-5	-5
1401.6.6 Vertical Openings	-14	-14	-14
1401.6.7 HVAC Systems	-5	-5	-5
1401.6.8 Automatic Fire Detection	-4	-4	-4
1401.6.9 Fire Alarm System	-5	-5	-5
1401.6.10 Smoke Control	****	0	0
1401.6.11 Means of Egress	****	2	2
1401.6.12 Dead Ends	****	2	2
1401.6.13 Maximum Exit Access Travel Distance	****	-11	-11
1401.6.14 Elevator Control	-2	-2	-2
1401.6.15 Means of Egress Emergency Lighting	****	****	0
1401.6.16 Mixed Occupancies	0	0	0
1401.6.17 Automatic Sprinklers	-12	-6	-12
1401.6.18 Standpipes	0	0	0
1401.6.19 Incidental Use	0	0	0
1401.6.20 Smoke Compartmentation	0	0	0
1401.6.21.1 Patient Ability for Self-preservation	****	0	0
1401.6.21.2 Patient Concentration	****	0	0
1401.6.21.3 Attendant-to-patient Ratic	****	0	0
Building Score - total value	-70	-71	-77

Table 1401.9 - Final Evaluation Formula

Balmer Elementary School						
				Score	Pass	Fail
-70	(FS) -	*29*	(MFS)=	-99		X
-71	(MS) -	*40*	(MMS)=	-111		X
-77	(GS) -	*40*	(MGS)=	-117		X

For the scope of work criterion, the Division of Fire Services provides two separate thresholds - if the project exceeds one of these thresholds, then the project is considered "major" in scope.

For Balmer Elementary School, if the work area exceeds 22,966 square feet (33% of the total building area of 69,594 square feet) ***or*** if the cost of work exceeds $ 2,178,393 (33% of the value of the building, calculated above), the project *scope* would be considered "major". These thresholds should be kept in mind as one considers any future alterations to this building.

The "nature of work" criterion is less specific, but essentially if any work is being done that would not make the installation of sprinklers substantially more difficult, it would be considered “major” in nature. Examples include the demolition of ceilings, walls, or floor decking exposing the structural framing.

International Energy Conservation Code

The Town of Northbridge has adopted the Massachusetts STRETCH Energy Code. As such, any alterations to the energy consuming systems or building envelope would be required to comply with the International Energy Conservation Code (IECC), 2015 Edition. The IECC requires that any alteration, renovations, or repairs to an existing building conform to the provisions of the code, but does not require that unaltered portions to comply. Essentially this means that any system or portion of a system that is altered would be designed in compliance with the energy code, but there is no provision that the entire facility be brought into full compliance. The project may incorporate additional energy performance improvements beyond those required by the code.

A Life Cycle Cost Analysis (LCCA) would be required to be conducted for any alterations to an Energy System in accordance with M.G.L. c. 149 s. 44m.

Standards for the Treatment of Historic Structures

The building and property is not listed on, nor is it eligible for listing on the National or State Registry of Historic Places.

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ACCESSIBILITY

Balmer Elementary School was constructed before the existence of the ADA guidelines or the MAAB accessibility rules, however some isolated accessibility improvements have provided accessible routes to the building. Not all interior features and amenities are accessible, including toilet rooms and the second floor.

If the cost of any proposed work exceeds $100,000, the code requires that an accessible entrance, toilet room, drinking fountain, and telephone (if drinking fountains and telephones are provided) be provided, in addition to the compliance requirements of the proposed work. When the cost of work exceeds 30% of the full and fair cash value of the building (see previous), then the entire facility will be required to comply with the MAAB Rules. For the Balmer Elementary School, this 30% threshold dollar value would be $1,980,357.

Because the building is a public school, owned and operated by the local municipality, it is considered a Title II facility under the Americans with Disabilities Act (ADA). As such, any proposed work to the facility would be required to comply to the maximum extent feasible with the ADA Architectural Guidelines (the ADAAG) except where it would be structurally impractical. The ADA does not have a threshold for requiring full facility compliance, but does require that when there are alterations to an area of "primary function" (including classrooms, gymnasium, cafeteria, and administration areas), than the path of travel as well as the restrooms, telephones, and drinking fountains serving the areas of primary function are also accessible.

Several accessibility deficiencies or non-compliant conditions were noted at Balmer. If a major alteration exceeding the 30% threshold were undertaken, these items would require correction.

Specific Issues	*Recommendations*
An accessible route appears to exist from accessible parking to the main entrance, including curb ramps that appear to comply with slope requirements. Concrete walks are fair condition; there are a few areas of cracking. Refer to the Site Assessment for discussion of pedestrian paving (Figures 1, 2).	Investigate grades and slopes of all accessible routes to verify that slopes meet current MAAB and ADA slope requirements.
57 on-site, striped parking spaces exist. Four spaces near the main entry are designated with pavement markings as accessible spaces which is in excess of MAAB and ADA requirements, however they do not feature required signage. None of the spaces are designated as van-accessible, however restriping the lot and signage could accommodate this.	Install signage required by MAAB rules, and restripe parking to create a space compliant with van accessible size and aisle standards.
The school currently does not have an elevator to provide access to the second floor classrooms. There are no other means to reach the second floor except by use of the stairs..	Install an elevator in a hoistway constructed exterior to the existing building to provide an accessible route to the second floor classroom wing.

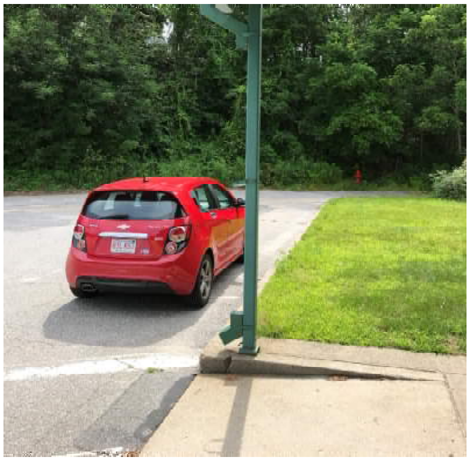

Figure 1—Accessible entrance with curb ramp

Figure 2—Accessible entrance with curb ramp

Figure 3—Accessible entrance

Figure 4—Accessible side entrance typical

Figure 5—Playground surface and equipment issues

ACCESSIBILITY (CONTINUED)

Specific Issues	*Recommendations*
The playground surface under the equipment is wood chips, which does not comply with MAAB accessible surface requirements, also these wood chips are not preventing erosion within the play area; a drainage path is visible where the wood chips wash out, further affecting accessibility. (Figure 5, previous page)	Refer to Site Assessment section of this report for discussion of replacing playground surfacing.
Nearly all of the required exterior egress doors from interior spaces have a 6”(+/-) step down to grade. Doors intended to be used as entrances should be accessible. (Figure 6)	Adjust grading of sidewalks and adjacent landscaped areas leading up to exterior frost pads at doors to provide an accessible path. Ideally, slopes should be maintained at less than 1:20. See Site Assessment section for additional discussion.
The ramp adjacent to the loading dock does not feature guardrails and handrails compliant with MAAB and the building code, and is too steep for MAAB requirements (Figure 7, 8).	Replace the ramp with a ramp meeting accessibility requirements for slope; include guards and handrails meeting accessibility and building code requirements.
There is no elevator to provide access to the second floor of the classroom wing. There are no other means to reach the second floor except by use of the stairs..	Install an elevator in a hoistway constructed exterior to the existing building to provide access to the second floor classroom wing.
There is no accessible path from the cafetorium floor to the stage platform. The only way to access the stage is by the stairs at the front of the stage or two stairways on either side of the stage accessed from outside the cafetorium space (Figure 10, 11).	Install an enclosed vertical wheelchair lift to access the platform stage.
The main entrance is configured with two pairs of doors, each with a 36” wide active and a 24” wide inactive leaf, however there are no motorized operators on any exterior doors. (Figures 3, 9). Secondary entry doors also feature a 36” wide active leaf and 24” wide inactive leaf (Figure 4).	Install a motor operator with push-button controls at one exterior door at the entrance to guarantee the doors meet the accessibility requirements for opening force.

Figure 6—Exit stair discharge door with step

Figure 7—Ramp at loading dock missing guardrail

Figure 8—Ramp at loading dock missing guardrail

Figure 9—Corridor exit vestibule door classroom wing

Figure 10—Stage access via stairs at front of stage

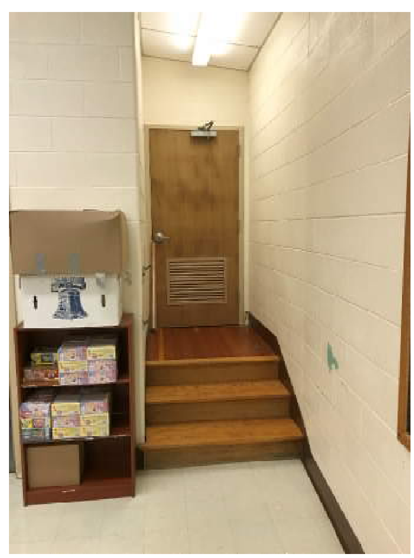

Figure 11—Stage access via stairs in SAC office

ACCESSIBILITY (CONTINUED)

Specific Issues	*Recommendations*
While some previous attempts were made to improve accessibility at toilet rooms by the addition of grab bars, they are not fully compliant with MAAB or ADA requirements. Fixtures and accessories such as mirrors are not compliant. In toilet rooms with more than 6 total toilets and/or urinals, ambulatory stalls are not provided. Mounting heights of fixtures and accessories such as mirrors must be coordinated with the grades and ages served. (Figure 12)	Reconfigure toilet rooms to provide accessible toilet stalls, possibly including reduction in total fixture count. This would include demolition and replacement of floor slabs to facilitate relocation of underground piping.
Gang toilet rooms feature pedestal mounted sinks which do not provide knee clearance. There are no paper towel dispensers in proximity to any sinks. (Figure 13).	Refer to recommendation above.
The toilet room in the Nurse's suite is not accessible; the configuration of walls does not provide the required floor clearance for any fixture or door openings. The sink is located outside the toilet room. Reconfiguration of walls in the area would be needed to provide a compliant room. (Figures 14, 15).	Demolish inaccessible toilet room in its entirety including doors, frames, and walls. Provide new toilet room layout that is in compliance with current MAAB and ADA requirements.
Faculty single user toilets are not in compliance with current MAAB regulations; the required floor clearance at toilets is not provided, there are no grab bars at the toilet, the toilet paper dispenser is not mounted in an acceptable location. Relocation of walls will likely be required to create compliant spaces (Figure 16)	Demolish inaccessible toilet room in its entirety including doors, frames, and walls. Provide new toilet room layout that is in compliance with current MAAB and ADA requirements.
Drinking fountains in the building are not the high/ low configuration required by ADA, and do not provide knee space for forward approach. (Figure 17).	Remove all non compliant drinking fountains and replace them with the high / low configuration that is compliant with the current MAAB regulations.

Figure 12—Non accessible toilet room.

Figure 13—Non accessible gang bathroom typical

Figure 14—Non-accessible toilet in nurses suite

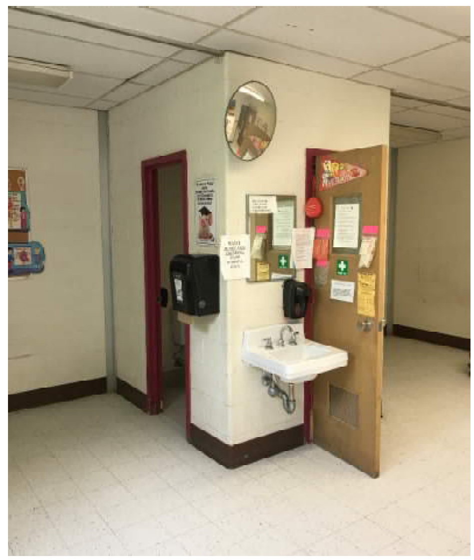

Figure 15—Non-accessible toilet in nurses suite

Figure 16—Non accessible single user toilet room.

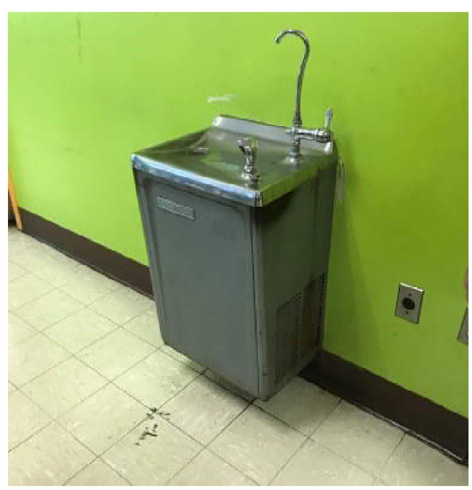

Figure 17—Non-accessible drinking fountains

Accessibility (Continued)

Specific Issues	*Recommendations*
All of the casework and sinks in the classrooms are not accessible. There is no knee space under the sinks and there are paper towel dispensers in the approach to the sinks. (Figure 18).	Remove all of the casework and sinks from the classrooms and replace them with new casework and sinks that meet the requirements of the current MAAB regulations.
There are four classrooms that have toilet rooms which are not accessible. Two of those bathrooms are being used for storage. It is our interpretation that the occupants in these classrooms are not covered by accessible gang facilities on the floor; if these facilities are provided for a specific use such as pre-K or Kindergarten-only, in-class use, they should be accessible. (Figure 19)	Demolish and reconstruct the toilet rooms, including the surrounding walls and doors, to provide accessible toilet rooms. .Use child-height fixtures and mounting heights as appropriate to the ages of the intended users.
Handrails at all stairs are not compliant with MAAB and ADA requirements as they lack proper extensions at the top and bottom of the stair, and do not appear to be at an acceptable height. Guards are not compliant with building code as they are not high enough and the openings in the guard construction are too large. (Figure 20).	Remove and replace all handrails and guards in their entirety. Install new guards and handrails throughout, and that feature proper extensions wherever practical.
Interior ramp in the corridor does not feature handrails. The wall configuration along one side of the ramp will not facilitate installation of continuous wall-mounted handrails along the length of the ramp (Figure 21)	Provide a combination of wall mounted and floor mounted handrails at the length of the ramp complying with MAAB requirements.
Some doors were observed to feature knob-type handles, which are not compliant with accessibility rules. Lever style handles are required.	Replace all knob style door handles with locksets and latchsets that include lever style trim.

Figure 18—Typical non-accessible sink

Figure 19—Non-accessible classroom toilet

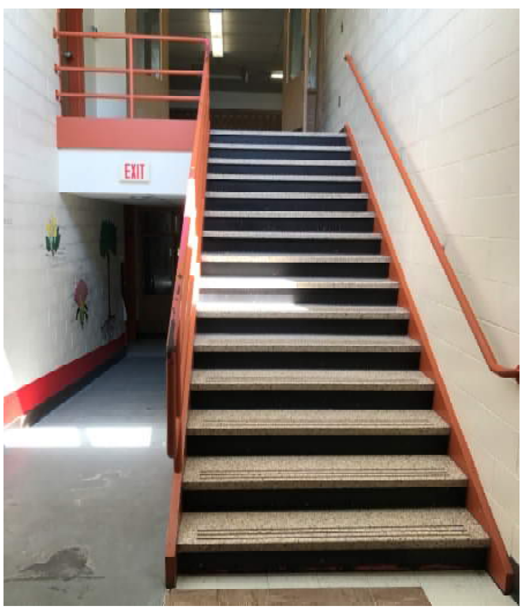

Figure 20—Typical stairwell guardrails & handrails

Figure 21 —No handrails at interior ramp

STRUCTURAL ASSESSMENT

The purpose of this report is to describe, in broad terms, the structure of the existing building; to comment on the condition of the existing building; and on the feasibility of renovations and expansion of the school

SCOPE

- Description of existing structure
- Comments on the existing condition
- Comments on the feasibility of renovation and expansion.

BASIS OF REPORT

This report is based on our visual observations during our site visit on July 10, 2017 and our review of the original building prepared by J. Williams Beal Sons Granger & Pokus Architects dated April 29, 1966 and the renovation drawings prepared by Dixon Salo Architects, Inc. dated July 2, 1988.

During our site visit, we did not remove any permanent finishes or take measurements. Our understanding of the structure is limited to the available drawings and our observations of the structure.

BUILDING DESCRIPTION

The school is located on Crescent Street in Whitinsville, Massachusetts. The original school is a one and two story steel and masonry framed structure constructed in 1968. In 1998, minor renovations were made to a small portion of the school.

The typical roof construction is framed with wood fiber or gypsum panels spanning between open web steel joists supported on load bearing, unreinforced masonry walls and steel columns. We were not able to view the floor framing; but, we expect it to be a concrete slab on form deck supported on open web steel joists. The lowest level slab is a concrete slab-on-grade and the foundations are traditional reinforced concrete strip footings.

EXISTING CONDITIONS

Based on our observations, the school structure is functioning well based on the age of the school.

- We observed signs of past water leakage at a few locations.
- Cracks in the interior masonry walls were evident at some locations, especially in the Gymnasium, the Library and in the exterior masonry façade where evidence of past repairs was also observed.
- Minor spalling of concrete at the corners of the foundations was also observed.
- Surface rusting in the steel columns of the front canopy was also observed.
- We did not observe any signs of foundation settlement, or any cracking of slabs due to vibrations from footfall and traffic on the supported floor slab.

PROPOSED SCHEMES

Based on our observations and analysis of the existing drawings, no structural upgrades are required for any proposed renovations of limited scope that do not invoke any required structural modifications. The extent of the code required structural upgrades is dependent on the extents of the proposed renovations. The following is a description of the compliance methods that may be triggered depending on the extents of the proposed schemes as dictated by other disciplines.

GENERAL CODE CONSIDERATIONS

If any repairs, renovations, additions or change of occupancy or use are made to the existing structure, an evaluation of the structure is required to demonstrate compliance with 780 CMR, Chapter 34 "Existing Building Code" (Massachusetts Amendments to The International Existing Building Code 2015). The intent of the IEBC and the related Massachusetts Amendments to IEBC is to provide alternative approaches to alterations, repairs, additions and/or a change of occupancy or use without requiring full compliance with the code requirements for new construction.

The IEBC provides three compliance methods for the repair, alteration, change of use, or additions to an existing structure. The three compliance methods are as follows:

1. Prescription Compliance Method.
2. Work Area Compliance Method.
3. Performance Compliance Method.

For more information on these compliance methods, refer to the Regulatory Overview section of this report. A summary of the structural implications of the various compliance methods follows.

Prescriptive Compliance Method

In this method, compliance with Chapter 4 of the IEBC is required. As part of the scope of this report, the extent of the compliance requirements identified are limited to the structural requirements of this chapter.

Alterations

- If the proposed alterations of the structures increase the demand-capacity ratio of any lateral load resisting element by more than 10 percent, the structure of the altered building or structure shall meet the requirements for the code for new construction.
- Where alterations increase the design gravity loads by more than 5 percent on any structural members, those members would have to be strengthened, supplemented, or replaced.

Additions

Additions can be designed to be structurally separate or structurally connected to the existing building. Based on the project scope, the following structural issues must be addressed: The requirements applicable to the existing structure for connected additions are similar to those for altered structures.

- All construction of all addition areas must comply with the code requirements for new construction in the IBC.
- For additions that are not structurally independent of an existing structure, the following rules apply to the existing building:
  - The existing structure and its addition - acting as a single structure - must meet the requirements of the code for new construction for resisting lateral loads. Exceptions allow that structural elements that only resist lateral forces whose demand-capacity ratio is not increased by more than 10 percent may remain unaltered.
  - Any load-bearing structural element for which the addition or its related alterations causes an increase in the design gravity load of more than 5 percent shall be strengthened, supplemented or replaced. This may invoke or cause additional renovation work to access the structure.

In order to avoid invoking required structural modifications to the existing building, any planned additions should be designed as structurally separate buildings.

Work Area Compliance Method

In this method, compliance with Chapter 5 through 13 of the IEBC is required. The extent of alterations is classified into LEVELS OF WORK based on the scope and extent of the alterations to the existing building. Refer to the Regulatory Overview section of this report for an explanation of the Levels of Work.

This report assumes that planned renovation schemes would affect more than 50 percent of the floor area and invoke Level 3 Alteration requirements, and the following analysis is based on that assumption. In addition, there are requirements that have to be satisfied for additions to the existing structure.

Level 3 Alterations

- Any existing load-bearing structural element for which an alteration causes an increase in the design gravity load of more than 5 percent shall be strengthened, supplemented or replaced.
- If the proposed structural alterations of an existing structure exceed 30 percent of the total floor and roof areas of an existing structure, we have to demonstrate that the altered structure complies with the IBC for wind loading and with reduced IBC level seismic forces.
- Existing anchorage of all unreinforced masonry walls to the structure have to be evaluated. If the existing anchorage of the walls to the structure is deficient, the tops of the masonry walls will require new connections to the structure.
- If the proposed structural alterations of an existing structure are less than 30 percent of the total floor and roof areas of the existing structure, the project must demonstrate that the altered structure complies with the loads applicable at the time of the original construction (or the most recent major renovation) and that the seismic demand-capacity ratio is not increased by more than 10 percent on any existing structural element. Those structural elements whose seismic demand-capacity ratio is increased by more than 10 percent must be strengthened, supplemented, or replaced in order to comply with reduced IBC level seismic forces.
- Anchorage of all unreinforced masonry walls to the structure have to be evaluated.

Additions

- All additions shall comply with the requirements for the code for new construction in the IBC.
- Any existing gravity, load-carrying structural element for which an addition or its related alterations cause an increase in design gravity load of more than 5 percent shall be strengthened, supplemented or replaced.
- For additions that are not structurally independent of any existing structures, the existing structure and its additions, acting as a single structure, shall meet the requirements of the code for new construction in the IBC for resisting wind loads and IBC Level Seismic Forces (may be lower than loads from the Code for New Construction in the IBC), except for small additions that would not increase the lateral force story shear in any story by more than 10 percent cumulative. In this case, the existing lateral load resisting system can remain unaltered.

Performance Compliance Method

Following the requirements of this method for the alterations and additions may be onerous on the project because this method requires that the altered existing structure and the additions meet the requirements for the code for new construction in the IBC.

SUMMARY

The existing school structure appears to be performing well. All of the structural components that are visible appear to be in sound condition. The cracks in the interior masonry walls and the minor spalling of concrete that was observed are not a structural concern. We would recommend that these cracks in the masonry walls and spalls in the concrete foundation walls be repaired as part of the regular maintenance program.

The compliance requirements of the two Prescriptive and Work Area Compliance methods are very similar in most respects for a major renovation. The Prescriptive Compliance Method would be more restrictive, as it would likely require that the existing lateral load resisting systems of the existing building meet the requirements of the code for new construction of the IBC, even for small increases of design lateral loads. Based on this, we would recommend the Work Area Compliance Method for the project.

Any major proposed renovations and additions would likely require that the structure be updated to meet the requirements for the Code for New Construction. This may require addition of some shear walls, connecting the floor and roof diaphragms to the existing masonry walls and the clipping of non-structural walls to the structure. All of the existing masonry walls would have to be adequately connected to the roof and floor structure.

HEATING, VENTILATING, & AIR CONDITIONING (HVAC) ASSESSMENT

Executive Summary

Presently, the HVAC Systems serving the building are a gas-fired heating hot water plant, unit ventilators with hot water heating coils, both general and dedicated exhaust systems, terminal hot water heating units, roof and in-line mounted exhaust fan systems, portable de-humidifiers, a pneumatic control system, & de-stratification ceiling fans. The building was reportedly constructed in 1966 and there have been no apparent building renovations since the original construction.

In general, the HVAC systems are far beyond their expected service lives and require updating. The current installations comply with code, and are adequately sized to support the existing building layout. All proposed renovation/ new construction options will require the installation of new HVAC equipment dedicated to serve the new areas.

Terminology

Building Condition scale of terms used throughout this report are as follows:

"Excellent": new or nearly new condition with few or no blemishes or compromises of quality or function.

"Very Good": highly functional condition with slight wear and tear and/or minor compromises of quality or function.

"Good": median functional condition with noticeable wear and tear and/or compromises of quality or function.

"Fair": below median functional condition with significant wear and tear and/or major compromises of quality or function. Seriously worn parts or elements, minor structural compromise. Possible near-future safety hazard.

"Poor": nearly– or completely non-functional condition with major wear and tear and/or serious compromises of quality or usability. Missing parts or elements, major structural damage or condition. Immediate safety hazard or danger.

Hot Water Heating Plant

The building hot water heating plant is located in the main level boiler room and consists of two (2) gas-fired cast iron sectional boilers manufactured by "Cleaver Brooks" model CB552-152 (5230 MBH Input). (Figure 1) The boilers appear to be provided with all code-required safety controls and the general boiler installation appears to be code compliant. The boilers were originally fed with heating oil but have since been converted to natural gas.

Base-mounted oil pumps are abandoned in the corner of the room (Figure 2) and communicate to an abandoned underground oil storage tank. Assuming this fuel oil system is original to the building, the underground tank should be removed & inspected to avoid/ determine any potential pollution concerns.

Heating hot water is circulated throughout the building within an insulated combination copper and schedule 40 steel piping system. Much of the Insulation utilized for the heating system may contain asbestos and should be tested. The building is divided into four (4) heating zones; each zone is provided with two (2) circulator pumps piped in parallel for redundancy. (Figure 3) Zones 1, 2, & 3 are provided with inline pumps mounted high in the mechanical room and zone 4 is provided with base-mounted pumps. The piping system dedicated to each zone communicates with a common header pipe above the boiler plant, allowing the individual zone pump-set to pull hot water from the heating plant whenever required. Each zone circulator pump is provided with a variable frequency drive and is capable of varying speed to match the zone heating load.

Flue gases from each boiler are vented to the outdoors via a common insulated breeching system that communicates with a masonry chimney for termination above the roof. This common vent breeching system includes a barometric damper within the boiler room to enhance the stack effect in the vertical masonry chimney.

Combustion air is provided to the boiler room via operable windows and general infiltration; this condition appears to be in compliance with the building code but we recommend that the operable window(s) be opened during the heating season to provide combustion air for the boiler.

The hot water heating plant and all associated components are antiquated and beyond their expected service life.

Specific Issues	*Recommendations*
All insulation associated with the Heating Hot Water system may contain asbestos.	Test and abate all insulation as required.
Abandoned fuel-oil system may be a cause for pollution concerns beneath the ground.	Remove/ test fuel-oil system as required to alleviate all concerns of pollution.
The hot water heating plant and all associated components are antiquated and beyond their expected service life.	Provide new high efficiency hot water heating plant.

Figure 1

Figure 2

Figure 3

Generator Room Section

A generator room is located adjacent to and connected with the main boiler room. The generator room houses a gas-fired generator for supplying the building with electrical power under emergency conditions. The generator is ducted to an adjacent exterior wall louver for exhaust of heat; an intake louver with motorized damper is located directly above the exhaust louver and interlocked with the generator to open for make-up air when the generator is running. An insulated flue-gas exhaust duct (Figure 4) is routed from the generator directly through the roof above. Please refer to the electrical assessment for further generator information.

Specific Issues	*Recommendations*
All insulation associated with the generator exhaust system may contain asbestos.	Test and abate all insulation as required.

Classroom, Admin, & Media Center HVAC:

Generally, all regularly occupied spaces within the building are provided with heating and ventilation from unit ventilators within each space. (Figure 5) Many of the unit ventilators are floor-mounted along an exterior wall with outdoor air & exhaust louvers and hot water heating coils; the remaining units are horizontal ceiling mounted unit ventilators with hot water heating coils that are ducted to fresh air intake and exhaust hoods on the roof. All regularly occupied spaces are also tied into a general exhaust system to maintain a neutral building pressure by means of roof-mounted exhaust fans and duct distribution systems. While many of these units have probably been replaced since the original building construction, they have all surpassed their expected service lives and operate at efficiencies significantly lower than that of current technologies.

Specific Issues	*Recommendations*
Existing unit ventilator systems do not utilize demand control ventilation to limit the amount of Outdoor Air introduced based on space CO2 levels for energy conservation & current code compliance.	Replace existing unit ventilators and associated control systems with current technologies for compliance with the current building code and general energy efficiency. It is not a requirement for the building as it stands now, but if any renovations are planned to HVAC, new equipment would have to meet IECC.
No supplemental Hot water heating units are installed for maintenance of unoccupied heating space temperature set-points to avoid running the unit ventilators when unnecessary.	Provide Supplemental Hot Water heating terminal units within all spaces as the primary occupied and unoccupied heating source.

Figure 4

Figure 5

GYMNASIUM:

The Gym space is provided with two (2) indoor air-handling units with hot water coils ducted to roof-mounted fresh air intake and exhaust hoods. (Figure 6) These air-handling units deliver air to the space for heating and ventilating purposes via high-wall supply grilles and low-wall return grilles at each end of the space. Although these systems are not provided with cooling capabilities, they appear to be adequate for heating and ventilating the space. De-stratification fans are installed at the ceiling to enhance the mixing of air within the tall space. (Figure 7)

All HVAC equipment serving the gymnasium has exceeded its anticipated service life and operates at efficiencies significantly lower than that of current technologies.

Specific Issues	*Recommendations*
Existing systems do not utilize demand control ventilation to limit the amount of Outdoor Air introduced based on space CO2 levels for energy conservation & current code compliance.	Replace existing air-handling units and control systems with current technologies for compliance with the current building code and general energy efficiency.
No supplemental hot water heating units are installed for maintenance of unoccupied heating space temperature set-points to avoid running the air-handling unit fans when unnecessary.	Provide Supplemental Hot Water heating terminal units within the space as the primary occupied and unoccupied heating source.
Destratification fans have exceeded the anticipated service life.	Replace destratification fans for efficient operation.

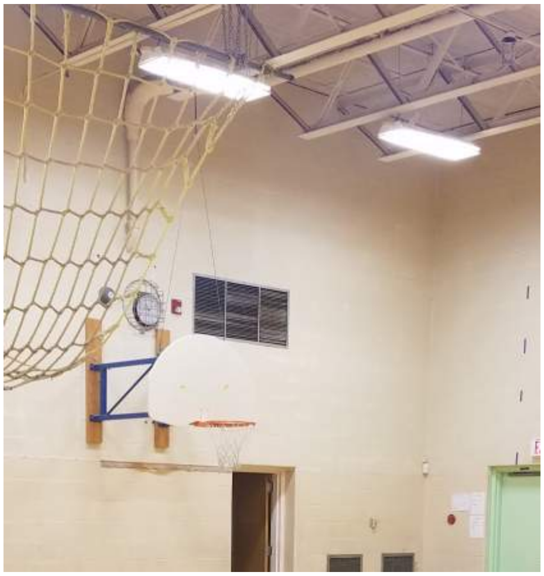

Figure 6

Figure 7

Cafetorium:

The Cafetorium space is provided with heating and ventilation from three (3) unit ventilators with hot water heating coils mounted on the floor at the exterior exposure. (Figure 8) Roof-mounted exhaust fans provide general exhaust to the space via high space grilles above the stage and low-wall grilles in the cafetorium space for maintenance of a neutral pressure within the space. (Figures 9, 10) The unit ventilators and exhaust fans appear to be original to the building and have surpassed their expected service lives.

Specific Issues	*Recommendations*
Existing unit ventilator systems do not utilize demand control ventilation to limit the amount of Outdoor Air introduced based on space CO2 levels for energy conservation & current code compliance.	Replace existing unit ventilators and associated control systems with current technologies for compliance with the current building code and general energy efficiency.
No supplemental Hot water heating units are installed for maintenance of unoccupied heating space temperature set-points to avoid running the unit ventilators when unnecessary.	Provide Supplemental Hot Water heating terminal units within the space as the primary occupied and unoccupied heating source.

Main Electric & Head End Room:

The Main electric room and head-end data rooms did not include any means of mechanical cooling or ventilation.

Specific Issues	*Recommendations*
Risk of space over-heating leading to equipment failure.	Provide a mechanical means of space temperature control (Split Cooling System, Exhaust system)

Figure 8

Figure 9

Figure 10

Kitchen:

The Kitchen is provided with a ducted exhaust range-hood for control of cooking grease and fumes. (Figure 11) This exhaust system appears to be adequately sized for the associated cooking range. There did not appear to be any means of make-up air for the range-hood exhaust system; this condition is not code compliant and should be remediated. All systems appear to be original to the building and have surpassed their expected service lives.

Specific Issues	*Recommendations*
Code-required make-up air for the Kitchen Range hood is not provided.	Add tempered make-up air system to kitchen tied to existing kitchen hood, or replace hood with model that includes compliant makeup air.

Public and Private Toilet rooms:

All toilet rooms within the building are provided with hot water baseboard heaters or hot water wall-mounted convectors for space heating. (Figure 12) All toilet rooms are also provided with general exhaust systems connected to roof-mounted exhaust fans. (Figure 13) All systems have surpassed their expected service lives.

Specific Issues	*Recommendations*
Exhaust systems have surpassed their expected service life.	Provide new exhaust systems.
Hot water heating terminal units have surpassed their expected service life.	Provide new hot water heating terminal units.

Figure 11

Figure 12

Figure 13

Corridors, Entryways, and Stairwells:

All Corridors, Entryways, and Stairwells are provided with hot water heating terminal units such as cabinet unit heaters, convectors, and baseboard radiators. (Figure 14, 15) There did not appear to be any means of ventilation within the corridors. All systems have surpassed their expected service lives.

Specific Issues	*Recommendations*
Code-required ventilation for corridors is not provided.	Add a mechanical means of ventilation to the corridors.
Existing convectors, baseboards, and unit heaters have surpassed their expected service life.	Provide new hot water heating terminal units.

Automatic Temperature Controls:

A pneumatic control system is utilized in the Balmer Elementary School. An air compressor is installed in the boiler room and provides compressed air to the central control panel and individual components throughout the building. (Figures 16, 17)

Many spaces are provided with two (2) pneumatic temperature sensors; one for use during occupied building schedule periods and one for unoccupied building set-back temperatures. (Figure 18) In general, the controllability and dependability of pneumatic control systems are lacking and do not compare to current electronic communication technologies. The pneumatic control system leaks and is beyond its expected service life.

Specific Issues	*Recommendations*
Pneumatic Control system air leaks were noted in various spaces throughout the building and at the boiler room control panel.	Replace control system entirely with Direct Digital Control system.

Figure 14

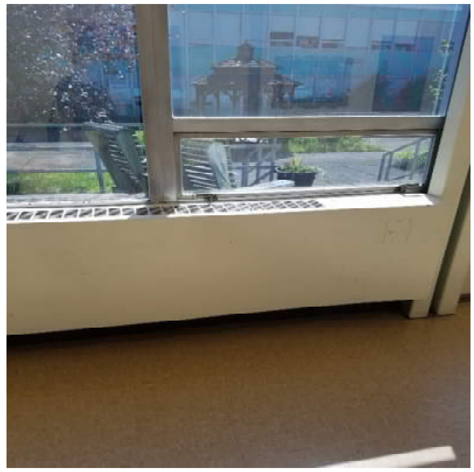

Figure 15

Figure 16

Figure 17

Figure 18

ELECTRICAL ASSESSMENT

EXECUTIVE SUMMARY

Presently, the majority of the systems are original vintage and although most are functional, they are beyond the end of the serviceable life.

The power distribution system is of original vintage. Most of the lighting systems have been upgraded over time and are generally in fair condition however, not energy efficient, and the wiring and switches are original to the building.

The fire alarm system has fair coverage, however, does not comply with current codes. The emergency generator is in poor condition. The emergency system is not in compliance with current codes.

It is our recommendation, taking into consideration the age and general condition of the existing equipment, that all electrical systems be replaced with new energy efficient, code compliant systems, including the fire alarm, emergency standby power, lighting, and power distribution systems.

Power Distribution System

The secondary service runs underground between a pad mounted transformer (Figure 1) and a 1200 ampere, 120/208V, 3 phase, 4 wire switchboard located in the Main Electric Room. (Figure 2) The facility is secondary metered and the metering is done outside at the pad mounted transformer.

The switchboard consists of a 1200 amp main breaker and distribution breakers in the same section. The main switchboard is manufactured by Westinghouse, it is original vintage and beyond it's serviceable life (Figure 3).

Receptacles in kitchen are generally not GFI protected.

Typical classrooms have minimal receptacles resulting in the use of extension cords and plug strips.

GFI protection of receptacles is not compliant.

Specific Issues	*Recommendations*
Switchgear is beyond its serviceable life.	Upgrade service equipment and provide with transient voltage surge suppression and replace all panelboards throughout the facility. Extend and reconnect existing branch circuits to new panelboards.
GFI protection is non-compliant.	Add GFI outlets/breakers for devices within 6' of a water source and protect all 15A and 20A devices in the kitchen.
Lack of receptacles.	Add receptacles for computer equipment and A/V that has been added over the years.

Emergency Stand-By System

The facility has an interior natural gas emergency generator manufactured by Kholer located in the Main Electric Room. The generator is in poor condition. A new Asco series 300 automatic transfer switch is located in the electric room. (Figures 4, 5)

A separate emergency only panel is located adjacent to the automatic transfer switch. A system of emergency only, normally off, lighting system exists throughout the facility. The emergency-only lights consist of recessed incandescent fixtures. Existing exit signs generally have battery back-up. Exterior doors do not have emergency lights.

The emergency system is not in compliance with current codes and should be replaced with a code compliant system. Current codes require a separate transfer switch and dedicated panels within 2 hour rated closets with fire rated feeders.

Specific Issues	*Recommendations*
The generator is in poor condition and does not comply with current code.	Provide a new exterior generator and two automatic transfer switches with new associated panelboards.
Separation of emergency and life safety equipment is required.	Provide circuity for new emergency lighting. Remove the existing normally off/emergency only lighting system.

Figure 1

Figure 2

Figure 3

Figure 4

Figure 5

Interior Lighting

The corridor lighting consists of 1x4 surface wraparound fixtures with (2) T8 lamp controlled with local switches. (Figure 6)

The typical classroom has three rows of surface wraparound fixtures with (2) T8 lamps controlled by row with (3) local switches. A ceiling mounted occupancy sensor also controls lights. (Figure 7)

The cafetorium lighting consists of 2x4 lensed troffers and (2) T8 lamps. The platform contains a theatrical lighting system with incandescent fixtures. The system is in poor condition. All lighting is switch controlled. (Figure 8)

The kitchen has recessed 2x4 lensed troffers with acrylic lens and (2) T8 lamps controlled with (2) local switches. The hood has incandescent globes without guard with compact fluorescent lamps. (Figure 9)

The gym has 2x4 suspended fluorescent high bay with (4) T5HO lamps on local switches. (Figure 10)

The media center and offices have recessed 2x4 fixtures with (2) T8 lamps on local switches. (Figure 11)

The lighting consists of utility grade fixtures added or retrofitted over the years and is generally in fair condition. However, the wiring and switches are original.

Specific Issues	*Recommendations*
Lighting fixtures are not energy efficient.	Replace existing lighting throughout the building with LED fixtures and provide an automated lighting control system with occupancy sensors to reduce energy usage and comply with the latest energy code.

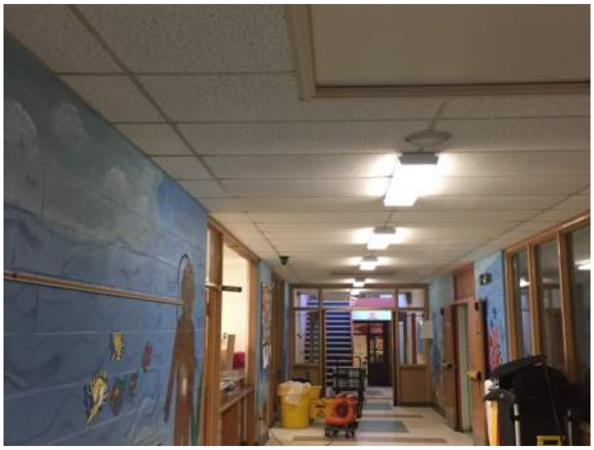

Figure 6

Figure 7

Figure 8

Figure 9

Figure 10

Figure 11

Exterior Lighting

HID wall packs exist on building, however, most exterior doors do not have a light fixture.

The entrance canopy has pendant decorative incandescent fixtures. Canopies also have surface incandescent fixtures. (Figure 12)

The exterior lights are controlled with time clocks.

Specific Issues	*Recommendations*
Lighting fixtures are lacking in Parking Area.	Provide LED cut-off fixtures for roadway and parking areas.
Lighting fixtures are not energy efficient.	Provide building mounted LED sconces over all exterior doors. Connect to emergency power.

Fire Alarm System

The fire alarm system consists of a Firelite MS-2410B, non-addressable control panel located in the Custodian office. The form of alarm transmission is via an AES Intellinet radio box with exterior antenna. The exterior master box with pull lever is still in place with a red beacon above. (Figures 13, 14)

The audible/visual signal devices consist of horns and strobes. (Figure 15)

Corridors have heat detectors and horn/strobes. The electric room has a smoke detector. The corridor doors and stairway doors are on magnetic door holders.

Heat detectors exist in the boiler room, media center, gym, cafetorium, platform, kitchen and toilet rooms. The building does not have a sprinkler system.

Pull stations exist at exterior exist discharge doors. Some pull stations are not ADA compliant. (Figure 16)

Toilet rooms have strobes.

The fire alarm system, in general, has fair coverage, however, it does not comply with current codes which require voice evacuation throughout the school. The system should be replaced under a renovation program.

Specific Issues	*Recommendations*
Fire alarm system is non-addressable and in poor condition. Voice evacuation is required in E-use group.	Replace the fire alarm system horns with speakers. Provide smoke detectors and carbon monoxide detectors in the Nurse's suite. Under a renovation program, the entire fire alarm system should be replaced.

Figure 12

Figure 13

Figure 14

Figure 15

Figure 16

TECHNOLOGY AND COMMUNICATIONS ASSESSMENT

EXECUTIVE SUMMARY

The Northbridge Public School District's initiative to connect all their schools including the Balmer Elementary School to the High School over a wide area network using leased fiber; upgrading to an enterprise class of wireless infrastructure; moving to Cloud based computing with Google Chromebooks, and upgrading the school's security system platform are all notable achievements within the School District, and that have a positive impact on the Balmer Elementary School. These initiatives have been correctly identified as essential foundations for implementing future technology plans.

The structured cabling system throughout the Balmer Elementary School building, although doing an adequate job of supporting systems currently, is in poor condition with many wiring centers located in storage rooms, classrooms, etc. This is typical of schools where technology has evolved within a building structure that was never originally designed to support technology. The technology infrastructures, including network cabling and the power to support technology and communication systems, should all be upgraded.

The school's distributed communication system, which includes the public address and clock systems, are in fair condition but have reached their functional end of life.

The use of interactive instructional technologies in the classroom based on Smart Technology Smartboards are in fair condition, but should be refreshed and updated.

Network switching and wide area network design are in very good condition. Currently, plans exist to upgrade the school to an enterprise level wireless system and to increase the internet bandwidth serving the schools. This will produce an infrastructure that will better support mobile Chromebooks and greater cloud based computing, both of which are excellent guiding strategies for the future.

Personal printing is being minimized with reliance on larger and more cost effective copier/printers.

Recent initiatives within the last four years into "state of the art" security systems including video surveillance, access control and intrusion detection are in good condition and should be maintained and expanded.

Infrastructure Cabling

The Balmer Elementary School typically has at least two Category 5 data cable and jacks in each room to support desktop computer equipment. Cabling is mostly surface mounted (Figure 2). Labs and the Library have multiple jacks. The library/Media Center is equipped with power poles (Figure 17) and the computer lab is equipped with computers at the perimeter of the room (Figure 18). Cabling is from the late 80's and early 90's, most originated from volunteers during Netday events back in the 1990's Network cabling ranges in grades from Category 3 to Category 5 and 6. The MDF and IDF's are connected with Category 6 copper cabling. IDF locations are currently wall mount racks in other shared spaces (Figure 5 and 6), with one IDF located in a classroom closet (Figure 3).

Specific Issues	*Recommendations*
Network Cabling is functional but older and needs to be updated.	Install all new data cabling with multiple drops per room to accommodate future wireless, instructional AV, and other network services. Cable should be Category 6A to future proof the school's infrastructure.
Lack of dedicated and secure MDF and IDF rooms for terminations and equipment.	Create new intermediate distribution frame rooms that are dedicated and secure for housing network terminations and switch equipment, with dedicated power and environmental conditioning.
Fiber optic cabling is limited or not used between IDF's and MDF.	Upgrade from Category 6 to fiber OM4 50 micron multimode as well as single mode between IDF's and MDF, to support future bandwidth demands.

Network Switches

Currently the school district is standardized on HP network switches, utilizing Procurve 5406zl series chassis in the MDF and IDF racks. Some switches are on shelving with cabling extending to patch panels (Figure 4) All of the current network switches are state of the art and in good working condition, but they have recently been discontinued and are no longer supported by the manufacturer.

Specific Issues	*Recommendations*
The 5400zl series chassis have reached end of life with HP as of December of 2015.	Upgrade and replace the 5400zl series with the newer 5400R series of chassis switches. Existing Switches can be redeployed elsewhere as long as they are working. Chassis switches should be equipped with SFP+ fiber optic modules, GbE and Gb PoE network ports and management modules. Minimum backbone optics between MDF and IDF should be based on 20GbE.

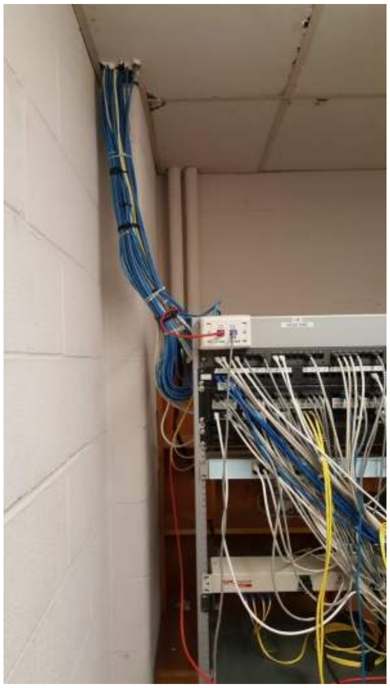

Figure 1—MDF

Figure 2—Surface Mount Cabling

Figure 3—IDF in Classroom

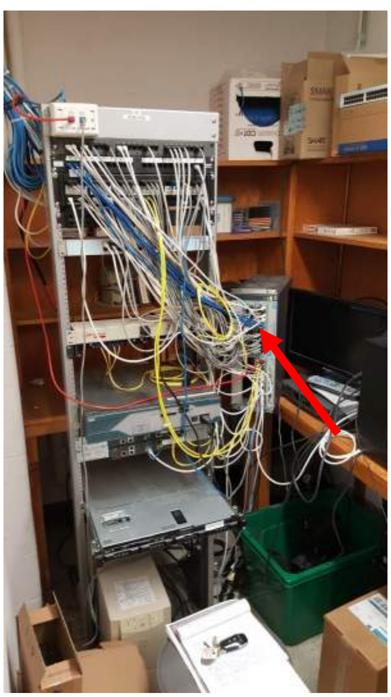

Figure 4—MDF 5406zl Switch

Figure 5—IDF in Copy Room

Figure 6—IDF in Copy Room

Public Address and Clock System

The Distributed Communication System, (public address system) including the master clock system is in poor condition, and is based on an older version of the Rauland Telecenter (Figure7). Not all of the secondary analog clocks (Figure 8) are synchronized with the master clock. Announcements are not heard in all spaces or rooms. Classroom telephone handsets are dedicated to the public address system and not part of the schools telephone system.

Specific Issues	*Recommendations*
Public address system cabling and speakers are original and in poor condition. The system's main equipment is older and outdated.	Replace with a new public address system, with new main equipment and speakers throughout. Move the main equipment to the MDF.
Master and secondary analog clock system is not working properly in all areas.	Replace existing clock system with new equipment that provides for synchronized secondary clocks throughout the school.
Public address system handsets (Figure 10) in all rooms tie back to the main office, but do not provide outside dialing capability.	Utilize telephone handsets that connect to the public address system to provide both internal and external communications. Add call switches to the rooms for separate independent calling capability for security and safety reasons
Main System Equipment is located in main office area.	Move main equipment and connections to the MDF.

Telephone System

The Telephone System is an older hybrid digital/VoIP Vodavi System that is in fair condition and provides office and administrative spaces with telephone system capability for making and receiving outside calls. (Figure 9). Classroom telephone handsets are not part of this system. The telephone handsets in classrooms are dedicated to only the public address system and do not provide outside calling capability.

Specific Issues	*Recommendations*
Older system provides only administrative offices with telephone capability. It is linked to the Public Address system so that announcements can be initiated at any administrative telephone handset.	Telephone system should be expanded or upgraded to provide telephone handsets that are distributed throughout the school with voicemail capability provided for all teachers and staff in addition to administrators. Voicemail should also be integrated with email, so that messages are received through both the telephone system and the district's email system.

Figure 7—PA System (typical of Balmer)

Figure 8—PA System Speaker/Clock

Figure 9—Telephone System (typical)

Figure 10—Classroom PA Telephone

Classroom Instructional Audio-Visual

Instructional audio-visual equipment is in good condition and is currently installed in all teaching spaces throughout the school. It is based on standard throw, short throw, and ultra short throw projection technology, depending on when it was purchased and deployed. SMART Technology Smartboards of varying vintages are also deployed throughout all classrooms. (Figures 11 and 14). The equipment deployed ranges in age from 5-10 years old to a few months. There are no standards for this equipment as it has been obtained through multiple procurement cycles. Audio systems integrated with the Smartboards for program playback purposes were observed in some but not all cases. Voice lift or speech reinforcement systems were not observed to be installed. Reliance on a projection screen in the computer lab (Figure 12) is much less functional an versatile than a standard 5' high marker board, which are more versatile in elementary schools when using interactive classroom technology.

Specific Issues	*Recommendations*
Older projection technology with multiple manufacturers.	Newer and standardized ultrashort projection technology should be deployed.
Older interactive electronic smartboard technology is deployed. This technology is electronic and therefore will fail at some point.	Update to newer interactive projection technology, which can be used with standard porcelain on steel marker boards and not screens. Newer projectors are brighter and use less energy and have less expensive lamps.
No Document Cameras were observed	Deploy cost effective document camera technology for the classroom
Assisted listening technology was lacking or limited in deployment	Deploy modern classroom voice reinforcement technology throughout all classrooms and learning spaces to serve all students and teachers. This equipment can also be linked to personal hearing aid equipment for the hearing impaired.

Audio-Visual for Large Assembly Spaces

The Cafeteria, which is the group assembly space for the school has a performance stage with an audio system and speakers that did not appear to be functional (Figure 15). There was no permeant projection system, however, a projection screen does exist (Figure 13).

The Gymnasium has poor quality audio system speakers and no real permanent sound system. A mobile projection cart and audio system are used in this space (Figure 16)

Specific Issues	*Recommendations*
Audio system in the primary assembly area was not working.	Install new permeant sound equipment.
There is a portable projection cart with a low lumen projector used in Cafeteria.	Install a permanent mounted high lumen projector with connections to new audio system and inputs at the state for presentations. Upgrade screen.
Gymnasium is without permanent AV equipment	Install new audio system and projection screen on the wall. Upgrade portable cart with high lumen projector for use in the Gym.

Figure 11—Ultra-Short Projection

Figure 12—Computer Lab Screen

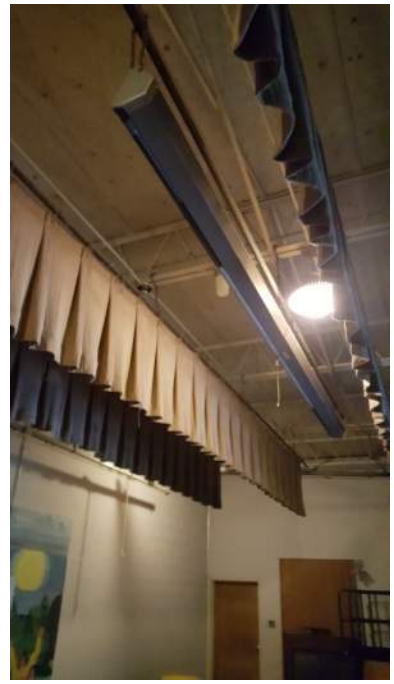

Figure 13—Cafeteria Screen

Figure 14 –Classroom Standard Throw

Figure 15—Cafeteria Stage Speakers

Figure 16 –Multimedia Cart

Network Computer Equipment

There are two desktop computers in each classroom, with one permanently connected to the projection system. These computers serve teacher and student needs in the classroom. There are also eight (8) mobile carts in teh school with 30 Chromebooks in each cart for student to use. Chromebooks are all based on Acer, with Bretford charging charts being the preferred mobile cart.

There are multiple desktop computer workstations in the Library-Media Center (Figure 17), and a computer lab (Figure 18), with multiple computer workstations around the perimeter. There is a need for better cabling and power distribution in the computer lab to support computers (Figure 19). Computer network servers are centralized at the High school and connect to the school via leased fiber optic cabling from Charter Communications. Currently Charter is also the internet service provider and the School District is considering upgrading their internet bandwidth from 100Mbps to 500Mpps up and down.

Specific Issues	*Recommendations*
Additional student devices are required to move the school closer to the ideal of a one-to-one computer to student ratio.	Chromebooks are an excellent platform for cost effectively increasing the ratio of computers to students and additional Chromebooks and charging carts should be procured as needed.
Computer Lab is lacking cable and power distribution methods for desktop computers.	Replace furniture with fabricated casework or furniture that includes cabling distribution and management systems.

Wireless Network Equipment

The school is currently upgrading their wireless network through E-rate funding. They are moving from Aruba (Figure 20) to an enterprise class system by Aerohive. Existing Aruba radios will be relocated and reused at the Northbrdige Elementary School. Aerohive is the new standard in the district, which utilizes the Aerohive 802.11ac AP230 access points. The Middle School utilizes this platform currently. Aerohive is a popular choice and prevalent in many school districts.

Specific Issues	*Recommendations*
Ensure that there is an adequate concentration of wireless access points to meet existing and future wireless connection needs.	Increase the number of wireless access points to at least one per classroom and provide multiple access points in larger assembly spaces like the cafeteria, library, gymnasium, etc. Cover all administrative areas. Perform a heat map and deploy wireless access points for optimum coverage to support a one-to-one deployment of user devices.

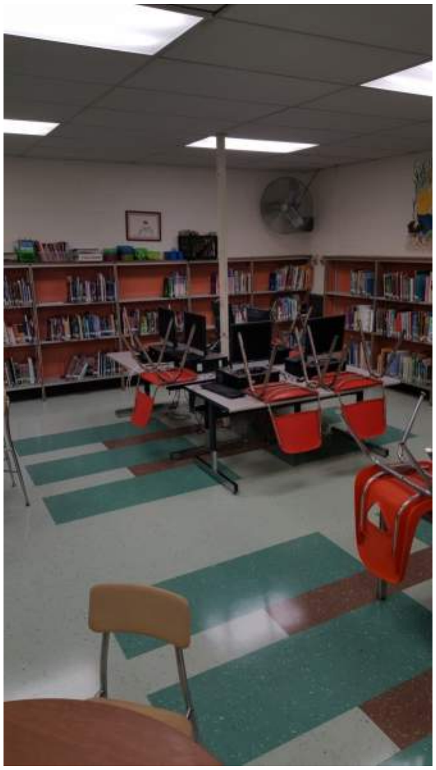

Figure 17—Computers in Library

Figure 18—Computer Lab

Figure 19—Power and cabling Under lab bench

Figure 20—Existing Wireless Access Point

Printing

The school is utilizing more cost effective and centralized large format copier/printer technology. They currently rely on Konica Minolta and Toshiba copier/printers distributed in various locations such as the Library-Media Center (Figure 23). The School is also investigating other manufacturers such as Ricoh. They lease the copiers and supplement sparingly with HP laser printers in strategic areas (Figure 24). The HP Lasers are purchased without manufacturer Carepacks and are serviced directly by the district.

Specific Issues	*Recommendations*
No Issues—Centralized and work group printing is being implemented, with private printers deployed on a limited basis.	Maintain strategy and evaluate age of printers. Upgrade Copier Printers and select more current laser printer technology to reduce the cost of printing.

Digital Signage

There is no digital signage currently deployed within the school.

Specific Issues	*Recommendations*
No digital signage	Consider digital flat panel signage for strategic areas within the school to enhance the paperless dissemination of public announcements and information to both staff and the public.

Security

There was a security system upgrade and installation involving surveillance cameras, access control, and a multi-zone intrusion detection system about 4 years ago (Summer of 2013). The core system is based around the Genetec's Security Center 5.4 platform, which is an excellent platform for integrating security between surveillance, access control and intrusion. Honeywell is the basis of design for intrusion detection (Figure 23). Surveillance cameras are located on the interior and exterior of the school (Figure 21 and 22). A local host server is located in the school which is based on Dell R320 that sends stored video to an archive server located at the High School, which maintains 30 days of stored video. Staff use key-fobs with an access control reader located at the main entrance doors (Figure 21). The main door integrates a door buzzer with an intercom system and a security camera so that the main office can see and communicate with someone seeking entrance to the school and remotely control unlocking the door.

Specific Issues	*Recommendations*
Possible lack of coverage by surveillance system cameras and alarm system motions sensors on the first floor.	Increase the number of cameras and areas of coverage as required or needed. Adjust and modify with additional motion sensors to first floor areas for greater intrusion detection. Maintain system software assurance for best return on investment.

Figure 21— Entrance Security

Figure 22—Inside Dome Cameras

Figure 23- Intrusion Alarm Keypad

Figure 23—Copier/Printer

Figure 24—Workgroup Printer

PLUMBING ASSESSMENT

Executive Summary

The majority of piping, fixtures, and equipment is past it's serviceable life, and in poor condition. Replacement of of all piping, fixtures, and equipment is recommended.

Terminology

Building Condition scale of terms used throughout this report are as follows:

- "Excellent": new or nearly new condition with few or no blemishes or compromises of quality or function.
- "Very Good": highly functional condition with slight wear and tear and/or minor compromises of quality or function.
- "Good": median functional condition with noticeable wear and tear and/or compromises of quality or function.
- "Fair": below median functional condition with significant wear and tear and/or major compromises of quality or function. Seriously worn parts or elements, minor structural compromise. Possible near-future safety hazard.
- "Poor": nearly– or completely non-functional condition with major wear and tear and/or serious compromises of quality or usability. Missing parts or elements, major structural damage or condition. Immediate safety hazard or danger.

EXTERIOR

Roof

Specific Issues	*Recommendations*
There is considerable ponding on roof in vicinity of the roof drains. Roof drain bodies are heavily corroded, and some are strainers are loose. (Figures 1,2, 3)	Refer to architectural assessment for discussion of roofing slope and drainage. Replace roof drain bodies and strainers with new drain assemblies.
Plumbing vent stack is heavily corroded, and flashing at roof penetration appears to be loose, potentially leaking into the building. (Figure 4)	Replace plumbing vent through roof and re-flash to roofing membrane.
Flue for water heating / boiler is located adjacent to a higher wall. Supports for the flue are showing significant corrosion. (Figure 5)	Flue may not achieve proper draft. Evaluate performance of equipment. Replace flue and supports.

Figure 1— Ponding around Roof Drain

Figure 2— Ponding around Roof Drain

Figure 3— Ponding on roof

Figure 4— Plumbing Vent. Appears to be disconnected.

Figure 5 — Chimney

INTERIOR

MECHANICAL ROOM

Specific Issues	*Recommendations*
Domestic hot water originates from 35 gallon hot water heater (Figure 6) and is stored in a 1235 gallon storage tank (Figure 7).	Based on age of equipment and domestic hot water demand of an elementary school, it is very inefficient to heat and store that amount of water. Replace with high efficiency gas fired domestic hot water plant.
Janitor's sink has a chemical dispenser. However, there is no backflow preventer installed to prevent cross-contamination (Figure 9).	Backflow preventers are required and will need to be installed per plumbing code.

Figure 6 — 35 Gallon Domestic Hot Water Heater

Figure 7 — 1235 Gallon Domestic Hot Water Storage

Figure 8— Gas Service

Figure 9 — Mechanical Room Janitor's Sink

BATHROOMS

Specific Issues	*Recommendations*
Not all bathrooms containing more than one toilet or urinal have floor drains. Toilet rooms with more than one toilet and urinal fixture are required to have floor drains.	Add floor drains to all bathrooms containing two or more urinals/toilets, per plumbing code. Replace all floors in such rooms to provide for positive drainage.
Not all bathrooms have accessible toilets, urinals, and sinks.	Add or replace fixtures with accessible toilets, stalls, urinals, and sinks as required. Refer to Regulatory Assessment section of this report for additional discussion.
Toilets are a combination of tank and flush valve types, that are not low-flow water conserving types. (Figure 10, Figure 11).	Replace all toilets with low-flow (1.28 gpm) flush valve types.
Urinals (Figure 14) are wall mounted and 1 gpf. Urinals were observed to be in disrepair.	Replace all urinals with low-flow (1/8 gpf) urinals.
Urinals are not shielded for privacy as required by plumbing code.	Add urinal screens to toilet rooms with more than one urinal.

Figure 10— Typical single bathroom

Figure 11—ADA stall in bathroom

Figure 12—Semi Circular Sinks

Figure 13—Typical Wall hung sink

Figure 14— Urinals

Kicthen

Specific Issues	*Recommendations*
Grease trap (Figure 19) appears to be in poor condition.	Replace the grease trap unit.

Figure 15— Washer in kitchen

Figure 16— Dryer in kitchen

Figure 17— Gas Kitchen equipment

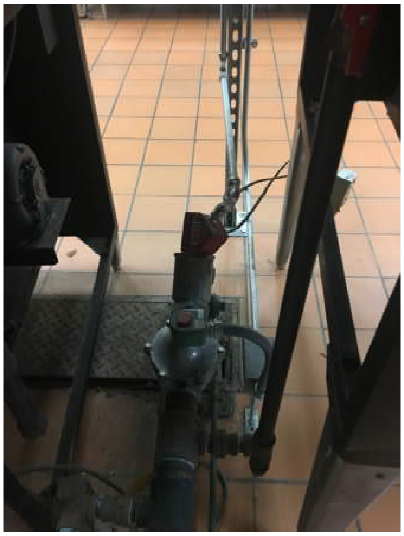

Figure 18—Solenoid gas valve

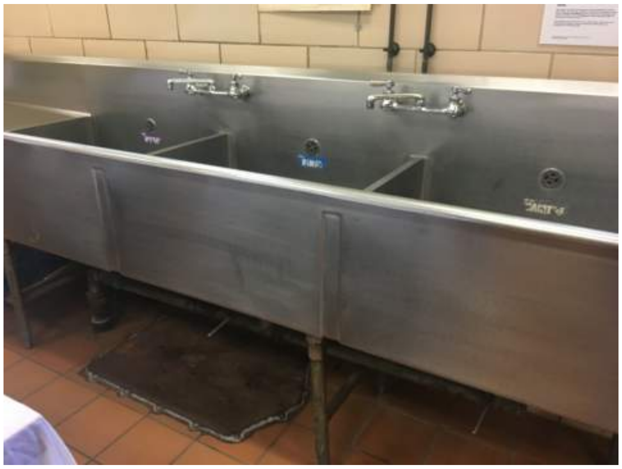

Figure 19— Pot Sink with Recessed Grease Trap

MISCELLANEOUS

Specific Issues	*Recommendations*
Drinking fountains are not accessible. (Figure 20)	Refer to the Regulatory Assessment section of this report for further discussion.
The shower rooms are used as storage (Figure 22, Figure 25).	Showers are required for schools that include physical education and sports. Determine proper use of the space, and if not required, cap and remove plumbing at shower units.
Most classrooms have a sink with a drinking spout tapped off of the sink (Figure 23). Signs above the sinks state water is not for consumption, due to past testing that showed lead in the water supply. (Figure 22).	Replace supply piping to sinks or throughout building to remove iron piping and lead solder. Continue testing water service to attempt to isolate sources of lead contamination.
The water service is largely inaccessible, and appears to be being used as a support for a makeshift counter. (Figure 25)	Remove stored materials from the water entry piping and valves.

Figure 20— Drinking fountain

Figure 21— Single Shower

Figure 22— Not for consumption Sign

Figure 23— Typical Classroom Sink

Figure 24— Shower room used as storage

Figure 25— Water Meter in Janitor's Closet

FIRE PROTECTION ASSESSMENT

Summary

The existing building does not have a fire suppression system. The existing building is 71,871 square feet, and two stories. Per the current building code, a building over 7,500 square feet in area requires a fully automatic sprinkler system in compliance with NFPA 13—The Standard for the Installation of Sprinkler Systems.

Since the existing building does not meet this code requirement, any planned additions or renovations would trigger the need to install a new fire suppression system throughout the building.

Recommendations

Install a new fire suppression system throughout the building in compliance with NFPA 13.

FOODSERVICE EQUIPMENT ASSESSMENT

EXECUTIVE SUMMARY

The Balmer Elementary School serves students in grades 2 through 4. Current enrollment is approximately 560 students, with many students taking part in the foodservice lunch program. The school's cafeteria kitchen serves the typical school lunch program in a two serving line configuration. The serving equipment that is present is in poor condition, showing obvious signs of wear with some recent repairs being evident at the hot wells. The back of house preparation and cooking equipment is also in poor condition and in need of replacement.

We understand that the Balmer school "satellites" food to the Northbridge elementary School, meaning that the hot meal is prepared at this location and shipped to the Northbridge Elementary School to be served. This kitchen appears to also store bulk paper goods for the Northbridge School, given the limited storage space there.

THE KITCHEN

The floor finish within the kitchen is quarry tile with cove base, and it is in good condition. There is a utility trench running across the floor and it appears that it is used for the gas supply to the cooking equipment. The grate cover is corroding and in need of preventative maintenance to remediate the corrosion. The walls are a mix of a glazed CMU block on the lower half with standard painted CMU block above. These finishes are durable and in good condition.

The floor system was constructed with drain recesses that were originally implemented to catch water coming from equipment or to be used similar to a slop/mop sink. These recesses occur at the corner adjacent to the food preparation sink and at the cooking line. Though practical, recesses are generally no longer used when designing new kitchens due the tripping hazard they present. Modern kitchens use floor troughs that are flush with the floor and are equipped with non slip grating.

The ceiling is in poor condition. The health code mandates that kitchen ceilings be smooth, non porous, and an easily cleaned surface. The current ceiling is a typical soft stippled finish that is easily damaged and degrades in moist environments. Panels are sagging at the location around the hood exhaust duct, and staining is prevalent in the remaining areas.

KITCHEN

Back of house Equipment

The back-of-house foodservice equipment is in poor shape. There are may wood topped tables with galvanized steel bases. Two hand-washing sinks cover the entire kitchen area, which is not a sufficient quantity. The pot sink and tray-washing areas are de-centralized and should be combined to assist with the distribution of what is typically limited labor resources for this type of facility. The walls and floor are in good condition. Some cracks in the floor do exist and walls have signs of wear and tear where it is to be expected.

The ceiling grid and ceiling tiles are in poor condition. In some location they are falling out of the grid. In general they are stained and in need of a complete replacement.

Specific Issues	*Recommendations*
The walk-in cooler and freezer are original to the facility. Wood is used as some of the finishes within the rooms. The rooms are constructed of two layers of caulk insulation covered with a vapor barrier and a stucco finish. (Figure 1).	Replace with a modern walk-in panel assembly that is complaint with modern food safety standards for sanitation. All wood must be eliminated. Upgrade the refrigeration system and the insulation to current Department of Energy standards for insulation R- values.
The shelving within the walk-in rooms is galvanized steel. Galvanized steel is not a compliant food contact surface, due to fear of contamination by zinc in the galvanizing. Also, in time the zinc wears away and the mild steel begins to corrode, as is the case here. (Figure 2)	Replace the shelving with food grade shelving that is non corrosive and easy to clean.
The interior wall finish of the walk-in units is a rough stucco finish. It is not smooth or easy to clean. It is also absorbent and prone to cracking. It appears that mold is forming in various locations. (Figure 3).	Replace the walk-in units as noted above.
The condensing unit for the walk-in units are located indoors at the receiving corridor. Because they are indoors the units reject heat and noise into the kitchen space. (Figure 4).	Replace with new more energy efficient units located outdoors.
Wood topped tables are allowed in kitchens, but only for use with baking functions. A majority of the tables in the kitchens are wood topped. Wood is difficult to maintain as they need to be oiled regularly. These tables are in fair shape, as it is clear they are well-maintained. However, as a food preparation surface stainless steel is required. (Figure5).	Replace all wood topped tables with stainless steel constructed tables.
The table bases are constructed of painted galvanized steel. As paint wears off the mild steel begins to corrode. (Figure 6).	Replace with new tables that are constructed with 100% stainless steel.


Figure 1—Walk-in Cooler wood door


Figure 2—Walk-in cooler corroded shelving


Figure 3—Walk-in cooler interior finishes


Figure 4-Walk-in cooler remote condensers


Figure 5—Two of many wood topped tables


Figure 6— Galvanized and corroding table bases

Specific Issues	*Recommendations*
The kitchen hood includes a large horizontal surface below the ceiling, where conduits and utility piping is visible dropping from the ceiling above. The area above the hood is required to be closed off. The horizontal surfaces become a place for dust to settle. Cleaning that horizontal surface on a regular basis is not practical in this case. (Figure 7).	Replace the hood with a modern UL listed hood with appropriate closure trim.
The health code mandates that kitchen ceilings be a smooth, non porous, and an easily cleaned surface. The current ceiling is a typical soft stippled finish that is easily damaged and degrades in moist environments. (Figure 8).	Replace grid and lay in tiles with melamine faced or kitchen rated smooth ceiling panels that are washable and resistant to moisture.
The extent of the utility lines and the manner in which they have been added over time has created a condition that makes it very difficult if not impossible to maintain and keep clean. (Figure 9).	Implement a Utility Distribution System (UDS) to conceal the utility lines. The enclosure around the utility lines will provide for a smooth water tight surface that can be easily cleaned.
The mixer in this case works well but lacks the modern safety features required with a new mixer.	Replace the mixer with a new unit that offers the safety features meeting OSHA compliance and providing attachments that will allow expanded functions in the preparation of food.
The serving counter is outdated and lacks the components needed to effectively maintain proper serving temperatures. The glass shields needed to protect the food from contamination are missing or inadequate. The sneeze shield on the counter is not compliant and does not offer the minimum coverage needed to shield the food. The old hot wells appear to have been cut out of the counter and replaced with a unit that was slid into the cut out. It is an installation with many rough edges. (Figure 11).	A serving counter replacement is warranted. Adequate hot and cold wells along with proper sneeze shields are a necessity. A new counter will also be equipped with additional power sources to offer flexibility.
The clothes washer is in among the food preparation space between the tray washing are and the food preparation space. There appears to be water leaking from either the water supply valve or the unit itself (Figure 12).	Locate the washer and dryer in an area that is outside the food preparation zone. This area shall also include items necessary to support other clean up functions.

Figure 7—Cooking equipment

Figure 8– Exhaust hood and floose ceiling tile

Figure 9—Extensive utilities at cooking line

Figure 10– Large mixer lacking safety guard

Figure 11—Repaired serving line

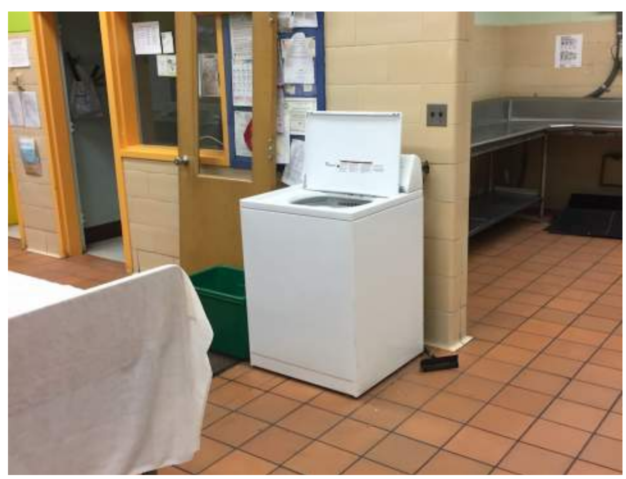

Figure 12– Clothes washer in food preparation space

UEC universal environmental consultants

July 31, 2017

Mr. Thomas Hengelsberg
Dore & Whittier Architects
260 Merrimac Street
Newburyport, MA 01950

Reference: Hazardous Materials Determination Survey
W. Edward Balmer School, Northbridge, MA

Dear Mr. Hengelsberg:

Thank you for the opportunity for Universal Environmental Consultants (UEC) to provide professional services.

Enclosed please find the report for hazardous materials determination survey at the W. Edward Balmer School, Northbridge, MA.

Please do not hesitate to call should you have any questions.

Very truly yours,

Universal Environmental Consultants

____
Ammar M. Dieb
President

UEC:\217 265.00\Report-W. Edward Balmer School.DOC

Enclosure

REPORT
FOR
HAZARDOUS MATERIALS DETERMINATION
SURVEY
AT THE
W. EDWARD BALMER SCHOOL
NORTHBRIDGE, MASSACHUSETTS

PROJECT NO: 217 265.00

Survey Dates:
July 24-26, 2017

SURVEY CONDUCTED BY:

UNIVERSAL ENVIRONMENTAL CONSULTANTS
12 BREWSTER ROAD
FRAMINGHAM, MA 01702

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 eight years of experience.

UEC was contracted by Dore & Whittier Architects to conduct the following services at the W. Edward Balmer School, Northbridge, MA:

- Inspection and Testing for Asbestos Containing Materials (ACM);
- Inspection for Polychlorinated Biphenyls (PCB's)-Electrical Equipment and Light Fixtures;
- Inspection for PCB's-Caulking;
- Inspection for Lead Based Paint (LBP);
- Mercury in Rubber Flooring inspection and sampling;
- Airborne Mold inspection and sampling;
- Radon sampling;
- Other hazardous materials.

A comprehensive survey per the Environmental Protection Agency (EPA) NESHAP regulation would be required prior to any renovation or demolition activities.

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 a Massachusetts licensed asbestos inspector Mr. Jason Becotte (AI-034963) and analyzed by a Massachusetts licensed laboratory EMSL, Woburn, MA.

Airborne mold samples were analyzed by an EPA trained laboratory EMSL, Woburn, MA.

Radon samples were analyzed by an EPA licensed laboratory AccuStar, Medway, MA.

Refer to samples results.

2.0 FINDINGS:

Asbestos Containing Materials (ACM):
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 greater than 1 percent 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

Forty six (46) bulk samples were collected from the following materials suspected of containing asbestos:

Type and Location of Material

1. Ceiling joint compound at room 14 closet
2. Ceiling joint compound at room 9 closet
3. Transite heater panel at room 14 in cabinet
4. Transite heater panel at room 14 in cabinet
5. 1’ x 1’ Acoustical ceiling tile at cafeteria
6. 1’ x 1’ Acoustical ceiling tile at cafeteria
7. Interior door framing caulking at boiler room
8. Interior door framing caulking at cafeteria
9. Interior window glazing caulking at hallway by gymnasium
10. Interior window glazing caulking at hallway by room 12
11. Interior door glazing caulking at room 14
12. Interior door glazing caulking at room 14
13. Black sink coating at room 14
14. Black sink coating at room 9
15. Pink sink coating at pathways 1
16. Pink sink coating at pathways 1
17. Grey sink coating at room 1
18. Grey sink coating at room 1
19. Paper under hardwood floor at gymnasium
20. Paper under hardwood floor at gymnasium
21. Pink 12” x 12” vinyl floor tile at old locker room
22. Pink 12” x 12” vinyl floor tile at old locker room
23. Yellow glue for pink 12” x 12” vinyl floor tile at old locker room
24. Yellow glue for pink 12” x 12” vinyl floor tile at old locker room
25. Boiler exhaust insulation at boiler room
26. Boiler exhaust insulation at boiler room
27. Boiler exhaust insulation at boiler room
28. Generator exhaust insulation at boiler room
29. Generator exhaust insulation at boiler room
30. Generator exhaust insulation at boiler room
31. White cloth flexible connector at boiler room
32. White cloth flexible connector at boiler room
33. Boiler wool insulation at boiler room
34. Boiler wool insulation at boiler room
35. Tank wool insulation at boiler room
36. Tank wool insulation at boiler room
37. Exterior window framing caulking
38. Exterior window framing caulking
39. Exterior window glazing caulking
40. Exterior window glazing caulking
41. Exterior window panel glazing caulking
42. Exterior window panel glazing caulking
43. Exterior expansion joint caulking
44. Exterior expansion joint caulking
45. Exterior door framing caulking
46. Exterior door framing caulking

Samples Results

Type and Location of Material	Sample Result
1. Ceiling joint compound at room 14 closet	2% Asbestos
2. Ceiling joint compound at room 9 closet	2% Asbestos
3. Transite heater panel at room 14 in cabinet	40% Asbestos
4. Transite heater panel at room 14 in cabinet	40% Asbestos
5. 1’ x 1’ Acoustical ceiling tile at cafeteria	No Asbestos Detected
6. 1’ x 1’ Acoustical ceiling tile at cafeteria	No Asbestos Detected
7. Interior door framing caulking at boiler room	8% Asbestos
8. Interior door framing caulking at cafeteria	No Asbestos Detected
9. Interior window glazing caulking at hallway by gymnasium	3% Asbestos
10. Interior window glazing caulking at hallway by room 12	3% Asbestos
11. Interior door glazing caulking at room 14	2% Asbestos
12. Interior door glazing caulking at room 14	3% Asbestos
13. Black sink coating at room 14	2% Asbestos
14. Black sink coating at room 9	2% Asbestos
15. Pink sink coating at pathways 1	5% Asbestos
16. Pink sink coating at pathways 1	5% Asbestos
17. Grey sink coating at room 1	5% Asbestos
18. Grey sink coating at room 1	5% Asbestos
19. Paper under hardwood floor at gymnasium	No Asbestos Detected
20. Paper under hardwood floor at gymnasium	No Asbestos Detected
21. Pink 12” x 12” vinyl floor tile at old locker room	No Asbestos Detected
22. Pink 12” x 12” vinyl floor tile at old locker room	No Asbestos Detected
23. Yellow glue for pink 12” x 12” vinyl floor tile at old locker room	No Asbestos Detected
24. Yellow glue for pink 12” x 12” vinyl floor tile at old locker room	No Asbestos Detected
25. Boiler exhaust insulation at boiler room	7% Asbestos
26. Boiler exhaust insulation at boiler room	7% Asbestos
27. Boiler exhaust insulation at boiler room	7% Asbestos
28. Generator exhaust insulation at boiler room	15% Asbestos
29. Generator exhaust insulation at boiler room	15% Asbestos
30. Generator exhaust insulation at boiler room	5% Asbestos
31. White cloth flexible connector at boiler room	40% Asbestos
32. White cloth flexible connector at boiler room	40% Asbestos
33. Boiler wool insulation at boiler room	No Asbestos Detected
34. Boiler wool insulation at boiler room	No Asbestos Detected
35. Tank wool insulation at boiler room	No Asbestos Detected
36. Tank wool insulation at boiler room	No Asbestos Detected
37. Exterior window framing caulking	2% Asbestos
38. Exterior window framing caulking	5% Asbestos
39. Exterior window glazing caulking	2% Asbestos
40. Exterior window glazing caulking	No Asbestos Detected
41. Exterior window panel glazing caulking	2% Asbestos
42. Exterior window panel glazing caulking	2% Asbestos
43. Exterior expansion joint caulking	No Asbestos Detected
44. Exterior expansion joint caulking	No Asbestos Detected
45. Exterior door framing caulking	5% Asbestos
46. Exterior door framing caulking	5% Asbestos

Observations and Conclusions:

The condition of ACM is very important. ACM in good condition does not present a health issue unless it is disturbed. Therefore, it is not necessary to remediate ACM in good condition unless it will be disturbed through renovation, demolition or other activity.

1. Ceiling joint compound was found to contain asbestos.
2. Transite heater panel was found to contain asbestos.
3. Interior door framing caulking was found to contain asbestos.
4. Interior window glazing caulking was found to contain asbestos.
5. Interior door glazing caulking was found to contain asbestos.
6. Black sink coating was found to contain asbestos.
7. Pink sink coating was found to contain asbestos.
8. Grey sink coating was found to contain asbestos.
9. Boiler exhaust insulation was found to contain asbestos.
10. Generator exhaust insulation was found to contain asbestos.
11. White cloth flexible connector was found to contain asbestos.
12. Exterior window framing caulking was found to contain asbestos.
13. Exterior window glazing caulking was found to contain asbestos.
14. Exterior window panel glazing caulking was found to contain asbestos.
15. Exterior door framing caulking was found to contain asbestos.
16. Exterior unit vent grille caulking was assumed to contain asbestos.
17. Hard joint insulation off fiberglass insulated pipes was previously found to contain asbestos.
18. Beige 9” x 9” vinyl floor tile was previously found to contain asbestos.
19. Mastic for beige 9” x 9” vinyl floor tile was previously found to contain asbestos.
20. Brown 9” x 9” vinyl floor tile was previously found to contain asbestos.
21. Mastic for brown 9” x 9” vinyl floor tile was previously found to contain asbestos.
22. Light green 9” x 9” vinyl floor tile was previously found to contain asbestos.
23. Mastic for light green 9” x 9” vinyl floor tile was previously found to contain asbestos.
24. White 9” x 9” vinyl floor tile was previously found to contain asbestos.
25. Mastic for white 9” x 9” vinyl floor tile was previously found to contain asbestos.
26. Green 9” x 9” vinyl floor tile was previously found to contain asbestos.
27. Mastic for green 9” x 9” vinyl floor tile was previously found to contain asbestos.
28. Dark beige 9” x 9” vinyl floor tile was previously found to contain asbestos.
29. Mastic for dark beige 9” x 9” vinyl floor tile was previously found to contain asbestos.
30. Packing residue around end of boiler was previously found to contain asbestos.
31. Black asphaltic moisture barrier was previously found to contain asbestos.
32. Mastic for cove base was previously found to contain asbestos.
33. Beige 12” x 12” vinyl floor tile was assumed to contain asbestos. The tiles were found covering ACM tiles.
34. Mastic for beige 12” x 12” vinyl floor tile was assumed to contain asbestos. The tiles were found covering ACM tiles.
35. Glue holding blackboard was assumed to contain asbestos.
36. Insulation/rope inside boilers was assumed to contain asbestos.
37. Insulation/rope inside incinerator was assumed to contain asbestos.
38. Paper/glue under stage hardwood floor was assumed to contain asbestos.
39. Roofing material was assumed to contain asbestos. Roofing material does not have to be removed by a licensed asbestos contractor. However, the Demolition/Roofing Contractor must comply with OSHA regulation during demolition and with state regulations for proper disposal. A non-traditional abatement plan would have to be prepared and submitted to the DEP for approval
40. Dampproofing 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. A non-traditional abatement plan would have to be prepared and submitted to the DEP for approval.
41. Thru-wall flashing was assumed to contain asbestos. The demolition contractor will have to segregate the ACM from non-ACM building surfaces for proper disposal. A non-traditional abatement plan would have to be prepared and submitted to the DEP for approval.
42. Underground sewer pipes were assumed to contain asbestos.
43. All other suspect materials were either not found or previously found not to contain asbestos. Hidden ACM may be found during demolition activities.

Polychlorinated Biphenyls (PCB's)-Electrical Equipment and Light Fixtures:
Observations and Conclusions
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 since there were labels indicating that "No PCB's" was found. Tubes in light fixtures, thermostats, 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 treated as if containing mercury and disposed in an EPA approved landfill as part of the demolition project.

PCB's in Caulking:
Observations and Conclusions
Caulking was assumed to contain PCB's.

Lead Based Paint (LBP):
Observations and Conclusions
LBP was assumed to exist on painted surfaces. A school is not considered a regulated facility. 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. According to OSHA, any amount of LBP triggers compliance.

Mercury in Rubber Flooring:
Observations and Conclusions:
No rubber flooring exists.

Airborne Mold:
Airborne mold testing was performed utilizing Zefon International Incorporated's Air-O-Cell® sampling device following all manufacturer supplied recommended sampling procedures. The Air-O-Cell® is a direct read total particulate air sampling device. It works using the inertial impaction principle similar to other spore trap devices. It is designed for the rapid collection and analysis of airborne particulate including bioaerosols. The particulate includes fibers (e.g. asbestos, fiberglass, cellulose, clothing fibers) opaque particles (e.g. fly ash, combustion particles, copy toner, oil droplets, paint), and bioaerosols (e.g. mold spores, pollen, insect parts, skin cell fragments).[1]

The method involves drawing a known quantity of air through a sterile sampling cassette. Subsequent to sampling, the cassette is sealed and transferred to a microbiology laboratory under chain of custody protocol for microscopic analysis. This method counts both viable and nonviable mold spores.

AIRBORNE MOLD and PARTICULATE

Lab ID #	Location	Total Mold Counts/M^3	Pollen	Insect Fragment	Hyphal Fragments
131604724-0001	Cafeteria	5,730	ND	ND	ND
131604724-0002	Gymnasium	4,370	ND	ND	ND
131604724-0003	Library	2,380	ND	20	ND
131604724-0004	Room 10	2,897	ND	ND	ND
131604724-0005	Room 20	2,890	7	ND	ND
131604724-0006	Outside	14,727	ND	ND	ND

[1] Zefon International Inc. <www.zefon.com>

AIRBORNE MOLD and PARTICULATE
(Subjective Scales)

Lab ID #	Location	Skin Fragment Density (SFD)	Fibrous Particulates (FP)	Total Background Particulate (TBP)
131604724-0001	Cafeteria	2	1	1
131604724-0002	Gymnasium	1	1	1
131604724-0003	Library	2	1	1
131604724-0004	Room 10	2	1	1
131604724-0005	Room 20	2	1	1
131604724-0006	Outside	1	1	1

Legend:
ND - Not Detected

Observations:
There are currently no guidelines or standards promulgated by a government agency or widely recognized scientific organization for the interpretation of airborne mold spore levels. The most commonly employed tool used to assess if mold growth is occurring in a structure is to compare quantities and species of mold outdoors to indoor. If there were more mold indoor, and/or if species were present indoor which were not present outdoors, then growth is occurring and remediation is recommended.

The indoor airborne mold spore concentrations were lower than the outside sample. Based on comparisons with historical data from projects of similar type, building utilization, geographic location and season, the indoor airborne levels are considered low. Indoor mold spore counts in the summer are typically in the 5,000-9,500-spores/cubic meter range.

Pollen, insect fragments and Hyphal fragments were either not present or low in the samples. Hyphal fragment is a non-reproductive part of the mold.

Total background particulate on all samples was assessed as “1” on a scale of 1-5 where 1 is low and 5 is high. Skin fragment density on all samples was assessed as “1-2” on a scale of 1-4 where 1 is low and 4 is high. The total background levels are measured to determine airborne dust not related to airborne mold. Skin fragments are measured to determine proper housing cleaning.

No visible mold growth was observed during sampling.

Radon:

Number of Samples Collected

Six (6) air samples were collected at the following locations:

Location of Sample

1. First Floor Stage
2. First Floor Library
3. First Floor OT/PT Room
4. First Floor Room 13
5. First Floor Room 10
6. First Floor Room 5

Location of Sample	Sample Result
1. First Floor Stage	0.4 pCi/L
2. First Floor Library	<0.4 pCi/L
3. First Floor OT/PT Room	<0.4 pCi/L
4. First Floor Room 13	<0.4 pCi/L
5. First Floor Room 10	<0.4 pCi/L
6. First Floor Room 5	<0.4 pCi/L

Observations and Conclusions:
The measured radon concentrations of the samples were found to be much lower than the EPA guideline of 4 picoCuris of radon per liter of air (pCi/L). No further action is required.

Underground Storage Oil Tanks (UST):
Observations and Conclusions
One (8,320 Gallons) UST was found at the school. There were no records on-site to review.

3.0 COST ESTIMATES:

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

Location	Material	Approximate Quantity	Cost Estimate ($)
Throughout	Flooring Materials and Mastic	45,000 SF	180,000.00
	Transite Panels Behind Heating Cabinets	2,500 SF	25,000.00
	Hard Joint Insulation	200 Total	6,000.00
	Interior Windows	110 Total	22,000.00
	Interior Doors	100 Total	20,000.00
	Interior Caulking on Select Doors	12 Total	2,400.00
	Chalkboards/Tackboards	60 Total	12,000.00
	Sinks	32 Total	6,400.00
	Hidden ACM	Unknown	25,000.00
	Light Fixtures Tubes	800 Total	16,000.00
	Miscellaneous Hazardous Materials	Unknown	25,000.00
Boiler Room	Boilers	2 Total	19,000.00
	Incinerator	1 Total	9,500.00
	Exhaust Duct Insulation	200 SF	5,000.00
	Generator Insulation	15 LF	500.00
	Flexible Connector	1 Total	200.00
Stage	Hardwood Floor Paper/Mastic	900 SF	9,000.00
First Floor Classrooms Closets	Joint Compound	450 SF	4,500.00
Exterior	Windows	250 Total	75,000.00
	Doors	10 Total	3,000.00
	Unit Vent Grilles	6 Total	1,200.00
	Roofing Material	71,871 SF	143,742.00
	Transite Sewer Pipes	Unknown [1]	50,000.00
	Thru-Wall Flashing	Unknown [1]	75,000.00

Location	Material	Approximate Quantity	Cost Estimate ($)
	Damproofing on Foundation Walls	1,500 Tons [1]	225,000.00
	UST	1 Total	15,000.00
PCB's Remediation[2]			50,000.00
Estimated costs for ACM NESHAP Inspection and Testing Services			10,000.00
Estimated costs for PCB's Testing and Abatement Plans Services[2]			25,000.00
Estimated costs for Design, Construction Monitoring and Air Sampling Services			124,558.00
		TOTAL:	***1,185,000.00***

[1]: Part of total demolition.

[2]: Should results exceed EPA limit.

4.0 DESCRIPTION OF SURVEY METHODS AND LABORATORY ANALYSES:

Asbestos:
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.

The samples were analyzed by an EPA licensed laboratory EMSL, Woburn, MA.

Airborne Mold:
The samples were analyzed by an EPA approved laboratory EMSL, Woburn, MA.

Radon:
Radon samples were analyzed by an EPA licensed laboratory AccuStar, Medway, MA.

Inspected By:

Jason Becotte

Jason Becotte
Asbestos Inspector (AI-034963)

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.

OrderID: 131703323

131703323

CHAIN OF CUSTODY

Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702
Tel: (508) 628-5486 - Fax: (508) 628-5488
adieb@uec-env.com

PLM
24-hour TAT

Town/City: North bridge, MA Building Name Balmer Elementary

Sample	Result	Description of Material	Sample Location
1		Joint compound in Closet	Room 14 closet ceiling
2		| |	Room 9 closet ceiling
3		Transite Heater Panel	Room 14 in Cabinet
4		| |	| |
5		1x1 AT	Cafe ceiling
6		| |	| |
7		Interior door frame Caulk	Boiler room door
8		| |	Cafe door
9		Interior window glaze	metal Hall by gym
10		| |	wood hall by Room 12
11		Interior door glass glaze	Room 14 door
12		| |	Room 9 door
13		Black sink coating	Room 14
14		| |	Room 9
15		Pink sink Coating	Pathways 1
16		| |	|
17		Gray sink coating	Room 1
18		| |	|
19		Paper under Hardwood	Gym Floor
20		| |	| |

Reported By: Jason Becotte Date: 7-27-17 Due Date:

Received By: Date:

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JUL 28 2017
By [signature] 8:30
DB

OrderID: 131703323

131703323

CHAIN OF CUSTODY

Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702
Tel: (508) 628-5486 - Fax: (508) 628-5488
adieb@uec-env.com

PLM
24-hour TAT

Town/City: Northbridge, MA Building Name Balmer Elementary

Sample	Result	Description of Material	Sample Location
21		Pink 12x12 VFT	old locker room
22		| |	| |
23		Yellow glue	| |
24		| |	| |
25		Boiler exhaust insulation	Boiler room
26		| |	| |
27		| |	| |
28		Generator Exhaust Insulation	Boiler room
29		| |	| |
30		| |	| |
31		white cloth flex Connector	generator duct
32		| |	| |
33		Boiler wool insulation	Boiler room
34		| |	| |
35		Tank wool insulation	Boiler room
36		| |	| |
37		Window Frame Caulk	Exterior window
38		| |	| |
39		window glass glaze	| |
40		| |	| |

Reported By: Jason Becotte Date: 7-27-17 Due Date:

Received By: Date:

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JUL 28 2017
By [initials] 8:30

131703323

CHAIN OF CUSTODY

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12 Brewster Road
Framingham, MA 01702
Tel: (508) 628-5486 - Fax: (508) 628-5488
adieb@uec-env.com

PLM
24-hour TAT

Town/City: Northbridge, MA Building Name Balmer Elementary

Sample	Result	Description of Material	Sample Location
41		window Panel glaze	exterior window
42		| |	| |
43		expansion Joint Caulk	exterior expansion Joint
44		| |	| |
45		Door Frame Caulk	exterior door
46		| |	| |

Reported By: Jason Becotte Date: 7-27-17 Due Date:

Received By: Date:

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By 8:30

EMSL Analytical, Inc.
5 Constitution Way, Unit A Woburn, MA 01801
Tel/Fax: (781) 933-8411 / (781) 933-8412
http://www.EMSL.com / bostonlab@emsl.com

EMSL Order: 131703323
Customer ID: UEC63
Customer PO:
Project ID:

Attention: Ammar Dieb
Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702

Phone: (617) 984-9772
Fax: (508) 628-5488
Received Date: 07/28/2017 8:30 AM
Analysis Date: 07/28/2017 - 07/29/2017
Collected Date:

Project: Balmer Elementary - Northbridge, MA

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
1 *131703323-0001*	Room 14 Closet Ceiling - Joint Compound in Closet	White Fibrous Homogeneous		98% Non-fibrous (Other)	2% Chrysotile
2 *131703323-0002*	Room 9 Closet Ceiling - Joint Compound in Closet	White Fibrous Homogeneous		98% Non-fibrous (Other)	2% Chrysotile
3 *131703323-0003*	Room 14 in Cabinet - Transite Heater Panel	Gray Fibrous Homogeneous		60% Non-fibrous (Other)	40% Chrysotile
4 *131703323-0004*	Room 14 in Cabinet - Transite Heater Panel	Gray Fibrous Homogeneous		60% Non-fibrous (Other)	40% Chrysotile
5 *131703323-0005*	Café Ceiling - 1x1 AT	Tan/White Fibrous Homogeneous	35% Cellulose 35% Min. Wool	30% Non-fibrous (Other)	None Detected
6 *131703323-0006*	Café Ceiling - 1x1 AT	Tan/White Fibrous Homogeneous	35% Cellulose 35% Min. Wool	30% Non-fibrous (Other)	None Detected
7 *131703323-0007*	Boiler Room Door - Interior Door Frame Caulk	Gray Non-Fibrous Homogeneous		92% Non-fibrous (Other)	8% Chrysotile
8 *131703323-0008*	Café Door - Interior Door Frame Caulk	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
9 *131703323-0009*	Metal Hall by Gym - Interior Window Glaze	Gray Non-Fibrous Homogeneous		97% Non-fibrous (Other)	3% Chrysotile
10 *131703323-0010*	Wood Hall by Room 12 - Interior Window Glaze	Gray Non-Fibrous Homogeneous		97% Non-fibrous (Other)	3% Chrysotile
11 *131703323-0011*	Room 14 Door - Interior Door Glass Glaze	Gray Fibrous Homogeneous		98% Non-fibrous (Other)	2% Chrysotile
12 *131703323-0012*	Room 9 Door - Interior Door Glass Glaze	Gray Non-Fibrous Homogeneous		97% Non-fibrous (Other)	3% Chrysotile
13 *131703323-0013*	Room 14 - Black Sink Coating	Black Non-Fibrous Homogeneous		98% Non-fibrous (Other)	2% Chrysotile
14 *131703323-0014*	Room 9 - Black Sink Coating	Black Non-Fibrous Homogeneous		98% Non-fibrous (Other)	2% Chrysotile
15 *131703323-0015*	Pathways 1 - Pink Sink Coating	Pink Fibrous Homogeneous		95% Non-fibrous (Other)	5% Chrysotile
16 *131703323-0016*	Pathways 1 - Pink Sink Coating	Pink Non-Fibrous Homogeneous		95% Non-fibrous (Other)	5% Chrysotile

Initial report from: 07/29/2017 16:28:13

EMSL Analytical, Inc.
5 Constitution Way, Unit A Woburn, MA 01801
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http://www.EMSL.com / bostonlab@emsl.com

EMSL Order: 131703323
Customer ID: UEC63
Customer PO:
Project ID:

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
17 131703323-0017	Room 1 - Gray Sink Coating	Gray Non-Fibrous Homogeneous		95% Non-fibrous (Other)	5% Chrysotile
18 131703323-0018	Room 1 - Gray Sink Coating	Gray Non-Fibrous Homogeneous		95% Non-fibrous (Other)	5% Chrysotile
19 131703323-0019	Gym Floor - Paper Under Hardwood	Tan Fibrous Homogeneous	80% Cellulose	20% Non-fibrous (Other)	None Detected
20 131703323-0020	Gym Floor - Paper Under Hardwood	Tan Fibrous Homogeneous	80% Cellulose	20% Non-fibrous (Other)	None Detected
21 131703323-0021	Old Locker Room - Pink 12x12 VFT	Pink Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
22 131703323-0022	Old Locker Room - Pink 12x12 VFT	Pink Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
23 131703323-0023	Old Locker Room - Yellow Glue	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
24 131703323-0024	Old Locker Room - Yellow Glue	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
25 131703323-0025	Boiler Room - Boiler Exhaust Insulation	Gray Fibrous Homogeneous		93% Non-fibrous (Other)	2% Amosite 5% Chrysotile
26 131703323-0026	Boiler Room - Boiler Exhaust Insulation	Gray Fibrous Homogeneous		93% Non-fibrous (Other)	2% Amosite 5% Chrysotile
27 131703323-0027	Boiler Room - Boiler Exhaust Insulation	Gray Fibrous Homogeneous		93% Non-fibrous (Other)	2% Amosite 5% Chrysotile
28 131703323-0028	Boiler Room - Generatior Exhaust Insulation	White Fibrous Homogeneous		85% Non-fibrous (Other)	15% Chrysotile
29 131703323-0029	Boiler Room - Generatior Exhaust Insulation	Gray Fibrous Homogeneous		85% Non-fibrous (Other)	15% Chrysotile
30 131703323-0030	Boiler Room - Generatior Exhaust Insulation	Gray Fibrous Homogeneous		95% Non-fibrous (Other)	5% Chrysotile
31 131703323-0031	Generator Duct - White Cloth Flex Connector	White/Silver Fibrous Homogeneous	40% Glass	20% Non-fibrous (Other)	40% Chrysotile
32 131703323-0032	Generator Duct - White Cloth Flex Connector	White/Silver Fibrous Homogeneous	40% Glass	20% Non-fibrous (Other)	40% Chrysotile
33 131703323-0033	Boiler Room - Boiler Wool Insulation	Gray Fibrous Homogeneous	95% Glass	5% Non-fibrous (Other)	None Detected
34 131703323-0034	Boiler Room - Boiler Wool Insulation	Gray Fibrous Homogeneous	95% Glass	5% Non-fibrous (Other)	None Detected
35 131703323-0035	Boiler Room - Tank Wool Insulation	Gray Fibrous Homogeneous	95% Glass	5% Non-fibrous (Other)	None Detected

Initial report from: 07/29/2017 16:28:13

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Customer ID: UEC63
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Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
36 *131703323-0036*	Boiler Room - Tank Wool Insulation	Gray Fibrous Homogeneous	95% Glass	5% Non-fibrous (Other)	None Detected
37 *131703323-0037*	Exterior Window - Window Frame Caulk	Gray Non-Fibrous Homogeneous		98% Non-fibrous (Other)	2% Chrysotile
38 *131703323-0038*	Exterior Window - Window Frame Caulk	Gray Fibrous Homogeneous		95% Non-fibrous (Other)	5% Chrysotile
39 *131703323-0039*	Exterior Window - Window Glass Glaze	Gray Fibrous Homogeneous		98% Non-fibrous (Other)	2% Chrysotile
40 *131703323-0040*	Exterior Window - Window Glass Glaze	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
41 *131703323-0041*	Exterior Window - Window Panel Glaze	Gray Non-Fibrous Homogeneous		98% Non-fibrous (Other)	2% Chrysotile
42 *131703323-0042*	Exterior Window - Window Panel Glaze	Gray Non-Fibrous Homogeneous		98% Non-fibrous (Other)	2% Chrysotile
43 *131703323-0043*	Exterior Expansion Joint - Expansion Joint Caulk	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
44 *131703323-0044*	Exterior Expansion Joint - Expansion Joint Caulk	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
45 *131703323-0045*	Exterior Door - Door Frame Caulk	Gray Non-Fibrous Homogeneous		95% Non-fibrous (Other)	5% Chrysotile
46 *131703323-0046*	Exterior Door - Door Frame Caulk	Gray Non-Fibrous Homogeneous		95% Non-fibrous (Other)	5% Chrysotile

Analyst(s)
Elizabeth Stutts (44)
Kevin Pine (2)

Steve Grise, Laboratory Manager
or Other Approved Signatory

Initial report from: 07/29/2017 16:28:13

OrderID: 131703311

131703311

UEC universal environmental consultants
12 Brewster Road
Framingham, MA 01702
Phone: 508.628.5486
Fax: 508.628.5488

CHAIN OF CUSTODY

BUILDING / SITE NAME: Balmer Elementary
TOWN / CITY: Northbridge
WORK AREA:
STATE: MA

Analysis Type	6-8 Hr	12 Hr	24 Hr	48 Hr	72 hr
TEM / AHERA					
TEM / Level II					
TEM / Dust					
TEM / Bulk					
TEM / Water					
PLM					
Mold			X		
Other:					

Turnaround Time (x)

Specific Project Notes

SAMPLE ID	MATERIAL DESCRIPTION	SAMPLE LOCATION	START	STOP	TIME	L/MIN	VOLUME
1	24219674	Cafe	1019	1029	10	15	150
2	24219693	Gym	1021	1031	10	15	150
3	24219696	Library	1030	1040	10	15	150
4	24219680	Room 10	1034	1044	10	15	150
5	24221627	Room 20	1042	1052	10	15	150
6	24219690	outside	1046	1056	10	15	150

SAMPLED BY: Jason Becotte	DATE/TIME: 7-25-17	RECEIVED BY: drop box	DATE/TIME:
RELINQUISHED BY:	DATE/TIME:	RECEIVED IN LAB BY:	DATE/TIME:

RECEIVED
JUL 27 2017
By 8:30 MS

EMSL Analytical, Inc.

5 Constitution Way, Unit A Woburn, MA 01801
Tel/Fax: (781) 933-8411 / (781) 933-8412
http://www.EMSL.com / bostonlab@emsl.com

EMSL Order: 131703311
Customer ID: UEC63
Customer PO:
Project ID:

Attn: Ammar Dieb
Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702

Project: Balmer Elementary

Phone: (617) 984-9772
Fax: (508) 628-5488
Collected: 07/25/2017
Received: 07/27/2017
Analyzed: 07/27/2017

Test Report: Air-O-Cell(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods EMSL 05-TP-003, ASTM D7391)

Lab Sample Number:	**131703311-0001**			**131703311-0002**			**131703311-0003**		
Client Sample ID:	**1**			**2**			**3**		
Volume (L):	**150**			**150**			**150**		
Sample Location	**café**			**gym**			**library**		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria	-	-	-	-	-	-	-	-	-
Ascospores	1	20	0.3	1	20	0.5	1	20	0.8
Aspergillus/Penicillium	1	20	0.3	1	20	0.5	-	-	-
Basidiospores	255	5560	97	194	4230	96.8	102	2230	93.7
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	4	90	1.6	5	100	2.3	4	90	3.8
Curvularia	1	20	0.3	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	2	40	1.7
Myxomycetes++	1	20	0.3	-	-	-	-	-	-
Pithomyces	-	-	-	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis	-	-	-	-	-	-	-	-	-
Stachybotrys	-	-	-	-	-	-	-	-	-
Torula	-	-	-	-	-	-	-	-	-
Ulocladium	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Oidium	-	-	-	-	-	-	-	-	-
Total Fungi	**263**	**5730**	**100**	**201**	**4370**	**100**	**109**	**2380**	**100**
Hyphal Fragment	-	-	-	-	-	-	-	-	-
Insect Fragment	-	-	-	-	-	-	1	20	-
Pollen	-	-	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	22	-	-	22	-	-	22	-
Analyt. Sensitivity 300x	-	7*	-	-	7*	-	-	7*	-
Skin Fragments (1-4)	-	2	-	-	1	-	-	2	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-
Background (1-5)	-	1	-	-	1	-	-	1	-

Bipolaris++ = Bipolaris/Drechslera/Exserohilum
Myxomycetes++ = Myxomycetes/Periconia/Smut

No discernable field blank was submitted with this group of samples.

Steve Grise, Laboratory Manager
or other approved signatory

Initial report from: 07/27/2017 15:04:19

EMSL Analytical, Inc.

5 Constitution Way, Unit A Woburn, MA 01801

Tel/Fax: (781) 933-8411 / (781) 933-8412

http://www.EMSL.com / bostonlab@emsl.com

EMSL Order: 131703311
Customer ID: UEC63
Customer PO:
Project ID:

Attn: Ammar Dieb
Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702

Phone: (617) 984-9772
Fax: (508) 628-5488
Collected: 07/25/2017
Received: 07/27/2017
Analyzed: 07/27/2017

Project: Balmer Elementary

Test Report: Air-O-Cell(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods EMSL 05-TP-003, ASTM D7391)

Lab Sample Number:		**131703311-0004**			**131703311-0005**			**131703311-0006**	
Client Sample ID:		**4**			**5**			**6**	
Volume (L):		**150**			**150**			**150**	
Sample Location		**room 10**			**room 20**			**outside**	
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria	-	-	-	-	-	-	-	-	-
Ascospores	-	-	-	1	20	0.7	15	330	2.2
Aspergillus/Penicillium	2	40	1.4	-	-	-	-	-	-
Basidiospores	92	2000	69	127	2770	95.8	622	13600	92.3
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	39	850	29.3	6	100	3.5	33	720	4.9
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	3	70	0.5
Myxomycetes++	-	-	-	-	-	-	-	-	-
Pithomyces	1*	7*	0.2	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis	-	-	-	-	-	-	-	-	-
Stachybotrys	-	-	-	-	-	-	-	-	-
Torula	-	-	-	-	-	-	-	-	-
Ulocladium	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Oidium	-	-	-	-	-	-	1*	7*	0
Total Fungi	**134**	**2897**	**100**	**134**	**2890**	**100**	**674**	**14727**	**100**
Hyphal Fragment	-	-	-	-	-	-	-	-	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	-	-	-	1*	7*	-	-	-	-
Analyt. Sensitivity 600x	-	22	-	-	22	-	-	22	-
Analyt. Sensitivity 300x	-	7*	-	-	7*	-	-	7*	-
Skin Fragments (1-4)	-	2	-	-	2	-	-	1	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-
Background (1-5)	-	1	-	-	1	-	-	1	-

Bipolaris++ = Bipolaris/Drechslera/Exserohilum
Myxomycetes++ = Myxomycetes/Periconia/Smut

No discernable field blank was submitted with this group of samples.

Steve Grise, Laboratory Manager
or other approved signatory

High levels of background particulate can obscure spores and other particulates leading to underestimation. Background levels of 5 indicate an overloading of background particulates, prohibiting accurate detection and quantification. Present = Spores detected on overloaded samples. Results are not blank corrected unless otherwise noted. The detection limit is equal to one fungal spore, structure, pollen, fiber particle or insect fragment. "*" Denotes particles found at 300X. "-" Denotes not detected. Due to method stopping rules, raw counts in excess of 100 are extrapolated based on the percentage analyzed. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Woburn, MA AIHA-LAP, LLC --EMLAP Accredited #180179

Initial report from: 07/27/2017 15:04:19

For information on the fungi listed in this report, please visit the Resources section at www.emsl.com

AccuStar

Radon in Air

NELAC NY 11769
NRPP 101193 AL
NRSB ARL0017

EPA Method #402-R-92-004
Liquid Scintillation
NRPP Device Code 8088
NRSB Device Code 12193

Laboratory Report for:

Universal Environmental Consultant
12 Brewster Road
Framingham MA 01702

Property Tested:

Balmer Elementary School
21 Crescent Street
Whitinsville MA 01588

Log Number	Device Number	Test Exposure Duration:				Area Tested	Result (pCi/L)
2143583	3486371	07/24/2017 12:07 pm	07/27/2017	12:32 pm		First Floor Room Stage	0.4
2143584	3486381	07/24/2017 12:08 pm	07/27/2017	12:33 pm		First Floor Library	< 0.4
2143585	3486359	07/24/2017 12:14 pm	07/27/2017	12:36 pm		First Floor OT and PT Room	< 0.4
2143586	3486372	07/24/2017 12:15 pm	07/27/2017	12:37 pm		First Floor Room 13	< 0.4
2143587	3486355	07/24/2017 12:16 pm	07/27/2017	12:38 pm		First Floor Room 10	< 0.4
2143588	3486360	07/24/2017 12:17 pm	07/27/2017	12:38 pm		First Floor Room 5	< 0.4

Comment: Universal Environmental Consultant was emailed a copy of this report.

Test Performed By: Jason Becotte

Distributed by: Universal Environmental Consultant

Date Received: 07/27/2017 Date Logged: 07/27/2017 Date Analyzed: 07/28/2017 Date Reported: 07/28/2017

Report Reviewed By: Michele Cleveland

Report Approved By:
Shawn Price, Director of Laboratory Operations, AccuStar Labs

Disclaimer:
The uncertainty of this radon measurement is ~+/- 10 %. Factors contributing to uncertainty include statistical variations, daily and seasonal variations in radon concentrations, sample collection techniques and operation of the dwelling. Interference with test conditions may influence the test results.

This report may only be transferred to a third party in its entirety. Analytical results relate to the samples AS RECEIVED BY THE LABORATORY. Results shown on this report represent levels of radon gas measured between the dates shown in the room or area of the site identified above as "Property Tested". Incorrect information will affect results. The results may not be construed as either predictive or supportive of measurements conducted in any area of this structure at any other time. AccuStar Labs, its employees and agents are not responsible for the consequences of any action taken or not taken based upon the results reported or any verbal or written interpretation of the results.

CIVIL SITE ASSESSMENT—NITSCH ENGINEERING

Executive Summary

Nitsch Engineering has performed research of the existing site conditions and anticipated site permitting requirements for Balmer Elementary School renovation/building project located on Crescent Street in Northbridge, Massachusetts. Nitsch Engineering's research included conversations with Steve Von Bargen, Director of Facilities and Operations, and Mike Bedard, Maintenance Supervisor, as well as information gathered during site visits conducted by Sandra A. Brock, PE and Jarrett Zube, EIT, of Nitsch Engineering on July 13, 2017. Information included in this report is also based on compiled record drawings, MassGIS data, and other documentation gathered by Nitsch Engineering and provided to Nitsch Engineering by Dore & Whittier.

The record drawings include the following utility and site plans:

- Plan Set entitled Northbridge Elementary School prepared for J. Williams Beal Son, Granger & Poskus Architects dated 1/4/65—5 sheets.
- Plan Set entitled Northbridge Elementary School prepared for J. Williams Beal Son, Granger & Poskus Architects dated 1/4/65—13 sheets including a site plan.

Terminology

Site Condition scale of terms used throughout this report are as follows:

"Excellent": new or nearly new condition with few or no blemishes or compromises of quality or function.

"Very Good": highly functional condition with slight wear and tear and/or minor compromises of quality or function.

"Good": median functional condition with noticeable wear and tear and/or compromises of quality or function.

"Fair": below median functional condition with significant wear and tear and/or major compromises of quality. Seriously worn parts or elements, minor structural compromise. Possible near-future safety hazard.

"Poor": nearly– or completely non-functional condition with major wear and tear and/or serious compromises of quality or usability. Missing parts or elements, major structural damage or condition. Immediate safety hazard or danger.

GENERAL SITE DESCRIPTION

NORTHBRIDGE ELEMENTARY SCHOOL

The following is an overview of the site and identified potential deficiencies and/or issues.

Specific Issues	*Recommendations/Conditions*
Site Description: The site is located on the west side of Cross Street at Pleasant Street. There are three driveway entrances off Cross Street to a parking lot north of the school building and a two driveways that services a loop drop off in front of the building. The Northbridge School District offices are also located on the site in a building south of the school. With their separate driveway entering from Linwood Avenue. There are NO wetlands resource areas indicated on the site on MassGIS. The parcel is 3.7 acre, area	The size of the parcels (total of 3.7 acres) is a constraint.
Utilities: Record plans indicated that the utility services come from Cross Street. The electrical service comes off a drop at a pole in front of the school that enters the site and into a transformer within the drop-off loop landscape island. Electrical then proceeds underground into the building. Record plans indicate an oil tank to the south of the drop off loop in the grass area. Gas, water, drainage and sanitary sewer all connect to utilities in Cross Street.	All new utilities would need to be brought to the site from Cross Street. Capacity of these utilities will need to be confirmed.
Site Access: There are three access points off of Cross Street, as describer above and one off Linwood Avenue to the Southbridge School Offices. One driveway to the parking lot is a dead-end at the parking lot. There is no vehicular access to the rear of the building. There are sidewalks along Cross Street.	The site area is constrained and the site may not be able to accommodate a separate bus and parent drop off, the preferred layout for safety reasons.
Other: The rear of the site abuts a commercial—retail area. Across the Street is a church and the remaining direct abutters are residential in nature. Linwood Street is a mix of residential and commercial uses. There are no play fields on site with very limited open lawn areas for recreation on site.	Article 97 property requires that the State Legislature vote to remove the land from Article 97 in order to construct a school on the property. (See permitting section). MassDOT permits will be required for curb cuts and utility connections (for work in State Highway)

Figure 1: Google Aerial View

Figure 2: Building—Drop-off

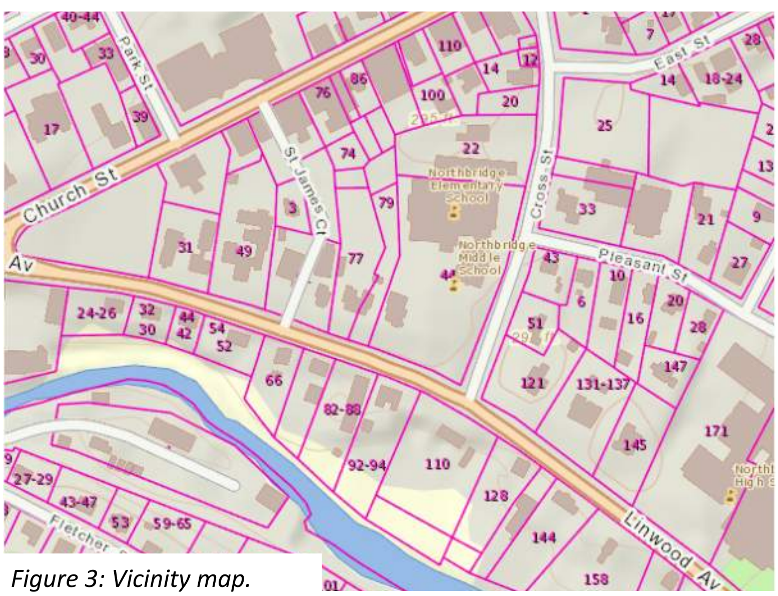

Figure 3: Vicinity map.

SITE PERMITTING

STATE AND FEDERAL SITE PERMITS

Review of the site and State and Federal Site Permit requirements, the following is a preliminary assessment of potential permit requirements.

Permit	*Recommendations/Potential Permit*
Wetlands Protection Act (310 CMR 10.00) The Wetlands Protection Act ensures the protection of Massachusetts' inland and coastal wetlands, tidelands, great ponds, rivers, and floodplains. It regulates activities in coastal and wetlands areas, and contributes to the protection of ground and surface water quality, the prevention of flooding, and storm damage and the protection of wildlife and aquatic habitat. A review of the Massachusetts Department of Environmental Protection (DEP) wetland layers available on the Massachusetts Geographic Information System (MassGIS), **indicates NO wetlands .**	Site should be walked by a wetland scientist to confirm no wetland resources areas on the site. Linwood Pond water body that receives runoff from the site has a TMDL. See Figure 5.
Natural Heritage & Endangered Species A review of the 13th Edition of the Massachusetts Natural Heritage Atlas prepared by the Natural Heritage and Endangered Species Program (NHESP), updated 2017, indicates that the High School site is NOT a Priority Habitat of Rare Species or an Estimated Habitat of Rare Wildlife. No such areas appear within close proximity to the site. (See Natural Heritage Endangered Species Program Map.)	No NHESP areas indicated on GIS. No further action required.
Floodplain Based on the Flood Insurance Rate Map (FIRM), information available on MassGIS the site does not fall within a flood hazard zone. (See Map 3A FEMA)	No Further Action is required.
USEPA NPDES Construction activities that disturb more than one acre are regulated under the United States Environmental Protection Agency's (EPA) National Pollution Discharge Elimination System (NPDES) Program. In Massachusetts, the USEPA issues NPDES permits to operators of regulated construction sites.	Regulated projects (an acres or more of site disturbance) are required to develop and implement stormwater pollution prevention plans and submit an online Notice of Intent for a General Construction Permit. The application shall be made a minimum of two weeks before construction by the Owner and the Contractor.

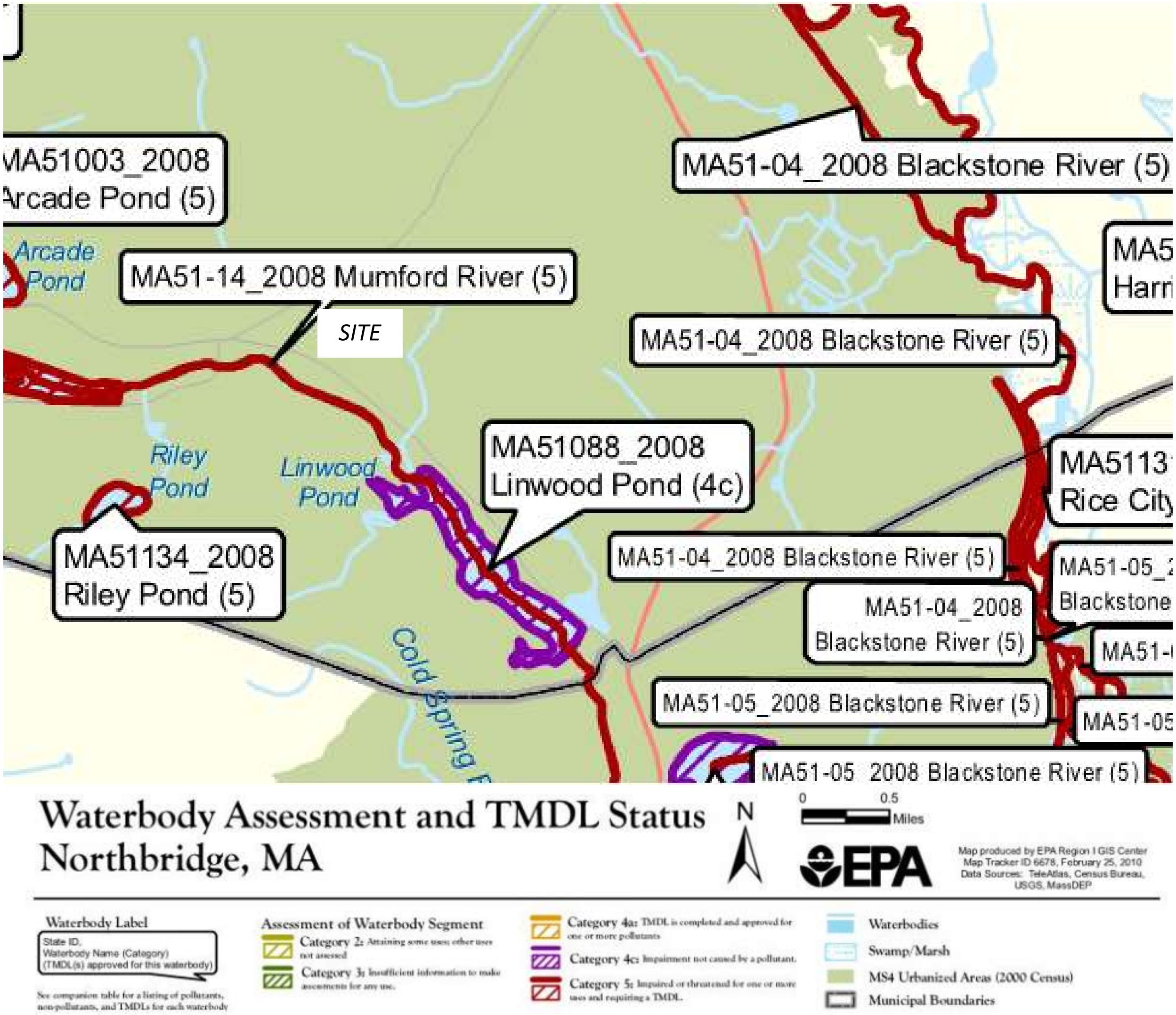

Figure 5: TMDL

Local Permits

Review of the Town of Northbridge zoning and other regulations, the following is a preliminary assessment of potential permit requirements.

Permit	*Recommendations/Potential Permit*
The proposed school falls under the Dover Amendment. Nitsch Engineering has no comment regarding the legal interpretation of the Dover Amendment and how it applies to the permitting process for the school **Zoning:** Review of the local zoning bylaw (Chapter 173 –Zoning) indicates that Educational Use are "permitted by right" in all Zoning Districts except for Heritage district. *Site Plan Review— Section 173-49 Site Plan Review states "A site plan for a permitted use shall be reviewed and approved by the Building Inspector." Section 173-49.1 Site Plan Review by Planning Board states "Any new structure or group of structures under the same ownership on the same or contiguous lots with at least 6,000 square feet of gross square feet or requiring the provision of 10 or more parking spaced under 173-27…"*	The school is a permitted use for Zone H—Heritage. Because the school falls under the Dover Amendment, Nitsch Engineering defers to counsel on the requirement of site plan review.
Department of Public Works (DPW) Stormwater Connections	Curb Cut Permit is required for a new or altered Curb Cut, to be submitted by the Contractor to DPW. Drainage Connections permit is required for connection to municipal system. The design team will submit water, sewer, and drainage plans for review and comment to the DPW but permits is obtained by the contractor typically.
DPW—Sewer Division	Sanitary Sewer Service permit is required for any new services. Typically obtained by the contractor.
Whitinsville Water Company	Water Service permit is required for any new services. Typically obtained by the contractor.
ARTICLE 97:Article XCVII. Article XLIX of the Amendments to the Constitution (Massachusetts) states "*The people shall have the right to clean air and water, freedom from excessive and unnecessary noise, …*" and states "*Lands and easements taken or acquired for such purposes shall not be used for other purposes or otherwise disposed of except by laws enacted by two thirds vote, taken by yeas and nays, of each branch of the general court.*"	No applicable.

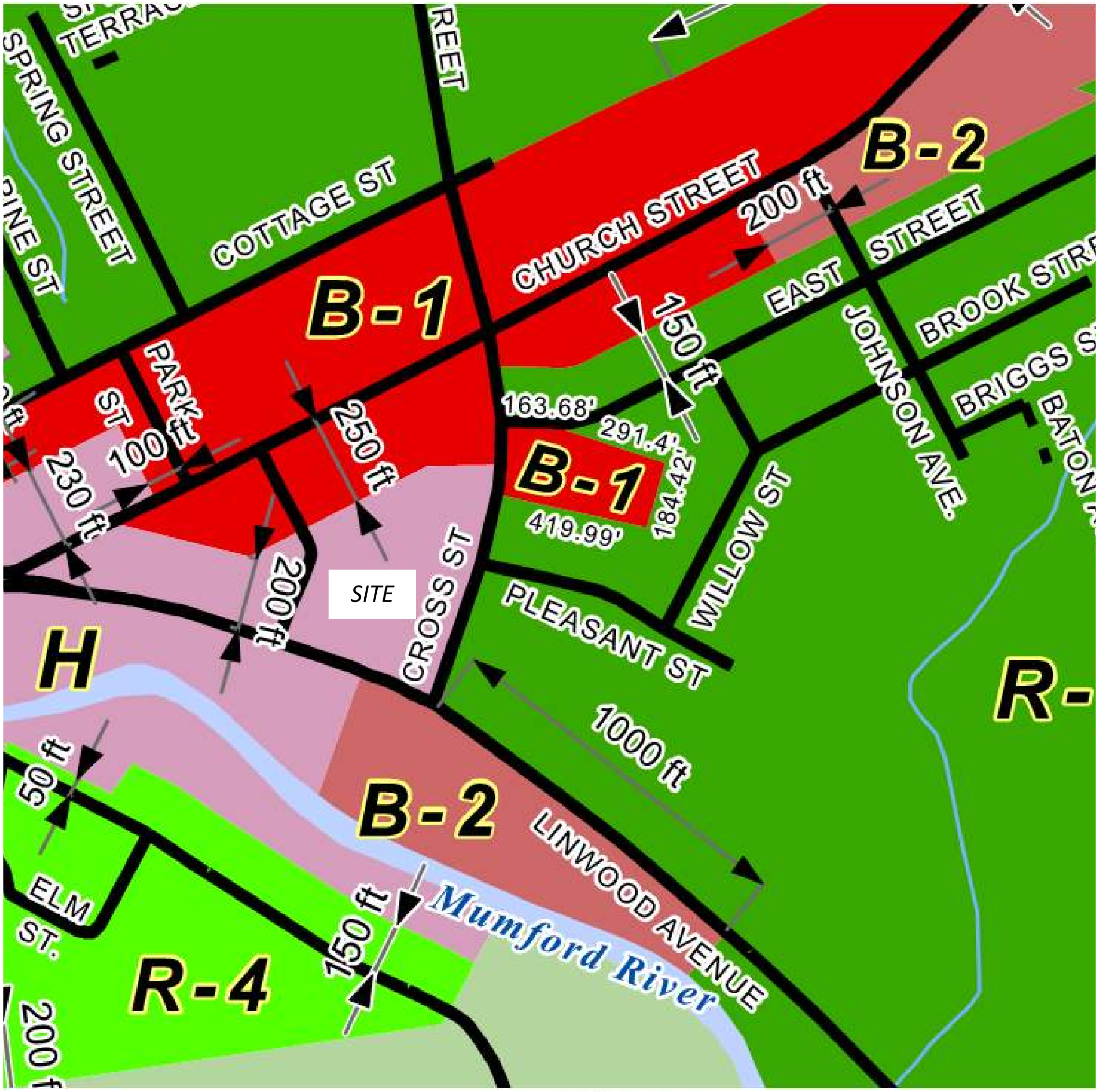

Figure 6: Zoning Plan

LANDSCAPE ASSESSMENT

Executive Summary

Northbridge Elementary is centrally located within the downtown area, and occupies an approximately 3 acre site that it shares with the School District offices building whose campus comprises approximately 1 acre. Because much of the school consists of a 1 story addition, the school building itself occupies the majority of the site so outdoor space is limited. The last major construction on site was done in 1983, and since that time the majority of the site has seen a significant amount of wear and is generally in fair to poor condition. The exception to this is the playground which appears to have been built within the last 10 years and is in good condition.

Terminology

Building Condition scale of terms used throughout this report are as follows:

- "Excellent": new or nearly new condition with few or no blemishes or compromises of quality or function.
- "Very Good": highly functional condition with slight wear and tear and/or minor compromises of quality or function.
- "Good": median functional condition with noticeable wear and tear and/or compromises of quality or function.
- "Fair": below median functional condition with significant wear and tear and/or major compromises of quality or function. Seriously worn parts or elements, minor structural compromise. Possible near-future safety hazard.
- "Poor": nearly– or completely non-functional condition with major wear and tear and/or serious compromises of quality or usability. Missing parts or elements, major structural damage or condition. Immediate safety hazard or danger.

Vegetation and topography

The original school building was constructed at the highest point of a steep hill, which is typical of period construction but presents accessibility challenges and problems for students navigating the site. The urban setting, in conjunction with the sprawling single-story construction on site, both contribute to reduced outdoor spaces for students and faculty. The schoolyard and playground are accessible by vehicle drop-off, but for pedestrians entering from offsite it must be accessed via steep walkways that do not conform to ADA standards. The site features a fair amount large, mature trees that are in various conditions of health .

Specific Issues	*Recommendations*
Lawn and open spaces on site are severely limited, with no space available for sports or ball fields. There are two small open areas of grass lawn, to the west and north of the school building. These areas contain healthy stands of turfgrass in good condition, but currently lack proper maintenance and contain a significant amount of weeds. (Figure 5.)	Aerate and slice seed lawn areas, and treat for weed growth. Provide regular maintenance.
There is a fair amount of ornamental plantings at the drop-off area of the school which are for the most part healthy and in good condition. There was a significant amount of weed growth among them but for the most part they appear cared for and appreciated. The plants serve to soften the harsh exterior of the drop-off area, reduce heat island effect, improve air quality, and provide aesthetic value and opportunities for learning (Figure 1.)	Expand ornamental plantings to other parts of campus, provide regular maintenance.
There are a number of large shade trees on site; Elm, Oak, Maple and Beech were observed. These trees provide a great deal of shade in the outdoor areas and also offer historic value for the entire community. At least one of these trees was observed to be in declining condition, but most appear to be in good health. (Figure 2., Figure 3.)	Have trees evaluated by a certified arborist and follow the recommendations provided. Likely maintenance will include edging and mulching, and airspading at base of tree, pruning of dead and dying limbs, and fertilization as needed.
The original school building is constructed on a steep hill, with the rest of the school occupying a relatively flat site beneath it. Topography is generally not a factor except where access is impeded by steep slopes at the original school building. (Figure 4., Figure 6.).	See Sidewalks and Pedestrian Routes section for specific recommendations.

Figure 1—Ornamental plantings at entrance

Figure 2—Historic shade tree on site

Figure 3—Mature trees on site

Figure 4-School and playground at top of steep slope

Figure 5—Limited lawn areas on site

Figure 6—Original building sited atop steep hill

STRUCTURES

External structures on site are limited to the school district offices (Figure 10), a storage shed at the playground (Figure 12), and a clothing and shoes donation storage shed (Figure 11)

Specific Issues	*Recommendations*
The school does not currently have any structured spaces for outdoor learning, such as seating or gathering areas for an outdoor classroom or a vegetable garden (Figure 7, 8, 9)	The school should explore expanding educational programs to include outdoor learning opportunities and provide the necessary structures required to support those programs.

Figure 7—Original building with two additions

Figure 8—Original school building

Figure 9—1983 school addition.

Figure 10-School district offices building

Figure 11—Clothing donation storage.

Figure 12—Storage shed at playground

SITE FURNISHINGS

Overall, there is a general shortage of furnishings on site, and the school would benefit from a greater distribution of furnishings like bicycle racks, trash receptacles, benches, water fountains, etc. Most furnishings are in poor to fair quality and in need of replacement. There is a lack of cohesive style and quality among site furnishings which detract from their visual impression on the site. Some common furnishings, such as water fountains, are missing altogether.

Specific Issues	*Recommendations*
There is a fair amount of galvanized chain link fencing around the school property, most of it is in fair to good condition. There is securely enclosed fencing around the rear schoolyard perimeter, which is common in similarly urban settings. There were instances of rusting fabric, bent rails, and missing hardware components. None of the chain link fencing was black-vinyl coated (Figure 17.)	Replace all missing or broken fence components to match existing galvanized construction. Consider replacing all fencing with black vinyl coated for greater longevity.
Only one trash receptacle and no recycling receptacles were observed at the school site. The single trash receptacle was not of suitable quality for permanent exterior use. Trash and litter has accumulated in some areas . (Figure 18.)	Furnish and install more trash and recycling receptacles of suitable quality for exterior use and of a uniform style and performance standards.
Benches are worn and in fair condition, and represent a variety of styles and designs. There is a lack of diversity in outdoor seating opportunities such as picnic tables or individual chairs. (Figures 13, 14, 15)	Remove old benches. Furnish and install new benches and picnic tables. Provide better distribution around site and at waiting areas.
One bicycle rack was observed and was in poor condition, and was located in an unsuitable location for proper access. The bicycle rack did not present sufficient capacity for the number of students. No bicycle racks were observed at other entrances. (Figure 16.)	Provide more high quality bicycle racks to encourage student to bike to school and sports. Place bicycle racks on level, undamaged concrete pads for safety and accessibility. Provide bike racks at appropriate areas.

Figure 13 Bench at play area

Figure 14—Benches at schoolyard

Figure 15—Bench at play area

Figure 16-Bicycle rack at drop-off area

Figure 17—Chain link fencing at school.

Figure 18—Waste barrel at schoolyard

RECREATIONAL ELEMENTS

Because of the relatively small area surrounding the school, the number of recreational elements are limited. The primary recreational space is in the schoolyard between the original school building and the School District Offices. The area consists of a paved asphalt area with painted games, a wood-chip surfaced playground, a swing set, and some seating areas. There is a small lawn area next to the playground and paved area for free form play. The area receives adequate shade and is in a good location, though access from the street is limited due to steep walkways.

Specific Issues	*Recommendations*
Playground equipment is generally in good condition; it appears to have been constructed within the last 10 years. There are fencing and edging in close proximity to the play equipment, which should be reviewed for compliance with equipment setback requirements. This should be conducted as part of a comprehensive playground safety inspection by a certified CPSI. The area itself is relatively small for the number of students it serves and would benefit from expansion (Figures 20, 21) No Accessible playground equipment was noted.	Perform a playground safety inspection by a certified CPSI. Refurbish and repaint all properly functioning equipment displaying visual wear. Provide accessible play equipment.
The surfacing at the playground is constructed of wood chips, and appears to be of fairly recent installation. The chips themselves appear to be in good condition, but migration and lack of maintenance has left some bare areas in the play area and some chips out on the paved area. (Figure 24.)	Provide regular maintenance of wood chip surfacing. Rake chips to avoid bare areas and prevent excessive mounding. Consider replacing wood chips with poured in place rubberized safety surfacing for increased safety and visual appeal, and reduced maintenance.
The is a single swing set with two swings, both designed for toddlers. It is in very good condition. The wood chip surface below has eroded and no longer provides any impact attenuation. (Figure 22)	Provide additional swing sets to allow more and older children to use them simultaneously. Provide adequate safety surfacing in fall zones surrounding all swing sets.
Although there is an abundance of paved surface in the play area, there are very few painted games. There is a single four square court, an unidentified painted game, and a painted line around the perimeter of the area which may be a bigwheel racetrack. (Figures 19, 23)	Provide more painted games and graphics for a range of ages and levels of skill, such as four square, hopscotch, maps, and other games or graphics.

Figure 19—Schoolyard and School District Office.

Figure 20—Play equipment at schoolyard.

Figure 21—Play equipment at schoolyard.

Figure 22-Swingset at schoolyard.

Figure 23—Painted games at schoolyard.

Figure 24—Play equipment and mulch surfacing

Vehicular circulation and parking, service and deliveries

Parking on site is extremely limited. There is a lot on the north side of the school for 21 vehicles. There is additional parking for 14 vehicles at the school district offices building, accessed from Linwood Ave. There is a drop-off loop at the front of the school at Cross St., but there does not appear to be separate drop-off areas for buses and parents which is problematic. Service and deliveries occur at this area as well

Specific Issues	*Recommendations*
A lack of separation for parent, bus, and delivery drop-off is a safety concern. (Figure 25.)	Explore options for providing better separation for these various access needs.
Bituminous concrete surfaces are in poor condition, with significant cracking and patchwork. This contributes to issues with vehicular and pedestrian accessibility and safety, as well as drainage and erosion. Painted lines and markings like crosswalks are faded and difficult to read, creating safety concerns (Figure 27.)	Repair and repave all vehicular bituminous concrete surfaces. Repaint and restripe traffic markings.
Parking is limited to 21 vehicles for the school administration, staff, and visitors. This is insufficient for a school of this size. It is likely that a lot of people are utilizing parking at the Pleasant St Church located across Cross St. (Figure 29.).	Explore options for increasing parking and expanding existing parking lot areas on site.
One catch basin in the school drop-off area was observed to be failing and a large puddle was observed during a dry period of no rain, suggesting it is clogged. The degree of cracking and erosion in the immediate area suggests that this is a serious problem and must be addressed. (Figure 28.)	Consult with a Civil Engineer to examine the catch basin and other drainage structures, and develop a repair or replacement plan.

Figure 25—Entrance at school drop-off

Figure 26—Entrance at school district offices

Figure 27—Poor condition of bituminous concrete

Figure 28—Catch basin at drop-off loop

Figure 29—Parking at school.

Figure 30—Parking at school district offices

SIDEWALKS AND PEDESTRIAN ROUTES

Nearly all of the sidewalks and pedestrian route areas are in poor condition and need to be replaced. The number of accessible routes are scarce and are further impacted by the poor quality of the surfaces. A single accessible ramp exists at the entrance by the drop-off area, but many entrances to the building do not provide accessible access points.

Specific Issues	*Recommendations*
Concrete sidewalks are in poor condition-spalling, heaving, cracking and crumbling were all observed. In many instances the damage has resulted in cracks or gaps in excess of 1/2”, rendering the routes unacceptable for MAAB or ADA access. Additionally, displacement from frost heaving has created irregularly sloped surfaces that do not meet accessibility regulations. (Figures 32, 33, 35, 36.)	Repair or replace all damaged concrete sidewalks. Provide accessible routes where necessary.
Bituminous concrete sidewalks and portions of sidewalks have been similarly damaged over time, particularly at the intersection of dissimilar surfaces, creating significant gaps. There is a portion of new bituminous concrete walkway from the parking lot to the north side of the school but it lacks an accessible entrance. (Figure 34.).	Repair or replace all damaged bituminous concrete sidewalks. Provide accessible routes to all building entrances and site amenities intended for use by the public.
There does not appear to be an ADA accessible route to access the schoolyard, which is currently accessed through the building with a step, or from the street below by way of a steep bituminous concrete walkway (Figure 35.)	Explore various design options for provide access to the upper schoolyard by way of an ADA accessible walkway.

Figure 31—Pedestrian crosswalk at school

Figure 32—Excessive gap at crosswalk and sidewalk

Figure 33—Damaged pedestrian surfaces

Figure 34-Gap at union of sidewalk materials

Figure 35—Steep slope at schoolyard access walkway

Figure 36—Poor quality of paved materials

ARCHITECTURAL ASSESSMENT

Northbridge Elementary School consists of an original three-story 1952 structure with two additions . In 1983 an addition was added to the existing building which consists of a single story core educational space with a 2 story classroom wing. In 2000 a group of modular classrooms were attached to the 1983 addition.

Overall the building is in fair condition however it is starting to show its age. Surfaces and equipment are showing signs of damage and wear. The roof is at or beyond the end of it's warranty period and serviceable life, and is due for replacement. Exterior window and curtainwall assemblies are not energy efficient and are beginning to show damage and signs of age. The building envelope is likely not thermally efficient, given the era in which the building was constructed. There are many significant accessibility issues present; which are not compliant with the current accessibility code and the ADA guidelines, which expose the school and District to risk of civil action. Generally, there are no significant hazards to life present.

Terminology

Building Condition scale of terms used throughout this report are as follows:

- "Excellent": new or nearly new condition with few or no blemishes or compromises of quality or function.
- "Very Good": highly functional condition with slight wear and tear and/or minor compromises of quality or function.
- "Good": median functional condition with noticeable wear and tear and/or compromises of quality or function.
- "Fair": below median functional condition with significant wear and tear and/or major compromises of quality or function. Seriously worn parts or elements, minor structural compromise. Possible near-future safety hazard.
- "Poor": nearly– or completely non-functional condition with major wear and tear and/or serious compromises of quality or usability. Missing parts or elements, major structural damage or condition. Immediate safety hazard or danger.

EXTERIOR

FOUNDATION

Northbridge Elementary School has two sections: the 1952 original school, and the addition built in 1983. The foundations of both areas are of similar cast-in-place concrete construction with spread footings, and both sections are rubbed and parged with an architectural finish. Both sections are, overall, in similar, fair condition, with some cracking at louver penetrations, and considerable staining of the concrete surface.

The concrete foundation extends considerable above grade to the height of the window sills. This section of wall is likely not insulated or is under-insulated, and offers inadequate thermal resistance insulation value.

Specific Issues	*Recommendations*
On the '83 wing, there is a recurring crack pattern at unit vent grille openings, at the upper corners of the opening. The cracks allow moisture to enter the wall thickness, where freeze-thaw cycles cause the moisture to deteriorate the concrete further, spalling the face and exposing deeper layers of concrete to moisture penetration. Evidence of past repair attempts are visible on the largest and deepest cracks. There are similar cracks on the '52 building, however they are much less severe. (Figures 1, 2, 3)	Undertake a concrete restoration program at all unit vent louvers where cracking exists. Remove all loose and unstable concrete material, and install new concrete repair mortar or patching cement. Consider applying an elastomeric coating or water repellant sealer to all exposed concrete to prevent further damage due to exposure to the elements.
The concrete parging has become significantly dirty due to years of accumulated weathering and grime. At some locations, mildew, mold, or lichens growth is apparent. (Figures 4, 5)	Either as part of the concrete repairs, or as a separate project, clean the concrete surface with a masonry cleaning product. Consider including application of an elastomeric coating or a water repellent sealer..

Figure 1—Cracking at unit vent grille

Figure 2—Cracking at unit vent grille

Figure 3—Cracking at unit vent grille

Figure 4-Discolored and dirty foundation wall

Figure 5—Discolored and dirty foundation wall

WALLS

The building exterior walls are clad in a combination of brick veneer, with an area of natural stone which appears to be installed as veneer, all of which is generally in good condition. Mortar joints are also generally in good condition, with a few areas of minor deterioration. Brick is laid up in a Flemish Stretcher Bond pattern on both buildings.

Based on original drawings of the building, the wall assembly appears to be brick veneer cavity wall construction most likely consisting of brick veneer, 1/2" air space, 1 1/2" insulation and concrete masonry unit (CMU) back up, which is exposed and painted for the interior wall finish. There are no weeps in the brick at the top of the concrete foundation or at lintels at heads of openings, suggesting that the brick is monolithic with the CMU back up wall; the Flemish bond pattern is likely used to "bond" the brick veneer directly to the CMU backup wall, using the turned brick to span the air space and bond into the CMU layer. If constructed as a cavity condition, there does not appear to be any provisions to manage or drain any moisture that manages to enter the cavity.

Specific Issues	*Recommendations*
There are a few cracked bricks, most notably a section at the NW corner of the 1983 wing where brick are displaced from the corner. Directly above that location, there is a vertical crack at the building corner, possibly indicative of stress due to temperature expansion of the large field of west-facing brick with no relief joints (Figures 6, 7)	Remove and repair damaged brick; tooth-in areas of repair. Repoint or repair crack above displaced brick. Assume 30 SF.
The concrete at the sill of several windows is cracked, which will allow water to penetrate and cause further spalling and breakup of the concrete if left untreated (Figure 8)	Remove loose and spalling material and seal with elastomeric concrete crack repair product or sealant. Consider cleaning and coating all concrete at the foundation with an elastomeric coating..
Some mortar joints are deteriorated, which may allow water to enter the wall and cause further damage. (Figure 9)	Undertake a building-wide masonry repointing program to identify and repoint all deteriorated joints. Assume XX SF.
The "garage" attached to the original building is in poor condition. The base of the painted exposed CMU block walls are showing signs deterioration due to exposure to moisture. The gutter at the front edge of the roof does not include a downspout; and discharges collected water to the pavement at the corner with the worst deterioration. (Figure 10)	Repaint the CMU with an elastomeric paint. Install a downspout to control the gutter discharge to grade and direct the water away so as to limit splashing. Alternatively, remove the existing garage in its entirety and replace with new construction with brick veneer to match the adjacent school building.
The soffit above the overhead door is rotted and is missing a section adjacent to the original building, suggesting a leak at the roof or roof edge. (Figures 10, 11)	Inspect the roof and gutter mounting detail to verify if any leaks are present, and make repairs as necessary.

Figure 6—Cracked and displaced brick NW corner

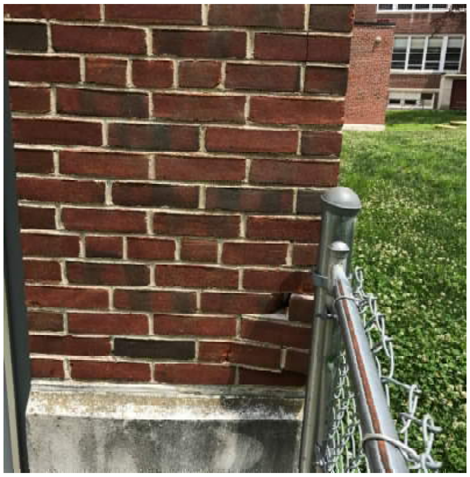

Figure 7– Cracked and displaced brick NW corner

Figure 8—Crack at precast concrete window sill

Figure 9– Degrading mortar joints typical

Figure 10—Garage attached to '52 building

Figure 11—Rotted soffit at garage

WALLS (CONTINUED)

Specific Issues	*Recommendations*
The modular classrooms are in fair to poor condition. There are a few areas where the T-111 wall paneling has rotted, exposing the inner wall to the elements. There are also areas where large sections of trim board have fallen off or are hanging from the walls (Figures 12, 13, 14).	Remove entire section of T-111 siding board that is rotten and replace with new siding; paint to match existing. Reinstall loose trim, and replace missing, sealing all joints between trim and siding with a durable exterior caulking..
The downspout at the corner of the modular building stops a foot or more above grade, allowing effluent to splash on the stone below and deteriorate the siding at the skirting. (Figure 12)	Replace the downspout to extend it to grade, with a neck angled to direct water away from the skirting.
The caulking at a control joint in the 1983 building is drying out and losing its elasticity, and losing its bond to the brick. This will potentially allow water to penetrate the wall system. (Figure 15).	Remove old caulking and completely clean out the joint. Install new caulking with a bond breaker or backer rod within the joint.

Figure 12—Rot at exterior wall of modular classrooms

Figure 13– Rot at exterior wall of modular classrooms

Figure 14—Trim board fallen of side of modulars

Figure 15—Dried out expansion joint caulking

Windows and Curtain Wall

The windows in the 1952 building are the original wood sashes with single-pane glazing, and are very inefficient thermally. The wood windows are substantially deteriorated, with glazing compound loose or missing at glass, and peeling or missing paint on the sashes and framing. Aluminum storm windows have been installed over most of the original wood windows, which is evidence of unsatisfactory performance of the windows.

The windows and curtainwall framing systems in the 1983 addition are aluminum construction with insulated glazing, and are in fair to good condition. Framing is likely not thermally broken, so the thermal performance of these windows is likely not consistent with current energy codes and expectations. Screens at the aluminum windows are in deteriorated condition at multiple locations, with loose or missing splines and sagging loose screen fabric.

Specific Issues	*Recommendations*
Given the era they were installed, aluminum window and curtainwall framing is likely not very energy efficient, and glazing likely does not perform very well to prevent heat gain. (Figure 16, 17, 18, 19))	Replace all aluminum window and curtainwall systems with new thermally broken, high-performance window and curtainwall systems with insulated Low-E glazing.
External screens at aluminum windows are deteriorated with loose screen fabric and splining. (Figure 20)	If not replaced with new windows, perform maintenance on screens by installing new fabric and splines.
Wood windows at the 1952 building are in poor condition, with significant deterioration of glazing compound caulking. Wood sashes and framing in poor condition with peeling or missing paint and rot in some places. The general condition is causing significant air leakage and creating significant heat loss in winter months. (Figure 21).	Replace all wood window with new thermally broken, high-performance window and curtainwall systems with insulated Low-E glazing.
Interior sills and trim at the wood windows in the 1952 building have deteriorating finishes; trim in general needs refinishing or replacement.	With any window replacement project, include replacement of interior wood sills and casing trim with new clear finish oak trim to match or approximate existing.
Significant staining is evident on the face of brick below some windows, suggesting that the caulking at the window or at joints in the precast sill is deteriorating, and water is washing the chemicals in the sealant down the wall. (Figure 20)	Undertake a building-wide maintenance program for all exterior caulking; replace all sealants that have been in place for 5 or more years, or which show failure.

Figure 16—Non Low-E coated window glazing

Figure 17—Non thermally broken windows

Figure 18—Non thermally broken windows

Figure 19—Loose screening and splines

Figure 20—Failing sealant stains on brick

Figure 21—Deteriorating wood windows '52 bldg.

Exterior Doors

The exterior door openings consist mostly of painted hollow metal doors and frames. It is unclear if these doors are insulated. Some doors include glass transom panels, which do not appear to be insulating glass. There is one aluminum entrance door on the '52 original building; it's unclear when this door was upgraded. There is one wooden overhead door installed on a garage addition on the 1952 building.

The majority of the hollow metal doors and frames are in fair to poor condition, with failing paint finishes that have become chalky, and corrosion along the bottom edges of most doors.. Vision panels in these doors is wired glass, which is a significant safety concern .

The aluminum entry door is in fair condition, however the lower half of the glazing has been replaced with an opaque aluminum panel, which appears to be retrofit. Hardware on this door is not well-matched to the door.

The wood overhead door is in poor condition, with damage to the face of the door, and peeling or non-existent paint along the bottom edge at grade. The wood at the bottom of the door is showing deterioration from exposure to moisture and the elements. The operation of this door was not verified during the site visit.

Specific Issues	*Recommendations*
The exterior aluminum storefront door is in fair condition, however it is not thermally efficient and appears to have required maintenance. The framing and glazing do not appear to be very thermally efficient. The door is missing portions of the bottom sweep and weather stripping (Figures 22, 23).	Replace this door and frame with a new, thermally broken door and frame, with insulating safety glass in transom and vision panels
The hollow metal doors are generally in fair to poor condition with failing paint finish and corrosion along the bottom edges. It is unclear if the doors are insulated. Some doors are missing weather stripping. Vision panels include wired glass, which is a significant danger in cases of glass breakage, and is not allowed under present building code: The wire decreases the performance of the glass, increasing the likelihood of breakage; once broken the wire represents a significant cutting or finger amputation risk. The vision panels do not comply with accessibility codes. (Figures 24, 25).	Replace all exterior hollow metal doors and frames with new thermally broken frames and insulated door panels, with insulating safety glass in transom and vision panels..
The wood overhead door is in poor condition, with damage to the finish and peeling paint. The bottom of the door has no paint finish left on it and is being damaged and weathered by exposure to the elements. The door hardware is in poor condition. (Figure 26).	Replace overhead door with new steel or aluminum door assembly with corrosion resistant construction and finish.

Figure 22—Storefront door at '52 building

Figure 23—Storefront door at '52 building

Figure 24—Exterior hollow metal doors

Figure 25—Exterior hollow metal doors

Figure 26—Wood overhead door

Louvers and Other Openings

Louvers on this building consist of two general types: horizontal blade intake/exhaust louvers, and vertical blade louvers in frames at unit ventilators. Louvers at the original building have been field painted, while those at the newer addition appear to be factory finished.

Louvers are generally in fair condition, with those near grade (serving unit ventilators) exhibiting some damage to vertical blades. Vertical blade louvers tend to not perform as well as horizontal blade louvers at preventing water infiltration.

Specific Issues	*Recommendations*
Some of the vertical blade louvers at grade for unit ventilators have bent or broken fins. Some fins are actually disconnected at the bottom and are hanging free. Vertical blade louvers do not perform well at preventing moisture from entering the building. (Figure 27).	Replace vertical blade louvers with prefinished horizontal blade louvers that are resistant to wind-driven rain..
The paint on the louvers at the '52 building is visibly deteriorated, and the substrate metal is showing through the paint at some locations. (Figure 28).	Replace vertical blade louvers with prefinished horizontal blade louvers that are resistant to wind-driven rain. Alternatively, scrape and repaint existing louvers with a durable exterior grade paint.
Various louvers have degraded and cracking caulk around the perimeter of the louver frame and staining on the face of the brick below. (Figure 29).	Undertake a building-wide maintenance program for all exterior caulking; replace all sealants that have been in place for 5 or more years, or which show failure.
Glass block above the storefront entrance door is showing signs of sealant failure at the perimeter. While the block appears to be in good condition, glass block performs very poorly thermally. (Figure 30)	Replace glass block with a new high performance thermally broken window system with insulated glazing.

Figure 27—Damage at '83 addition.

Figure 28—Degraded paint on louvers @ '52 building

Figure 29—Degraded caulking around louver typical

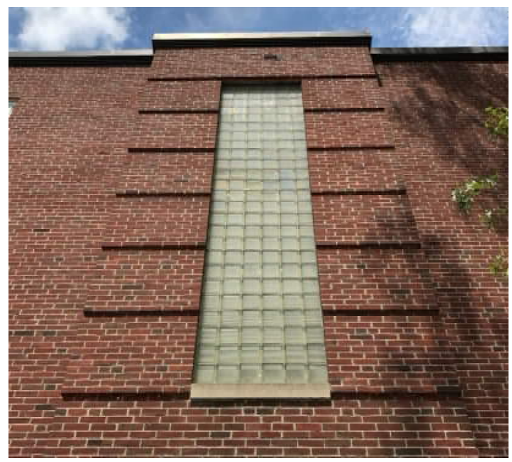

Figure 30—Glass Block Fenestration

ROOF

The roofing systems vary between the original building and the 1983 addition. The roof at the original building is a gray membrane system (likely PVC or TPO) that is heavily worn (to the point of exposing the fiber reinforcing within the membrane), and has required multiple patches. The roof drains reasonably well, and no significant ponding was observed. Continuous walk pads have been installed to all rooftop fans and equipment.

The roofing on the '1983 portion is a white PVC Sarnafil membrane, which also exhibits some patches. The maintenance manager reports that there are typically limited leaks that he is able to track down and repair, but their frequency has accelerated somewhat in recent years. The winter of 2015 saw great snowfalls, and reportedly volunteers who were removing snow from the roof may have caused punctures of the membrane during shoveling. Patches of these holes are evident.

The thickness of existing roof insulation could not be confirmed from the existing drawings or at the time of the visit. It's likely that the thickness of insulation throughout both buildings does not provide sufficient insulation value that would be consistent with current energy conservation goals and standards, or the current energy code.

Both roofs appear to be at or beyond their serviceable life spans. If original to the 1983 wing, the PVC membrane roofing there will almost certainly be beyond warranty.

Specific Issues	*Recommendations*
The roof at the 1952 roof is beyond its serviceable life, heavily worn to the point of exposing inner layers of the membrane, and patched in multiple locations. (Figures 31, 32).	Replace this roof with a new roofing system, with new insulation board meeting or exceeding Stretch Energy Code requirements and meeting the intent of the Town's Green Community initiatives. A recommended R value for insulation is R-50.
The roof of the 1983 addition features multiple areas of poor drainage and ponding, and several areas of "soft insulation" under the membrane. This could be indicative of insulation board being damaged by leaks. Water damage compromises the insulating value of insulation. There are several insulation fasteners poking through or nearly penetrating the membrane from below. (Figure 33, 35)	Replace this roof with a new roofing system, with new insulation board meeting or exceeding Stretch Energy Code requirements and meeting the intent of the Town's Green Community initiatives. A recommended R value for insulation is R-50. At the time of the replacement, verify the integrity of underlying roof decking, which appears to be wood fiber or gypsum based. Increase slope of tapered insulation to 1/4" per foot or more to resolve ponding issues. With reroofing, replace existing skylight units with energy efficient high performance units.
The flashing where the 1983 roof meets higher walls appears to be at the end of its serviceable life. Joints do not appear to be tight, and the flashing does not appear to be consistently tight to the vertical wall. Limited areas of flashing are damaged. (Figure 34).	At the time of roof replacement, consider installation of new through-wall flashing at the high walls, to extend to the face of the CMU backup wall. Include removal of brick in sections, shoring of the brick above, and reinstallation of brick after placement of the new flashing .
On the link that attaches the two buildings there is evidence of poor drainage on the roof this is apparent from the abundance of staining on the surface of the roof membrane (Figure 36).	See comments above regarding replacement of the roofing at the 1983 addition. If total replacement of the roofing is only considered long term, consider reroofing this section and increasing the taper of the insulation to resolve ponding.

Figure 31– Visible scrim layer on '52 building roof

Figure 32– Patches on '52 building roof

Figure 33– Areas of minor ponding on '83 roof

Figure 34– Undulating flashing on '83 addition roof

Figure 35– '83 roof fasteners torn through membrane

Figure 36– Poor drainage at link to '52 building

INTERIOR

FLOORING

The flooring material in the building is predominantly 12x12 vinyl composition tile (VCT), which is generally in fair to good condition, however at high traffic areas the tile is noticeably worn. There are some isolated areas of cracking and chipping. Joints in tile at slab on grade suggest there could be some issue with moisture vapor under the tile. Deteriorated and worn finishes and components in the building do not promote a sense of well-being for occupants, and can invite a general lack of respect for the building and its functions.

The tile and mastic in many areas of the 1983 building are known to contain asbestos—refer to the Hazardous Materials Survey portion of this report.

The gymnasium floor is painted concrete, which is chipping in some areas. Concrete is not a desirable athletic floor surface as it offers no resilience and can contribute to sports injuries, especially in children.

The gang bathrooms feature mosaic tile with tile cove base. The floor tile is of dated appearance and exhibits scars from relocated toilet partitions, areas of broken or missing tile, and multiple patches with tile of a different color. We could not determine if floors with drains provided positive slope.

The stage in the Cafetorium features a wood floor, which is in fair condition, however the finish is showing its age. Due to stored materials on the stage at the time of the site visit, we could not provide a thorough evaluation of the entire floor area.

In the mechanical, storage, and janitorial spaces the concrete slab on grade appears to be sound, however numerous areas of patching, filler, and considerable staining is evident. While issues are mainly aesthetic, application of a concrete topping could help prolong the service life of the concrete.

The sealed concrete floors in storage and janitorial spaces are in poor condition.

Specific Issues	*Recommendations*
Vinyl composition tile (VCT) is stained, worn, and chipped at high traffic areas. Many types and colors of floor tile are used throughout the building. VCT at many areas of the 1983 building is known to contain asbestos. (Figures 37, 38, 39).	Replace worn areas of VCT in high traffic areas such as entrance lobbies and corridors with new resilient flooring, abating any asbestos-containing flooring; especially broken and chipped tile. A low maintenance product such as sheet linoleum is recommended. Prior to covering slab, determine slab humidity and moisture emissivity levels. Remediate any moisture vapor drive issues by applying a moisture remediation topping compound to the slab prior to installation of the sports floor. Consider replacement of flooring building-wide in order to abate all asbestos-containing flooring.
The gymnasium floor is painted concrete which is badly worn. Concrete does not provide resiliency suitable for athletic type activities. (Figures 40, 41).	Install a sheet or poured resilient athletic sports floor system. Prior to covering slab, determine slab humidity and moisture emissivity levels. Remediate any moisture vapor drive issues by applying a moisture remediation topping compound to the slab prior to installation of the sports floor.

Figure 37—Delaminated & damaged VCT

Figure 38—Stained & delaminated tile at '83 bldg.

Figure 39—Worn down VCT tile at door '83 bldg.

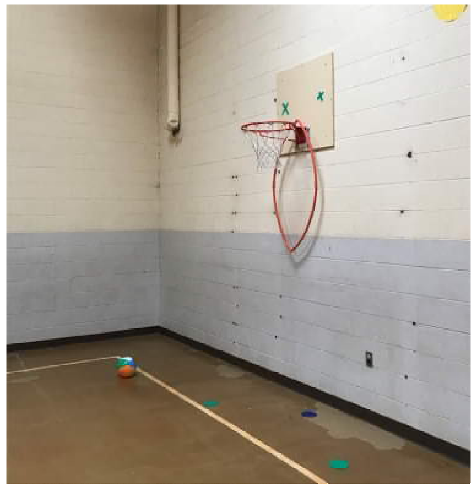

Figure 40—Worn down paint on Gymnasium floor

Figure 41—Worn down paint on Gymnasium floor

INTERIOR

FLOORING (CONTINUED)

Specific Issues	*Recommendations*
Mosaic floor tile in bathrooms in the original building is of very dated appearance, and all floors exhibit evidence of patching with tile of different color. Scars are visible where toilet partitions have been relocated. Tile base is frequently damaged, misaligned, or an inconsistent type. Grout joints are soiled and stained. Generally this contributes to an appearance that the toilet rooms are old and in disrepair. (Figures 42, 43)	Replace all ceramic tile flooring and base in the original building. At the 1983 addition, replacement of tile in rooms with patched or damaged tile. Consider updating the tile in all toilet rooms with a consistent appearance. In rooms with floor drains, if flooring replacement is warranted, install new flooring sloped to provide positive drainage to the floor drains.
In most of the areas that have sealed or painted concrete floors the surface coating has worn off in areas, exposing the concrete to increased moisture absorption, tracking of snow melt salt and chemicals by feet, and other staining. Some floors show moderate cracks and evidence of previous patching. (Figures 44, 45)	Repair and fill significant cracks in floors with an appropriate crack remediating grout or sealant. Apply new sealer or floor coating, bead-blasting the surface of the floor to remove existing applied coatings. Test slabs for humidity and moisture vapor emissivity and if warranted, include a moisture vapor reducing coating to limit vapor drive.
The stage floor is structurally performing well, however the finish is in poor condition with scuffs, gouges, and remnants of old tape or paint lines on the floor. (Figures 46, 47).	Strip and refinish the wood flooring and steps to the stage. Note that some alterations of the stage front will be required to provide either a ramp or a vertical wheel chair lift to access the stage. Refer to the Accessibility portion of Regulatory Assessment for discussion.
Wall base in most areas is resilient base or wood. There are multiple locations of missing base in both buildings. Wood base in the original building is in poor condition with staining from years of floor cleaning, splattered paint, and surface damage.. (Figure 47)	Replace missing sections of base. As part of any major flooring replacement, consider replacing all damaged base throughout both buildings.

Figure 42— Area of missing mosaic tile

Figure 43—Large area of mismatched tile

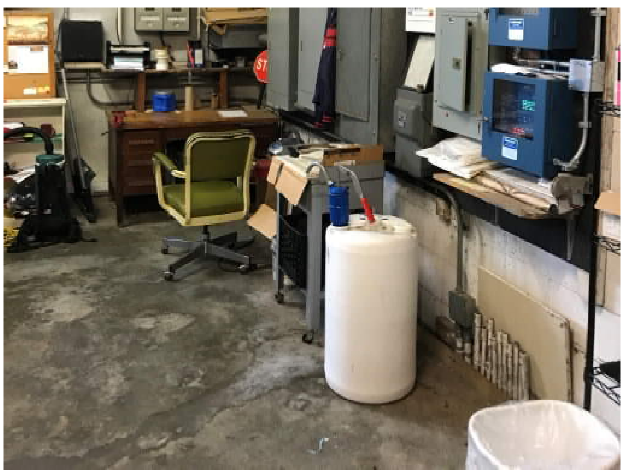

Figure 44—Concrete floor sealer worn

Figure 45—Sealed concrete floor worn away typical

Figure 46—scuffed and gouged stage floor

Figure 47—Various floor and base issues

Walls and Partitions

The interior walls at the 1952 building appear to be lath and plaster, which is consistent with the age of the building. These walls are in fair to good condition, but require repainting in several places. The walls in the 1983 addition are all concrete masonry unit (CMU) construction. Isolated cracking of CMU is evident especially in the gym, and this appears to be minor settlement cracking—refer to the structural section of this report for more discussion. Similar to the 1952 wing, most walls in the 1983 wing are in need of repainting.

Specific Issues	*Recommendations*
There are several superficial cracks in the CMU walls at various locations throughout the school; with multiple cracks at the gym. Most of the cracks follow the mortar joints vertically up the height of the wall, and some cracks traverse the face of some CMU blocks. (Figures 48, 49, 50).	Repair cracks with grout or sealant as part of building-wide painting program. Monitor cracks on a periodic basis to determine if cracks are worsening.
Paint finishes at walls throughout the building are in soiled and generally in need of refreshing. There are several areas where paint is peeling from the walls, apparently from lack of proper adhesion to the substrate (previously painted surface). (Figures 51, 52, 53).	Repaint walls throughout the building, removing all loose paint that is not properly adhered to the substrate.

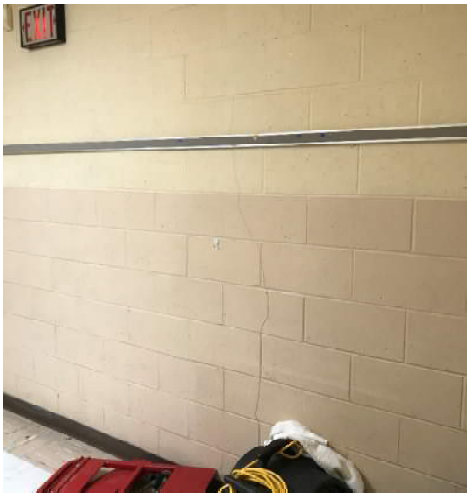

Figure 48—Crack in corridor of '83 addition

Figure 49—Crack in Gymnasium wall

Figure 50—Crack in Gymnasium wall

Figure 51—Paint pealing of plaster and lath wall

Figure 52—Paint peeling at plaster and lath wall

Figure 53—Paint pealing of plaster and lath wall

CEILINGS

The ceilings in the 1952 building are predominantly plaster, with 2' x4' acoustic ceiling panels (ACP) systems at some spaces on the lowest level. The ceilings in the 1983 addition are 2' x 4' ACP systems. The gymnasium and stage area feature exposed painted metal deck.

The plaster ceilings in the 1952 building are generally in good condition, however at isolated areas there is significant damage from leaks.

ACP ceilings throughout the school are generally in poor condition, with stains, general soiling, and visible sag of the panels, which is due to the age of the panels and the effects of humidity over a long period of time. . The exposed roof deck in the gymnasium is in good condition.

Specific Issues	*Recommendations*
There are areas of significant water damage to the plaster in the original 1952 building. The paint is blistering, and plaster is partly dislodged and missing in sections. Adjacent wall surfaces also exhibit water damage. (Figures 53, 54, 55)	Verify that the sources of leaks are resolved. Remove all loose and damaged plaster and lath. Patch underlying materials and plaster or install new gypsum wall board patches with veneer plaster to match appearance of adjacent ceiling. Repaint ceilings in their entirety (and adjacent damaged walls) to provide a consistent "like new" appearance.
ACP ceiling panels are stained, soiled, and visibly sagging within the support framing throughout the school. In some locations, edges of tiles are not supported by the framing system, or are not laying flat in the grids. Grids are showing signs of corrosion in many locations. Ceilings have generally surpassed their expected life spans. (Figure 56, 57, 58).	Verify the sources of all leaks are resolved. Replace all acoustic panel ceiling systems in the building. Humidity-resistant ceiling panels are recommended. Utilize grid types that are compatible with existing light fixtures.

Figure 54 —Flaking ceiling paint & water damage

Figure 55—Flaking ceiling paint & water damage

Figure 56—Water damaged ceiling 1st floor.

Figure 57—Sagging & stained ceiling panels.

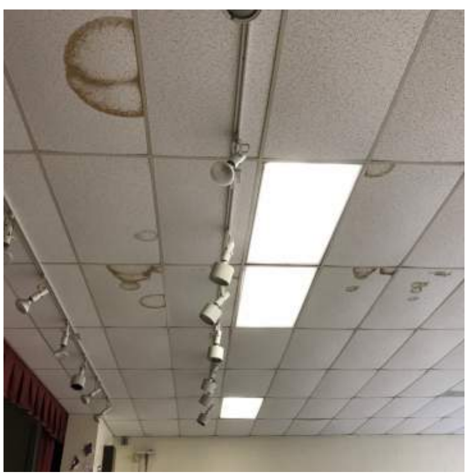

Figure 58—Stained ceiling panels in Cafetorium

Figure 59—Soiled ceiling panels at return grilles

INTERIOR DOORS

Interior doors vary between the 1952 and 1983 wings. Doors in the 1952 original building are generally steel or hollow metal at the corridors and stairs, and solid core wood at other locations. Doors in the 1983 wing are generally flush wood at public spaces and classrooms, and hollow metal doors at service and mechanical spaces. Wood doors are typically natural stain finish. Frames for all doors are typically painted hollow metal.

Although corridor and stair doors in the building appear to be substantial and self-closing, no labels were visible that would indicate these are fire rated as required by current code.

Vision panels and sidelight glazing generally include wired glass. Wired glass has been shown to represent a significant life safety hazard, as the presence of the wire within the glazing has been shown to reduce the fire and impact performance of the glass, and to represent a significant cutting hazard if located in pedestrian impact areas when the glass is broken.

Wood doors are generally in good condition. Hollow metal doors are in fair to poor condition. Hollow metal frames at doors and borrowed lites and corridor doors are in fair to good condition, however most locations need repainting.

Refer to the Regulatory Assessment section for additional discussion of code and accessibility related issues.

Specific Issues	*Recommendations*
The wood doors throughout the building are in fair to good condition, however finishes are often scratched or chipped, and door faces that don't feature mop plates have stains at the floor level from floor cleaning procedures. (Figures 60, 61).	Replace visibly damaged doors. With any significant renovations, include replacement of doors and frames where fire ratings are required. See Regulatory Assessment for code discussions.
Hollow metal doors—especially those at the 1952 wing—are approaching or at the end of their service life. Some doors show visible damage and warping of the door face. Doors in the 1952 wing are of antiquated appearance. Fire rating labels could not be found on any doors. (Figure 62)	Replace visibly damaged doors. With any significant renovations, include replacement of doors and frames where fire ratings are required. See Regulatory Assessment for code discussions.
Vision panels and sidelights commonly include wired glass. Wired glass has been shown by the Consumer Products Safety Commission to represent a significant safety concern and is no longer permitted for use in pedestrian impact zones (such as vision panels and sidelights). Wired glass reduces the strength and fire performance of the glass, and if the glass is broken represents a significant cutting or finger amputation danger.. (Figure 63)	Regardless of any planned renovations, consider replacement of all vision panels and glazing in the building with tempered or laminated safety glass. Provide fire rated safety glazing in vision panels and glazed openings at corridors and stairs.
Metal frames at doors and borrowed lights often feature chipped or soiled paint finish. (Figures 61, 62).	Glazing needs to be replaced in the borrowed lite systems to tempered glazing.

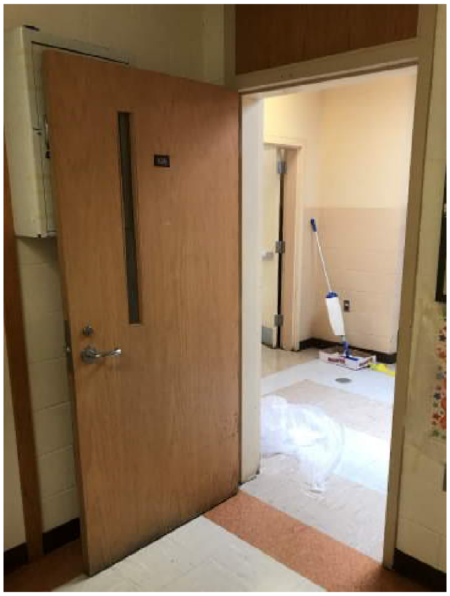

Figure 60—Typical natural finish wood door

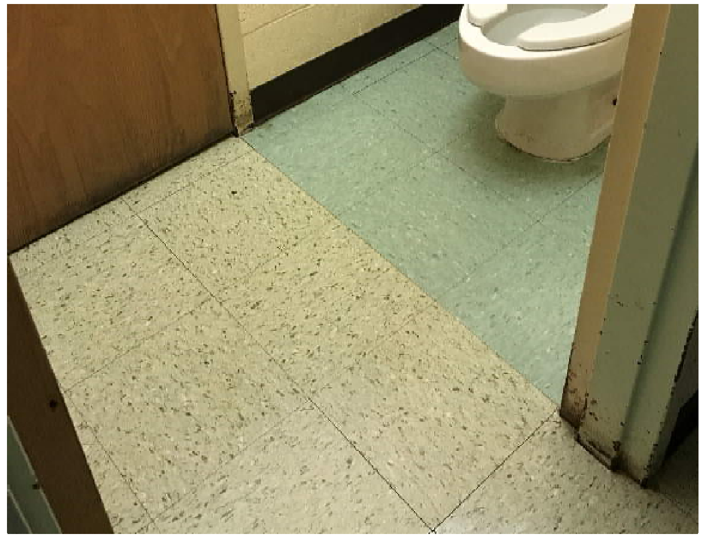

Figure 61—Soiled bottom edge of door and frame

Figure 62—Damaged face of HM door

Figure 63—Wired glass vision panel

Fixtures and Equipment

Storage in classrooms and in the building appears to be inadequate. In classrooms the tops of cabinets and shelving have been used for high-stacked storage, which can represent a hazard, however it appeared that most classrooms were in the midst of deep cleaning, so it was unclear if the storage in classrooms was "typical" for the school year.. Other rooms used for storage don't appear to be utilized efficiently. A "makeshift" partition was constructed some time ago to create general supply storage in a toilet room.

Obsolete fixtures such as board-mounted coat hooks are located in corridors; at some locations are not usable.

Classroom casework is a variety of types and quality, a mix of metal and wood, and is in varied condition given the varying age of the casework items. Original components are approaching the end of their service life and have damaged finishes.

Classrooms in the original building feature obsolete chalk boards throughout the rooms, which are no longer utilized. Marker and smart boards have been installed on top of these at many locations.

Specific Issues	*Recommendations*
Storage in the building appears to be inadequate for current needs. Classroom storage is piled high and densely on shelving; existing storage accommodations may not be efficient for current needs. (Figures 64, 65)	Undertake a storage needs study for classrooms, to identify the types of storage needed for typical classrooms. Replace storage casework in classrooms with modern storage cabinets that better meet classroom needs.
Classroom casework is nearing or at the end of its useful life. In many places, laminates are chipped or delaminating from substrate, countertop edges are delaminating, some drawer glides no longer operate smoothly. Sink cabinets do not meet accessibility requirements. (Figure 66)	. Undertake a casework replacement program to provide a consistent approach and appearance school-wide.
Classroom wall surfaces commonly feature chalk boards that are no longer used and create inefficient surfaces that are not compatible with modern teaching methods. The area of marker board surfaces is limited, and the current boards are mounted too high for smaller children to use effectively, which is limited by the existing chalk board trim (Figure 67).	Remove existing chalk and cork boards and related trim from walls; provide new marker and tack boards following repair of scars at wall surfaces. Assume two new 8' marker boards and two new 6' tack boards per classroom. Mount marker boards in grades PK thru3 at 24" AFF to bottom of board.
The 1983 lobby and some classroom wall surfaces in the 1952 building include cork tack boards and paper display within 5 feet of door openings. 527 CMR 10.09 prohibits the display of paper within 5 feet of exit doors.	Undertake a building-wide assessment and education program for faculty to verify that display of paper materials on walls meets the requirement of 527 CMR 10.09. With any classroom renovations, remove cork tack boards adjacent to door openings.
There do not appear to be a sufficient number of fire extinguishers in the 1952 building for the floor area of the building. Fire extinguishers do not appear to be mounted at the correct height per code. Extinguishers are bracket mounted in public areas, which could invite tampering or accidental damage (Figure 68).	Undertake a code analysis of fire extinguisher sizes and quantities building wide to confirm that sufficient extinguishers are provided. Verify all are mounted at code-compliant mounting height for size. Consider providing cabinet enclosures for extinguishers in high-traffic public spaces.

Figure 64—High piled classroom storage

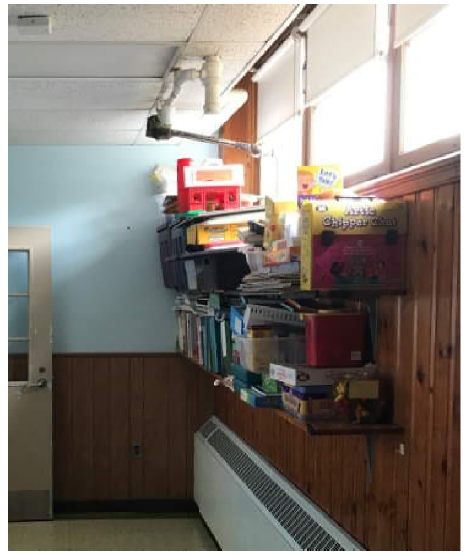

Figure 65—High Piled Storage

Figure 66—Classroom casework sink base

Figure 67—Inefficient use of teaching walls

Figure 68—Fire Extinguisher

FIXTURES AND EQUIPMENT (CONTINUED)

Specific Issues	*Recommendations*
Toilet partitions appear to have been replaced in the recent past, with solid plastic partitions. Not all partitions appear to be in compliance with ADA/ MAAB accessibility rules. Partitions are in good condition, however require some cleaning and maintenance. (Figure 69).	Perform maintenance on all toilet partitions; perform cleaning of surfaces, and replace missing and damaged components such as shoes, wall anchors, etc., to keep partitions in peak operating condition. Refer to Accessibility portion of Regulatory Compliance section of this report.
In the Gymnasium, there is no wall padding present It appears at one time there was padding on the walls at one time because the mounting hardware and Velcro tape are still visible on the walls, but the padding has been removed. (Figure 70)	Provide new wall padding from 4" above floor to approximately 6 feet above floor at each wall of the gymnasium to increase the safety of all users.
In the corridors of the second and third floor of the 1952 building there are rows of storage shelves and coat hooks. The coat hooks create a potential hazard if no coats are on them, as the sides are open and young children can easily run into them. These shelves and hooks are in poor condition. (Figure 71)	Remove old shelf and coat hook system in their entirety, and patch the walls. Install new casework "cubby" units that include enclosed coat hanging spaces.
At the Stage / Platform, portions of the performance lighting appears to have been replaced with general flood lighting bulbs. Curtains include one traveling main curtain at the proscenium, and a traveler at the back, upstage. The lighting batten is permanently attached to the roof joists making maintenance more difficult. There is no provision for projection surfaces on the stage. (Figure 72)	Replace flood lights with theatrical fixtures, or replace all stage lighting with up-to-date energy efficient theatrical fixtures with matching controls, suitable for elementary school use. Consider mounting the lighting on a batten to allow for manual lowering to facilitate aiming and maintenance of fixtures. Professionally clean and re-hang stage curtains, and adjust travelers for smooth operation. Consider providing a large-format motorized projection screen near the front of the stage.

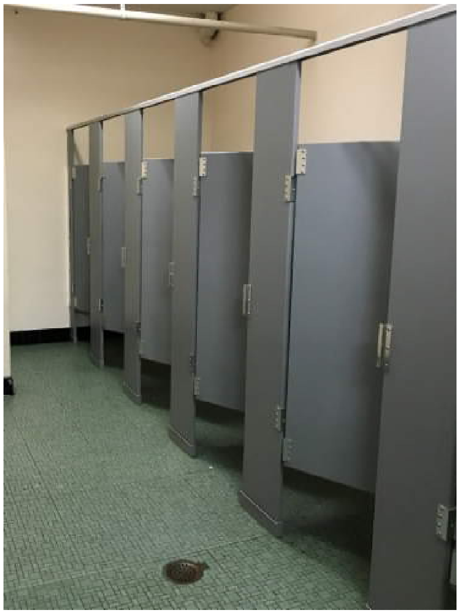

Figure 69—Toilet Partitions

Figure 70—Lack of wall pads at gymnasium

Figure 71—Shelves and coat hooks at corridor

Figure 72—Stage / Platform rigging

REGULATORY OVERVIEW FOR MASSACHUSETTS

Applicable Regulations

Buildings undergoing repairs, alterations, additions, changes in use, or relocation will be permitted under the 9th edition of the Massachusetts State Building Code (780 CMR).The base code for the 9th Edition is comprised of the following 2015 International Code Council family of codes with Massachusetts amendments:

- International Building Code (IBC)
- International Energy Conservation Code (IECC)
- International Existing Building Code(IEBC)
- International Mechanical Code (IMC)

Additional building regulations, included by reference in the base code or enforceable under Massachusetts General Law include:

- Massachusetts Fire Code (527CMR)
- Massachusetts Elevator Code (524 CMR)
- Massachusetts Plumbing Code (248 CMR)
- Massachusetts Electrical Code (NFPA 70 – NEC)

Accessibility regulations applicable to the project are the Massachusetts Architectural Access Board Rules (MAAB) (521 CMR), and the 2010 Americans with Disabilities Act Architectural Guidelines. Where these two regulations are in conflict, the regulation that provides the greater accessibility should be provided.

Finally, in addition to the sprinkler protection requirement found in the building codes, certain Massachusetts General Laws (M.G.L.s) require sprinkler protection in certain types of new and existing non-residential buildings over 7,500 gross square feet.

Scoping Requirements and Thresholds for Compliance

Of the regulations described above, three of them require special consideration since they contain specific thresholds for full compliance with the regulation. These threshold-defining regulations are:

- The International Existing Building Code (IEBC)
- 521 CMR , or the Architectural Access Board (MAAB)
- M.G.L. c.148 s.26G, or the Automatic Sprinkler System Requirements

Compliance thresholds are based on either the area or cost of proposed work in comparison to the existing building area or building value and are defined in greater detail under each specific regulation description below. Generally, when the proposed scope of work does not exceed a defined threshold, only the work being performed is required to comply with the current edition of the codes. The Americans with Disabilities Act (ADA) also contains requirements for incorporating improvements to an accessible path to Primary Function areas where alterations to that area are undertaken.

INTERNATIONAL EXISTING BUILDING CODE (IEBC)

When considering changes to an existing building, the principal guiding regulation is the International Existing Building Code (IEBC), which is enforced by the local building official. The IEBC requires that any proposed work on an existing building or portion thereof first undergo an evaluation to determine the effect of the proposed work on at least the following systems: structural, means of egress, fire protection, energy conservation, lighting, hazardous materials, accessibility, and ventilation for the space under consideration. Because no specific scope of work is being proposed as part of an existing conditions survey, this report includes a Regulatory Assessment for each building under consideration in order to determine to what degree the existing building[s] and systems comply with current regulations. It should be understood that non-compliance with current regulations does not compel corrective action. Only when a scope of work is defined can the Existing Building Code be applied to determine the applicable requirements.

Following completion of an evaluation for a proposed scope of work, a *compliance path* needs to be selected for the application of building code requirements. Owners must choose either the Prescriptive, Work Area, or Performance Compliance path and apply only the provisions of the chosen compliance path to the project.

The *Prescriptive Compliance Path* provides a broad-brush approach to existing buildings. While it may be beneficial for small renovation projects, for significant renovations it could result in requiring additional work that may not be necessary under the other compliance paths, and will not be employed for this assessment.

The *Performance Compliance Path* uses a calculation based methodology to determine the general level of life safety of a building. This path assigns numeric values to various life safety features of a building to arrive at an overall building “score”. Different building types require different scores to determine compliance or non-compliance with this path. This numeric value approach can be useful to evaluate the general life safety performance of an existing building as compared to current building regulations; because of this the Performance Compliance Path will be used to evaluate the general life safety condition of the existing facilities. Again, it should be noted that a non-compliant score does not compel corrective action – this methodology will be used to convey only how the existing building compares to current regulations.

The *Work Area Compliance* path typically offers the most advantageous approach to defining the code requirements for each portion of a building undergoing a significant renovation scope of work because it most closely correlates the required upgrades to building systems and components to that specific defined scope of work; for this reason, the Work Area compliance path will be the assumed compliance path for sake of any proposed work on the facilities, should they be pursued.

Work Area Compliance relies on identifying the type of work that is occurring throughout the building, and then applying the requirements for that type of work to the *Work Area*. The *Work Area*, as defined by the IEBC is:

> *That portion or portions of a building consisting of all reconfigured spaces as indicated in the construction documents. Work area excludes other portions of the building where incidental work entailed by the intended work must be performed...*

Using the definitions provided in the Code, the scope of work identified for existing buildings or portions thereof is categorized as follows:

Repairs:"...include the patching or restoration or replacement of damaged materials, elements, equipment, or fixtures for the purpose of maintaining such components in good or sound conditions with respect to loads or performance requirements..."(IEBC s. 502.1) Examples of repair would be repair or replacement of damaged plaster finishes, tiled or wood floors, replacement of wood trim, replacement of door hardware, replacement of any plumbing, heating, electrical ventilating, air conditioning, refrigerating, and fire protection equipment as well as the repair of any exterior masonry or roofing system, and repair of damaged structural elements with "in kind" elements or equipment. Chapter 6 of the IEBC is applicable to all Repairs.

Level 1 Alterations: "...include the removal and replacement or the covering of existing materials, elements, equipment, or fixtures using new materials, elements, equipment, or fixtures that serve the same purpose." This classification could be described as replacement with different systems, materials, or equipment, but providing the same function. Replacing wood flooring with a tile floor system, or proving all new kitchen equipment to replace outdated equipment would be considered Level 1 Alterations. (IEBC s. 503.1). Chapter 7 of the IEBC is applicable to all Level 1 alterations.

Level 2 Alterations: "...include the reconfiguration of space, the addition or elimination of any door or window, the reconfiguration or extension of any system, or the installation of any additional equipment." (IEBC s. 503.1). Chapter 7 and Chapter 8 of the IEBC is applicable to all Level 2alterations.

Level 3 Alterations: "...apply where the work area exceeds 50 percent of the *building area*."

Change of Occupancy: "A change in the use of the building or a portion of the building. A change of occupancy shall include any change of occupancy classification, any change from one group to another group within an occupancy classification or any change in use within a group for a specific occupancy classification."

Additions: "An extension or increase in floor area, number of stories, or height of a building structure."

Under the work area compliance path, each of the classifications of work described above require increasing levels of compliance with the building code. Repairs have the least restrictive requirements, essentially permitting replacement-in-kind for any repaired elements. Additions require the highest level of compliance and require that the addition comply with the building code as for new construction. The other classifications require increasing compliance and, for each classification, define prescriptive requirements for specific systems and elements such as means of egress, mechanical, electrical and fire protection systems, building materials, fire resistance ratings, and structural systems.

Work Areas, including Level 2 Alterations and Additions would be required to be identified on the construction documents. Repairs and Level 1 alterations, because they do not include reconfigured spaces, are not considered part of the "Work Area" defined by the code. Although there may be substantial repairs and Level 1 alterations throughout the building, this distinction is important; when the Work Area exceeds 50% of the floor area, the provisions for Level 3 alterations become applicable.

In addition to alterations that affect the building spaces and areas, it is necessary to understand how alterations affect the building structural system and elements. Where alterations change individual gravity or lateral load resisting elements, each element requires evaluation to determine if the alteration will result in additional loads and, if so, the element must be altered or replaced. For buildings with concrete or unreinforced masonry walls, when the work area exceeds 50 percent of the floor area, than all of the structural concrete or masonry walls (both gravity and lateral load resisting walls) are required to be secured to the floor or roof deck above.

Sprinkler Protection Requirements

There are two separate regulations that govern the requirements for sprinkler protection: the IEBC and M.G.L. c.148 s.26G.

In many occupancy types including schools, IEBC requirements—enforced by the building official— would require sprinklers where the *work area* (defined previously) exceeds 50 percent of the floor area and the work area is required to be provided with sprinklers in accordance with the International Building Code, Chapter 9 (provided there is sufficient water available to supply the system).

M.G.L. c.148 s.26G, which is enforced by the fire official, requires enhanced sprinkler protection in certain buildings which total more than 7,500 gross square feet in aggregate (adding all stories) floor area. This requirement is applicable when "major" alterations or modifications are occurring to a building. Because the statue is not specific about the definition of a "major" alteration, a memo issued on October 14, 2009 by the Fire Safety Commission's Automatic Sprinkler Appeals Board provides additional guidance on this subject.

This memo indicates two factors that are used to determine whether "major" alterations are taking place: a Nature of Work factor and a Scope of Work factor.

If the **Nature of the Work** is such that the effort to install sprinklers is substantially less than if the building was intact, or is the nature of work merely minor repairs and cosmetic work, or is the Nature of the Work "major" in its scope. There is no specific definition of "major", but the memo offers examples including: the demolition of existing ceiling or installation of suspended ceilings; the removal and installation of subflooring, exposing the building framing (not merely the replacement of finished flooring); the reconstruction or repositioning of walls; and the removal or relocation of a significant portion of the buildings HVAC, plumbing, or electrical systems involving penetrations of walls, floors, or ceilings.

If the **Scope of Work** affects a substantial portion of the building, or the cost of work is moderate in comparison to the total cost of work, than the Scope of Work criteria would be applicable to a project. The Scope of Work Thresholds defined in the memo are as follows:

1. Alterations or modifications are reasonably considered major when the work affects ***33 percent or more of the total gross square footage of the building*** (all floor levels combined). Again, no specific definition of alterations or modifications is provided, but we can infer from other codes and definitions that alterations relate specifically to the reconfiguration of spaces, or the "major" Nature of Work examples above.
2. Alterations or modifications are reasonably considered major when the total cost of the work (excluding costs related to sprinkler expenditure) is equal to or greater than ***33 percent of the assessed value of the subject building.***

The memo then indicates that if the Nature and Scope of work criteria and the Scope of Work (either 1 or 2) is satisfied, than the Board would consider the alterations "major" and thus require the installation of a sprinkler system.

Accessibility

In Massachusetts, the state developed Architectural Access Board Regulations (521 CMR) replace the accessibility provisions of the building code. Like the other sections of the building code, the accessibility regulations are enforced by the building official. However, waivers or variances to 521 CMR cannot be granted by the building official. Rather, any such appeal or variance request needs to be reviewed and accepted by the Architectural Access Board.

Chapter 3 of the Architectural Access Board Regulations outlines the scoping thresholds for the applicability of accessibility guidelines for a project. Specifically, section 3.3 describes three different dollar value thresholds for any proposed *additions to, reconstruction, remodeling*, and *alterations* or *repairs* to existing buildings as compared to the buildings “full and fair cash value”. The full and fair cash value is generally the assessed value of the building as recorded with the town assessor’s office. This section then lists the applicability requirements for each dollar value threshold:

- For work costing less than $100,000, only the work being performed is required to comply with Accessibility regulations.
- A scope of work that is more than $100,000, but less than 30% of the full and fair cash value requires the incorporation of an accessible public entrance, toilet, telephone, and drinking fountain.
- When a scope of work costing more than 30% of the full and fair cash value is proposed, the entire facility is required to be brought into compliance with the accessibility guidelines. This threshold also clarifies that additions costing more than 30% of the current building value would require the entire existing facility to be brought into compliance.

Two additional sections in Chapter 3 require special consideration. Section 3.4 requires that when a building undergoes a change from a private use to a public use, an accessible entrance must be provided, even if no work is being performed. This is significant because it is the *only compulsory requirement* found in the building or accessibility codes when no other work is proposed or anticipated.

Finally, 521 CMR section 3.9 allows for variances to the accessibility guidelines for Historic Structures listed on the State or National Register of historic places. The process of documenting and being granted variances for a broad range of accessibility requirements based on historic status is a complicated and nuanced process that requires careful coordination with the Access Board. The Board reviews the proposed variances to ensure that people with disabilities are granted dignified access to the primary function spaces of the building with as little influence on the historic fabric of the building as is feasible.

The Americans with Disabilities Act Architectural Guidelines (ADAAG 2010) is part of a federal civil rights regulation that is also applicable to work on existing buildings depending on their intended users. ADA applicability would be under Title II for any state or local government entity, program, service, or facility whereas Title III is applicable for any places of public accommodation or commercial facilities that fall into specifically defined categories. The requirements for buildings under the ADA are enforced by the US Department of Justice, and enforcement is typically through investigations or civil lawsuits resulting from complaints filed by individuals or organizations for perceived violations of the Act. These actions can be brought against a building Owner at any time, as opposed to building codes which are typically enforced when an building permit is granted for a proposed scope of work.

Title II (State and Local Governments) of the ADA requires that all services, programs, and activities provided by state and local government entities be accessible to people with disabilities. This does not require that all existing facilities be brought into compliance, but that barriers be removed in existing buildings such that all public services or programs, when viewed in their entirety, are accessible. Any proposed work on an existing building under Title II would be required to comply with ADA guidelines to the maximum extent feasible and new facilities would be required to comply completely with the guidelines. Additionally, when work is proposed that affects a primary function of an existing facility, the path of travel to that area, including the bathrooms, drinking fountain, and telephones on that path would need be made accessible as well. There are exceptions in Title II for structural impracticability, historic buildings, certain types of spaces, and disproportionality of cost for alterations to an accessible path serving a primary function area which all require close consideration for each scope of work in each building under consideration.

Title III facilities are privately owned buildings that are either defined as places of public accommodation (business open to the public and fall into one of 12 categories listed in the ADA) or as commercial facilities (non-residential facilities that are not defined as places of public accommodation). The requirements for alterations to these facilities are similar to those as for Title II facilities, including the provisions for an accessible path serving a space that is considered a primary function. The most significant difference is that Title III existing facilities are not held to the same "removal of existing barriers" standard or program and service access standards as Title II facilities. Still, any proposed work in a Title III building would be required to comply to the maximum extent feasible, taking all of the applicable exceptions into consideration.

Energy Conservation

The 2015 International Energy Conservation Code (IECC) replaces the Chapter 13 requirements of the building code. This specialized code, also enforced by the building official, is intended to regulate the design and construction of facilities with respect to the use and conservation of energy over the life of the building. Chapter 5 of the IECC controls the alteration, repair, addition, and change of occupancy of existing buildings and has no authority to require the removal, alteration, or prevent the continued use of any existing buildings. For communities that have adopted the Massachusetts STRETCH Code, increased reductions in energy consumption beyond the baseline thresholds established in the 2009 IECC would be required for new buildings and additions to existing buildings only. Alterations to existing buildings in these communities would be subject to the requirements of Chapter 5 of the 2015 IECC, described below.

Section C501.6, states that no provisions of the code relating to the repair, alteration, restoration or change of occupancy shall be mandatory for historic structures provided a report is submitted to the building official demonstrating that compliance with the provision would threaten, degrade, or destroy the historic fabric function of the building. While this is not a categorical exemption to the energy conservation code, it does place a high degree of value on the historic fabric of the building.

Proposed additions to existing structures would be required to comply with the IECC as for new construction. Alterations to existing buildings also need to comply with the IECC as for new construction and cannot make the existing building less conforming to the code than it was prior to the alteration. In general, this means that when a building envelope or mechanical system or piece of equipment is modified as part of a scope of work, the replacement elements or systems are required to comply with the IECC for new construction. There is no provision, based on the work area or dollar value of alterations, which would require an existing facility to be brought into full compliance with the energy code.

Certain specific scopes of work that may be limited to one portion of the building, whether considered as additions or alterations to existing facilities, are required to consider the effect on the entire facility. The addition of windows or other fenestration, including skylights, needs to incorporate all of the building fenestration areas in the total allowable fenestration area. Alternatively, a project could pursue the Total Building Performance method, requiring energy modeling, but would then need to demonstrate full compliance with the IECC as for new construction. Otherwise, alteration and addition compliance requirements are limited to the work performed.

Although not part of the energy conservation code, it is important to note that in Massachusetts, M.G.L. chapter 7C, section 29 requires that for any new construction or renovation of a public facility where the cost exceeds $25,000 and includes systems or elements that affect energy or water consumption, a life-cycle cost analysis (LCCA) would be required to be performed. This analysis is required to determine the short and long term costs and feasibility of different technologies or systems considered as part of the scope of work. These systems and components would include both energy consuming equipment as well as building envelope elements or systems, since all of these elements affect energy consumption.

Fire Safety Code

In addition to the building code (780 CMR), there is also a Massachusetts Comprehensive Fire Safety Code (527) which is enforced by the local Fire Official. The Fire Code is generally enforced as a safety maintenance code, intended to prevent or remedy any conditions that may be fire hazards and to provide safety requirements to protect the public in the event of a fire. This code also regulates the installation and maintenance of fire safety equipment such as sprinkler systems and fire detection systems.

The Fire Code does apply to both new and existing conditions, but this code states that all installations of equipment completed prior to the adoption of the code are deemed to be in compliance. However, the fire official still has the authority to require compliance with the code for any condition which constitutes an imminent danger.

For the purposes of this report, it is important to note that the Fire Code also states that any provision related to the construction, alteration, movement, enlargement, replacement, repair, equipment, use, occupancy, removal, or demolition of buildings shall effectively be regulated by the building code and is subject to the jurisdiction of the Building Official. As such, this report contains minimal references to the Fire Code and will rely on the IEBC requirements outlines above for evaluation and consideration of existing conditions and any proposed scope of work.

Historic Structures

Massachusetts General Laws require that any project that requires funding, licensing, or permitting from a state agency to be reviewed by the Massachusetts Historical Commission (MHC). This review and the regulations that guide the review are designed to identify historic properties, evaluate the impact of a proposed project, and consult with the invested parties to avoid, minimize, or mitigate any adverse effects of the project. Once a general scope of work is defined, a Project Notification Form should be filed with the MHC to determine if any historical or archeological considerations will need to be addressed as part of the project.

Beyond the State of Massachusetts regulations, the US Department of the Interior has developed a set of standards and guidelines related to the maintenance, repair, replacement of historic materials, and the design of alterations or additions to historic structures. The *Standards* are a set of concepts related to these different treatments, whereas the Guidelines offer design and technical recommendations in applying the Standards.

In order to determine which Standards and Guidelines are applicable, it is necessary to determine which treatment of a historic structure would be pursued for a given facility. A proposed scope of work outlined in a Capital Improvements Plan generally falls into work that could be classified as one of the following Treatments:

- **Preservation**: the maintenance and repair of existing historic materials and retention of a property's form as it has evolved over time.
- **Rehabilitation**: recognizing the need to alter or add to a historic property to meet continuing or changing uses while retaining the properties historic character.

In working to develop a defined scope of work as well as a sustainable capital improvement plan for the future, the Standards for Preservation and Rehabilitation as well as the Guidelines for the Treatment of Historic Properties will serve as guiding documents in the development of such plans. Compliance with the Guidelines is not obligatory, but will provide the best practice approach to both maintaining the building and allowing for alterations to serve the intended end use. It also serves to demonstrate that the Owner values and wishes to maintain the historic integrity of a building, reinforcing the appropriate application of any historic structure exceptions to accessibility and building code regulations.

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INTRODUCTION

This Regulatory Assessment will seek to convey to what degree the Northbridge Elementary School, in its current condition, complies with current building codes and regulations. The Assessment does not attempt to define a scope of work, but rather highlight specific non-complying conditions and identify which conditions would require correction if a repair, alteration, addition, or change of use were to be proposed for the facility.

It is important to note that a building or a portion of a building does not require correction simply because it does not comply with current codes; any building that is legally occupied and adequately maintained can remain so without bringing the building into full compliance with codes and regulations. This *principal of non-conforming rights* (that a newly adopted regulation cannot impose the undue burden of compliance on legally existing occupancies) is reflected in how the codes identify to what degree existing buildings must be brought into compliance when a scope of work is proposed. The greater the scope of work, the greater the burden of compliance with a given code or regulation will be required.

For some regulations, such as 521 CMR Accessibility Rules or the Massachusetts special sprinkler provisions of MGL c.148 s.26G, these compliance thresholds are "hard lines" comprised of specific dollar value thresholds. When determining the dollar value thresholds for compliance, the cash value of the building is used as the basis for the determining the requirements for compliance. The full and fair cash value of the *building*, as determined from the Town Assessor's online database is calculated as follows:

Total Assessment (Land + Improvements)	$4,500,100
Land	-$ 267,300
Detached Improvements	-$ 396,900
Building Only—Full and Fair Cash Value	**$3,835,900**

This value will be used later in this Assessment to calculate the applicable compliance thresholds.

The gross floor area (GFA) of the building is 50,688 SF.

The Existing Building Code uses the type of work and the affected area to determine when increasing levels of compliance are required. When considering a proposed scope of work for the building, a careful consideration of the various degrees of compliance will need to be considered. Refer to the Regulatory Overview section of this report for a more detailed description of the various compliance paths outlined in the Existing Building Code.

The International Existing Building Code (IEBC)

The Performance Compliance path described in the IEBC provides a simple yet comprehensive overview of the general life safety aspects of a building. Although designed as a building code compliance path, it can also be used as an assessment tool. This assessment will utilize the value and scoring based method of the Performance Compliance path to assign a score to the building as it is currently configured and maintained. The systems and basis for scoring are based on the building code for new construction (the International Building Code or IBC) and scores are determined by the degree of compliance with the IBC for various systems. Similar to previous comments, a failing score in any category as part of an assessment does not compel any corrective action - it simply indicates how the building would be viewed under current codes. It is intended to illustrated the relative general and life safety performance of the existing building.

The original 1952 building features loadbearing masonry interior and exterior walls, with limited steel framing, and combustible roof decking. None of the structure is protected with fireproofing. This portion of the building is best described as Type III-B per the code. The 1983 addition similarly includes load-bearing masonry, steel roof framing, and is generally non-combustible construction. None of the structure is protected with fireproofing. This is best described as Type II-B per the code. The modular classrooms are a combination of steel and wood frame construction with no fireproofing; this is best described as Type V-B construction. Given these varying construction types, it is not appropriate to apply the worst condition to all three areas. This assessment considers each area separately, and applies a weighted average to the building as a whole.

The resulting scores for Northbridge Elementary (Refer to Table 1401.9 on the following pages) are typical of buildings of that time period. The modular classroom units generally performed slightly better than the remainder of the building due to the relative building size, even though they're a lesser construction type.

The overall configuration of the means of egress systems and components (doors, corridors, stairs) is generally in compliance with the code. The most significant improvement that would increase the general life-safety of the building would be to provide fire sprinkler protection throughout the building.

Sprinkler Protection Requirements

The building is not equipped with fully automatic sprinkler systems in compliance with M.G.L. c.148 s.26G. All public schools larger than 7500 Gross Square Feet (GSF) would require a sprinkler system to be installed throughout the facility if any major alterations or any additions are planned. In Massachusetts, a building's fire area includes all portions of the building enclosed by the exterior walls regardless of interior sub-division with fire walls or fire barriers. This is important to understand because the sub-division of a building into separate fire areas (with fire walls and fire barriers, for example) would not be considered a strategy to avoid inclusion of fire sprinklers in Massachusetts.

In consideration of any future alterations or additions to the building: to be considered a "major alteration" the scope of work would have to meet both the "nature of work" and "scope of work" criteria.

For the scope of work criterion, the Division of Fire Services provides two separate thresholds - if the project exceeds one of these thresholds, then the project is considered "major" in scope. For Northbridge Elementary School, if the work area exceeds 16,727 square feet (33% of the total building area of 50,688 square feet) ***or*** if the cost of work exceeds $1,265,847 (33% of the value of the building, calculated previously), the project *scope* would be considered "major". These thresholds should be

Table 1401.7 Summary Sheet - Building code - *1952 ORIGINAL CONSTRUCTION*

Existing Occupancy	E	Proposed Occupancy	E		
Year building was constructed	1952	Number of Stories	3	Height in feet	32' - 6"
Type of construction	IIIB	Construction Type Factor (IEBC)	3.5		
Percentage of open perimeter increase	80%	Area per floor	5,810 / 5,810 / 5,810		
Completely Supressed	No	Corridor wall rating	0 hour		
		Type	N/A		
Compartmentation	No	Required door closers	Yes		
Fire resistance rating of vertical opening enclosures	No				
Type of HVAC system	Unit vents	, serving number of floors	3		
Automatic fire detection	Yes	Type and location			
Fire alarm system	Yes	Type	Mircomm 10000		
Smoke control	No	Type			
Adequate exit routes	Yes	Dead ends	Yes	Length in feet	39
Maximum exit access travel distance	85 feet	Elevatory controls	No		
Means of egress lighting	Yes	Mixed Occupancies	No		
Standpipes	No	Patient abilty for self preservation	N/A		
Incidental use	Yes	patient concentration	N/A		
Smoke compartment less than 22,500 sq. ft.	No	Attendant-to-patient ratio	N/A		

Safety Parameters	Fire Safety (FS)	Means of Egress (ME)	General Safety (GS)
1401.6.1 Building Height	-1	-1	-1
1401.6.2 Building Area	13	13	13
1401.6.3 Compartmentation	0	0	0
1401.6.4 Tenant and Dwelling Unit Separations	0	0	0
1401.6.5 Corridor Walls	-5	-5	-5
1401.6.6 Vertical Openings	-21	-21	-21
1401.6.7 HVAC Systems	-5	-5	-5
1401.6.8 Automatic Fire Detection	-4	-4	-4
1401.6.9 Fire Alarm System	-5	-5	-5
1401.6.10 Smoke Control	****	0	0
1401.6.11 Means of Egress	****	2	2
1401.6.12 Dead Ends	****	-2	-2
1401.6.13 Maximum Exit Access Travel Distance	****	11	11
1401.6.14 Elevator Control	-4	-4	-4
1401.6.15 Means of Egress Emergency Lighting	****	****	0
1401.6.16 Mixed Occupancies	0	0	0
1401.6.17 Automatic Sprinklers	-12	-6	-12
1401.6.18 Standpipes	0	0	0
1401.6.19 Incidental Use	0	0	0
1401.6.20 Smoke Compartmentation	0	0	0
1401.6.21.1 Patient Ability for Self-preservation	****	0	0
1401.6.21.2 Patient Concentration	****	0	0
1401.6.21.3 Attendant-to-patient Ratio	****	0	0
Building Score - total value	-44	-27	-33

kept in mind as one considers any future alterations to this building.

The "nature of work" criterion is less specific, but essentially if any work is being done that would not make the installation of sprinklers substantially more difficult, it would be considered “major” in nature. Examples include the demolition of ceilings, walls, or floor decking exposing the structural framing.

INTERNATIONAL ENERGY CONSERVATION CODE

The Town of Northbridge has adopted the Massachusetts STRETCH Energy Code. As such, any alterations to the energy consuming systems or building envelope would be required to comply with the International Energy Conservation Code (IECC), 2015 Edition. The IECC requires that any alteration, renovations, or repairs to an existing building conform to the provisions of the code, but does not require that unaltered portions to comply. Essentially this means that any system or portion of a system that is altered would be designed in compliance with the energy code, but there is no provision

Table 1401.7 Summary Sheet - Building code - *1983 Addition*

Existing Occupancy	E	Proposed Occupancy	E		
Year building was constructed	1983	Number of Stories	1	Height in feet	21'-10"
Type of construction	IIB	Construction Type Factor (IEBC)	3.5		
Percentage of open perimeter increase	75%	Area per floor	31,089		
Completely Supressed	NO	Corridor wall rating	0 hours (doors have closers)		
		Type	CMU		
Compartmentation	No	Required door closers	Yes		
Fire resistance rating of vertical opening enclosures	No vertical openings				
Type of HVAC system	Unit vent	, serving number of floors	1		
Automatic fire detection	Yes	Type and location			
Fire alarm system	Yes	Type	Mircomm 10000		
Smoke control	No	Type			
Adequate exit routes	Yes	Dead ends	No	Length in feet	
Maximum exit access travel distance	130 feet	Elevatory controls	No		
Means of egress lighting	Yes	Mixed Occupancies	No		
Standpipes	No	Patient abilty for self preservation	N/A		
Incidental use	Yes	patient concentration	N/A		
Smoke compartment less than 22,500 sq. ft.	No	Attendant-to-patient ratic	N/A		

Safety Parameters	Fire Safety (FS)	Means of Egress (ME)	General Safety (GS)
1401.6.1 Building Height	1	1	1
1401.6.2 Building Area	-9	-9	-9
1401.6.3 Compartmentation	0	0	0
1401.6.4 Tenant and Dwelling Unit Separations	0	0	0
1401.6.5 Corridor Walls	-5	-5	-5
1401.6.6 Vertical Openings	2	2	2
1401.6.7 HVAC Systems	-5	-5	-5
1401.6.8 Automatic Fire Detection	-4	-4	-4
1401.6.9 Fire Alarm System	-5	-5	-5
1401.6.10 Smoke Control	****	0	0
1401.6.11 Means of Egress	****	10	10
1401.6.12 Dead Ends	****	2	2
1401.6.13 Maximum Exit Access Travel Distance	****	7	7
1401.6.14 Elevator Control	0	0	0
1401.6.15 Means of Egress Emergency Lighting	****	****	0
1401.6.16 Mixed Occupancies	0	0	0
1401.6.17 Automatic Sprinklers	-12	-6	-12
1401.6.18 Standpipes	0	0	0
1401.6.19 Incidental Use	0	0	0
1401.6.20 Smoke Compartmentation	0	0	0
1401.6.21.1 Patient Ability for Self-preservation	****	0	0
1401.6.21.2 Patient Concentration	****	0	0
1401.6.21.3 Attendant-to-patient Ratic	****	0	0
Building Score - total value	-37	-12	-18

that the entire facility be brought into full compliance. The project may incorporate additional energy performance improvements beyond those required by the code.

A Life Cycle Cost Analysis (LCCA) would be required to be conducted for any alterations to an Energy System in accordance with M.G.L. c. 149 s. 44m.

Standards for the Treatment of Historic Structures

The building and property is not listed on, nor is it eligible for listing on the National or State Registry of Historic Places.

Table 1401.7 Summary Sheet - Building code - *2000 Modular Classrooms Addition*

Existing Occupancy	E	Proposed Occupancy	E		
Year building was constructed	2000	Number of Stories	1	Height in feet	12' - 8"
Type of construction	VB	Construction Type Factor (IEBC)	7		
Percentage of open perimeter increase	75%	Area per floor	8,422		
Completely Supressed	NO	Corridor wall rating	0 hours (doors do not have closers)		
		Type	Wood studs (panel finish)		
Compartmentation	No	Required door closers	No		
Fire resistance rating of vertical opening enclosures	No vertical openings				
Type of HVAC system	Roof top air handling	, serving number of floors	1		
Automatic fire detection	No	Type and location			
Fire alarm system	Yes	Type	Mircomm 10000		
Smoke control	No	Type			
Adequate exit routes	Yes	Dead ends	No	Length in feet	
Maximum exit access travel distance	94'-0" feet	Elevatory controls	No		
Means of egress lighting	Yes	Mixed Occupancies	No		
Standpipes	No	Patient abilty for self preservation	N/A		
Incidental use	Yes	patient concentration	N/A		
Smoke compartment less than 22,500 sq. ft.	No	Attendant-to-patient ratio	N/A		

Safety Parameters	Fire Safety (FS)	Means of Egress (ME)	General Safety (GS)
1401.6.1 Building Height	0	0	0
1401.6.2 Building Area	4	4	4
1401.6.3 Compartmentation	0	0	0
1401.6.4 Tenant and Dwelling Unit Separations	0	0	0
1401.6.5 Corridor Walls	-5	-5	-5
1401.6.6 Vertical Openings	2	2	2
1401.6.7 HVAC Systems	5	5	5
1401.6.8 Automatic Fire Detection	-4	-4	-4
1401.6.9 Fire Alarm System	-5	-5	-5
1401.6.10 Smoke Control	****	0	0
1401.6.11 Means of Egress	****	10	10
1401.6.12 Dead Ends	****	2	2
1401.6.13 Maximum Exit Access Travel Distance	****	10	10
1401.6.14 Elevator Control	0	0	0
1401.6.15 Means of Egress Emergency Lighting	****	****	0
1401.6.16 Mixed Occupancies	0	0	0
1401.6.17 Automatic Sprinklers	-12	-6	-12
1401.6.18 Standpipes	0	0	0
1401.6.19 Incidental Use	0	0	0
1401.6.20 Smoke Compartmentation	0	0	0
1401.6.21.1 Patient Ability for Self-preservation	****	0	0
1401.6.21.2 Patient Concentration	****	0	0
1401.6.21.3 Attendant-to-patient Ratio	****	0	0
Building Score - total value	-15	13	7

Table 1401.9 Final Evaluation Formula

1952 Original Construction Evaluation:							
					Score	Pass	Fail
-44 (FS)	-	*29*	(MFS)	=	-73		X
-27 (MS)	-	*40*	(MMS)	=	-67		X
-33 (GS)	-	*40*	(MGS)	=	-73		X
1983 Addition Evaluation:							
					Score	Pass	Fail
-37 (FS)	-	*29*	(MFS)	=	-66		X
-12 (MS)	-	*40*	(MMS)	=	-52		X
-18 (GS)	-	*40*	(MGS)	=	-58		X
2000 Addition Evaluation:							
					Score	Pass	Fail
-15 (FS)	-	*29*	(MFS)	=	-44		X
13 (MS)	-	*40*	(MMS)	=	-27		X
7 (GS)	-	*40*	(MGS)	=	-33		X
Area Weighted Average Evaluation:							
					Score	Pass	Fail
-34 (FS)	-	*29*	(MFS)	=	-63		X
-9 (MS)	-	*40*	(MMS)	=	-49		X
-15 (GS)	-	*40*	(MGS)	=	-55		X

Accessibility

The original portion of Northbridge Elementary School has remained relatively untouched since the original construction in 1952, prior to the adoption of the ADA and the MAAB rules. The building, including the addition in 1983 and the modular classroom addition in 2000, is generally in poor compliance with the accessibility requirements of 521 CMR—The Massachusetts Architectural Access Board or MAAB Rules, or the 2010 Americans with Disabilities Act standards. Any proposed alterations or additions will likely require alterations to the existing building to increase accessibility.

If the cost of any proposed work exceeds $100,000, the code requires that an accessible entrance, toilet room, drinking fountain, and telephone (if drinking fountains and telephones are provided) be provided, in addition to the compliance requirements of the proposed work. When the cost of work exceeds 30% of the full and fair cash value (calculated previously), then the entire facility will be required to comply with the MAAB Rules. For Northbridge Elementary School, this 30% threshold value would be $1,150,770.

Because the building is a public school, owned and operated by the local municipality, it is considered a Title II facility under the Americans with Disabilities Act (ADA). As such, any proposed work to the facility would be required to comply to the maximum extent feasible with the ADA Architectural Guidelines (the ADAAG) except where it would be structurally impractical. The ADA does not have a threshold for requiring full facility compliance, but does require that when there are alterations to an area of "primary function" (including classrooms, gymnasium, cafeteria, and administration areas), than the path of travel as well as the restrooms, telephones, and drinking fountains serving the areas of primary function are also accessible.

Several accessibility deficiencies or non-compliant conditions were noted at Northbridge. If a major alteration exceeding the 30% threshold were undertaken, these items would require correction to comply with MAAB.

Specific Issues	*Recommendations*
There is no accessible route provided from the vehicular drop-off zone to the main entrance; there are no curb ramps to allow wheel chair access to the main doors. (Figures 1, 2).	A curb cut ramp should be created at the main drop off loop in front of the main entry doors.
There are 36 parking spaces on the property, 21 of which serve the school building. There are no handicapped designated parking spaces serving the school, and there is no accessible route from the parking area to a building entrance.	Restripe the parking lot to create a van accessible parking space with required signage to comply with ADA. Provide a concrete walkway from the parking lot to connect to the sidewalk at the drop-off area.
The main entrance includes three pairs of doors, each with 36" wide leaves. A call button/ intercom is provided at accessible height, however no motorized operators are provided on any exterior door (Figure 3). All secondary entrance doors also have two 36" wide leaves (Figure 4). Concrete walks are in good condition.	Provide a motorized operator on one of the doors at the main entry to guarantee that the door will comply with opening force requirements.

Figure 1—Non-accessible entrance no curb cut ramp

Figure 2—Non-accessible entrance no curb cut ramp

Figure 3—Main entry doors

Figure 4—Typical non-accessible side door

Figure 5—Playground surface and equipment issues

ACCESSIBILITY (CONTINUED)

Specific Issues	*Recommendations*
There is a playground in between the school and the district offices. The play surface under the equipment is wood chips, which does not comply with MAAB accessible path requirements, (Figure 5, previous page).	Refer to Site Assessment section of this report for discussion of replacing playground surfacing.
Nearly all of the required egress doors feature a frost pad with a step down to grade. All doors intended to be used as entrances should be accessible from the exterior. A percentage of doors are required to provide an accessible means of egress from the building to a public way. (Figure 6).	Adjust grading of sidewalks and adjacent landscaped areas leading up to exterior frost pads at doors to provide an accessible path. Ideally, slopes should be maintained at less than 1:20. See Site Assessment section for additional discussion
There is no elevator to provide access to the second and third floor of the original classroom wing. There are no other means to reach the upper levels except stairs.	Install an elevator in a hoistway constructed exterior to the existing building to provide access to the second floor classroom wing.
The vestibule for the connector corridor at the modular classrooms has ample room 27'-0" +/- there is also one classroom door entering / exiting into this vestibule. This configuration is acceptable per current IBC code requirements (Figure 7).	None.
There is no accessible path from the Cafetorium floor to the stage platform. The only way to access the stage is by the stairs at the front of the stage or the stairway accessed from outside the Cafetorium space. (Figure 8, 9,10).	Install an enclosed vertical wheelchair lift to access the platform stage.

Figure 6—Exit stair discharge door with step

Figure 7—Vestibule entry for modular connector

Figure 8—Stair at side of stage / platform

Figure 8—Stair at side of stage / platform

Figure 9—Stairs at the front of cafetorium stage

Accessibility (Continued)

Specific Issues	*Recommendations*
Single-user toilet rooms are not in compliance with current regulations, and in most if not all cases lack the needed floor clearances for the fixtures and door. Grab bars are not provided at the toilets. Sinks are located too close to toilets. Accessory mounting heights and locations are not in compliance with code. (Figure 10).	Demolish inaccessible toilet rooms entirety including doors, frames, and walls. Construct new toilet rooms meeting current MAAB and ADA requirements.
The boy's gang toilet rooms feature floor mounted urinals, which are not compliant with current rules. Sinks in the boy's toilet room appear to lack proper floor clearance due to location of the urinal on the perpendicular wall. Sinks generally do not include insulation on the supply and drain piping in the knee-space. There are no paper towel dispensers within reach of the sinks. There is no compliant toilet stall; grab bars were added to a standard-size stall as an attempt at compliance. The gang bathrooms are not in compliance with current MAAB regulations (Figure 11).	Reconfigure toilet rooms to provide accessible toilet stalls, possibly including reduction in total fixture count. This would include demolition and replacement of floor slabs to facilitate relocation of underground piping.
The faculty toilet rooms and the toilet in the Nurse's suite is not accessible; the configuration of walls does not provide the required floor clearance for any fixture or door openings. At the nurse's office the sink is located outside of the toilet room. (Figures 12, 13).	Demolish inaccessible toilet room in its entirety including doors, frames, and cmu walls. Provide new toilet room layout that is in compliance with current MAAB regulations.
Drinking fountains in the building are not the high/ low configuration required by ADA, and do not provide knee space for forward approach. Also in some cases there are electrical panels mounted above the drinking fountains (Figure 15).	Remove all non compliant drinking fountains and replace them with the high / low configuration that is compliant with the current MAAB regulations. Refer to Electrical Assessment for discussion of replacement and relocation of electrical panels.

Figure 10—Non accessible toilet room.

Figure 11—Non accessible gang bathroom typical

Figure 12—Non-accessible toilet in nurses suite

Figure 13—Non-accessible toilet in nurses suite

Figure 14—Typ. non accessible single user toilet room.

Figure 15—Non-accessible drinking fountains

ACCESSIBILITY (CONTINUED)

Specific Issues	*Recommendations*
None of the casework at the sinks in the classrooms is accessible; there is no knee-space provided for forward approach. (Figure 16).	Refer to the Architectural assessment for discussion of replacement of casework. Provide sinks with compliant kneespace and piping insulation as appropriate to the age of the intended users..
The toilet room at a Pre-K or Kindergarten classroom is not compliant. A child size toilet is provided, however the side clearance to the adjacent wall exceeds the limit for children of this age. Side clearance to the sink is not provided. Makeshift grab bars are included, however they do not meet dimensional requirements. The toilet paper dispenser is mounted above the grab bar, and is not within reach ranges; MAAB does not permit installation of accessories above grab bars.. Piping below the sink is not insulated or guarded, and the faucets on the sink are not compliant.There was an attempt made to make it accessible by adding grab bars at the toilet. However it still does not meet MAAB current regulations. is our interpretation that the occupants in these classrooms are not covered by accessible gang facilities on the floor; if these facilities are provided for a specific use such as pre-K or Kindergarten-only, in-class use, they should be accessible. (Figure 17).	Demolish inaccessible toilet room in its entirety and provide an accessible toilet room meeting the reach ranges and dimensional requirements for the age of the intended users..
Handrails at stairs in the 1953 building do not feature required top or bottom extensions, especially at sidewall handrails. (Figure 18).	Replace handrails with types that include top and bottom extensions at walls. Provide handrails at kneewall betwee flights that are continuous around the end of the kneewall guard and between flights.
Some doors are located in narrow recesses and do not provide the required 18” pull side clearance. The doors do feature lever-type door hardware and closers in the ’52 building & ’83 addition (Figure 19).	Conduct a building-wide survey to identify accessible route to each space. Confirm that all doors required to be accessible comply with floor approach clearance requirements. At non-compliant doors, renovate adjacent walls to provide required clearances at each side of doors.
Some doors in the building feature round knob hardware trim, which is not compliant. Lever trim is required. (Figure 20)	Conduct a building-wide survey and replace all knob-type hardware with latch or locksets that feature lever style trim.

Figure 16—Typical non-accessible sink in classroom

Figure 17—Non-accessible classroom toilet

Figure 18—Typical egress stairwell handrails

Figure 19—C.R. door lacking pull side clearance

Figure 20 —Knob type door handles

STRUCTURAL ASSESSMENT

The purpose of this report is to describe, in broad terms, the structure of the existing building; to comment on the condition of the existing building; and on the feasibility of renovations and expansion of the school

SCOPE

- Description of existing structure
- Comments on the existing condition
- Comments on the feasibility of renovation and expansion.

BASIS OF REPORT

This report is based on our visual observations during our site visit on July 10, 2017 and our review of the available existing drawings of the Renovations and Additions prepared by J. Williams Beal Sons & Pokus Architects dated October 19, 1981. No architectural or structural drawings from this set were available to us. Drawings of the original construction were also not available to us at the time of this study.

During our site visit, we did not remove any permanent finishes or take measurements. Our understanding of the structure is limited to the available drawings and our observations of the structure.

BUILDING DESCRIPTION

The building is located on Cross Street in Northbridge, Massachusetts. The original structure is a three story structure. We were not able to identify the structure of the school; but, it is likely similar to the Balmer Elementary School structure, with steel joists supporting thin metal form deck slab at the floor and wood fiber on gypsum panels at the roof, with the joists supported on unreinforced load-bearing masonry walls. The original school was constructed in 1952.

The addition is a single story structure, built in 1983. The roof is metal deck supported on open web steel joists spanning between load bearing masonry walls.

The lowest floor level of the original structure and the addition is a concrete slab-on-grade. The foundations are traditional reinforced concrete strip footings.

The modular classrooms are single story and are constructed of light steel members and wood joists.

EXISTING CONDITIONS

Based on our observations, the school structure is functioning well based on the age of the school.

- We observed signs of past water leakage at a few locations.
- Cracks in the interior masonry walls were evident at some locations, and in the exterior masonry façade where evidence of past repairs was also observed.
- Minor spalling of concrete at the corners of the foundations was also observed.
- We did not observe any signs of foundation settlement, or any cracking of slabs due to vibrations from footfall and traffic on the supported floor slab.

PROPOSED SCHEMES

Based on our observations and analysis of the existing drawings, no structural upgrades are required for any proposed renovations of limited scope that do not invoke any required structural modifications. The extent of the code required structural upgrades is dependent on the extents of the proposed renovations. The following is a description of the compliance methods that may be triggered depending on the extents of the proposed schemes as dictated by other disciplines.

GENERAL CODE CONSIDERATIONS

If any repairs, renovations, additions or change of occupancy or use are made to the existing structure, an evaluation of the structure is required to demonstrate compliance with 780 CMR, Chapter 34 "Existing Building Code" (Massachusetts Amendments to The International Existing Building Code 2015). The intent of the IEBC and the related Massachusetts Amendments to IEBC is to provide alternative approaches to alterations, repairs, additions and/or a change of occupancy or use without requiring full compliance with the code requirements for new construction.

The IEBC provides three compliance methods for the repair, alteration, change of use, or additions to an existing structure. The three compliance methods are as follows:

1. Prescription Compliance Method.
2. Work Area Compliance Method.
3. Performance Compliance Method.

For more information on these compliance methods, refer to the Regulatory Overview section of this report. A summary of the structural implications of the various compliance methods follows.

Prescriptive Compliance Method

In this method, compliance with Chapter 4 of the IEBC is required. As part of the scope of this report, the extent of the compliance requirements identified are limited to the structural requirements of this chapter.

Alterations

- If the proposed alterations of the structures increase the demand-capacity ratio of any lateral load resisting element by more than 10 percent, the structure of the altered building or structure shall meet the requirements for the code for new construction.
- Where alterations increase the design gravity loads by more than 5 percent on any structural members, those members would have to be strengthened, supplemented, or replaced.

Additions

Additions can be designed to be structurally separate or structurally connected to the existing building. Based on the project scope, the following structural issues must be addressed: The requirements applicable to the existing structure for connected additions are similar to those for altered structures.

- All construction of all addition areas must comply with the code requirements for new construction in the IBC.
- For additions that are not structurally independent of an existing structure, the following rules apply to the existing building:
  - The existing structure and its addition - acting as a single structure - must meet the requirements of the code for new construction for resisting lateral loads. Exceptions allow

that structural elements that only resist lateral forces whose demand-capacity ratio is not increased by more than 10 percent may remain unaltered.

- Any load-bearing structural element for which the addition or its related alterations causes an increase in the design gravity load of more than 5 percent shall be strengthened, supplemented or replaced. This may invoke or cause additional renovation work to access the structure.

In order to avoid invoking required structural modifications to the existing building, any planned additions should be designed as structurally separate buildings.

Work Area Compliance Method

In this method, compliance with Chapter 5 through 13 of the IEBC is required. the extent of alterations has to be classified into LEVELS OF WORK based on the scope and extent of the alterations to the existing building. Refer to the Regulatory Overview section of this report for an explanation of the Levels of Work.

This report assumes that planned renovation schemes would affect more than 50 percent of the floor area and invoke Level 3 Alteration requirements, and the following analysis is based on that assumption. In addition, there are requirements that have to be satisfied for additions to the existing structure.

Level 3 Alterations

- Any existing load-bearing structural element for which an alteration causes an increase in the design gravity load of more than 5 percent shall be strengthened, supplemented or replaced.
- If the proposed structural alterations of an existing structure exceed 30 percent of the total floor and roof areas of an existing structure, we have to demonstrate that the altered structure complies with the IBC for wind loading and with reduced IBC level seismic forces.
- Existing anchorage of all unreinforced masonry walls to the structure have to be evaluated. If the existing anchorage of the walls to the structure is deficient, the tops of the masonry walls will require new connections to the structure.
- If the proposed structural alterations of an existing structure are less than 30 percent of the total floor and roof areas of the existing structure, the project must demonstrate that the altered structure complies with the loads applicable at the time of the original construction (or the most recent major renovation) and that the seismic demand-capacity ratio is not increased by more than 10 percent on any existing structural element. Those structural elements whose seismic demand-capacity ratio is increased by more than 10 percent must be strengthened, supplemented, or replaced in order to comply with reduced IBC level seismic forces.
- Anchorage of all unreinforced masonry walls to the structure have to be evaluated.

Additions

- All additions shall comply with the requirements for the code for new construction in the IBC.
- Any existing gravity, load-carrying structural element for which an addition or its related alterations cause an increase in design gravity load of more than 5 percent shall be strengthened, supplemented or replaced.
- For additions that are not structurally independent of any existing structures, the existing structure and its additions, acting as a single structure, shall meet the requirements of the code for new construction in the IBC for resisting wind loads and IBC Level Seismic Forces (may be lower than loads from the Code for New Construction in the IBC), except for small additions that would not

increase the lateral force story shear in any story by more than 10 percent cumulative. In this case, the existing lateral load resisting system can remain unaltered.

Performance Compliance Method

Following the requirements of this method for the alterations and additions may be onerous on the project because this method requires that the altered existing structure and the additions meet the requirements for the code for new construction in the IBC.

SUMMARY

The existing school structure appears to be performing well. All of the structural components that are visible appear to be in sound condition. The cracks in the interior masonry walls and the minor spalling of concrete that was observed are not a structural concern. We would recommend that these cracks in the masonry walls and spalls in the concrete foundation walls be repaired as part of the regular maintenance program.

The compliance requirements of the two Prescriptive and Work Area Compliance methods are very similar in most respects for a major renovation. The Prescriptive Compliance Method would be more restrictive, as it would likely require that the existing lateral load resisting systems of the existing building meet the requirements of the code for new construction of the IBC, even for small increases of design lateral loads. Based on this, we would recommend the Work Area Compliance Method for the project.

Any major proposed renovations and additions would likely require that the structure be updated to meet the requirements for the Code for New Construction. This may require addition of some shear walls, connecting the floor and roof diaphragms to the existing masonry walls and the clipping of non-structural walls to the structure. All of the existing masonry walls would have to be adequately connected to the roof and floor structure.

HEATING, VENTILATING, & AIR CONDITIONING (HVAC) ASSESSMENT

Executive Summary

Presently, the HVAC Systems serving the building are as follows:

- Gas-fired Heating Hot Water Boiler
- Gas-fired Steam Boiler
- Unit Ventilators with Hot Water and Steam Heating Coils
- Both General and Dedicated Exhaust Systems
- Terminal Hot Water and Steam Heating Units
- Roof and Inline Mounted Exhaust Fan Systems
- Pneumatic Control System
- Destratification Ceiling Fans

The steam heating system serves the original 1952 building and the hot water boiler serves portions of the original building as well as the 1983 addition. More recently, a modular building was added and connected to the existing school and is provided with dedicated packaged rooftop air-handling units.

In general, the HVAC systems of the original and 1983 buildings are far beyond their expected service lives and require updating. The current installations comply with code, and are adequately sized to support the existing building layout. All proposed renovation/new construction options will require the installation of new HVAC equipment dedicated to serve the new areas.

Hot Water Heating Plant

The building hot water heating plant is located in the main level boiler room in the original building and consists of two (2) gas-fired cast iron sectional boilers; one that produces heating hot water and is manufactured by "HB Smith" with 8 sections (approx. 1342 MBH Input) and one that produces steam and is manufactured by "Burnham" model V912A (2367 MBH Input). (Figure 1) The boilers appear to be provided with all code-required safety controls and the general boiler installation appears to be code compliant. The boilers were originally fed with heating oil but have since been converted to natural gas.

Base-mounted oil pumps are abandoned in the space and communicate to an abandoned underground oil storage tank. Assuming this fuel oil system is original to the building, the underground tank should be removed and inspected to avoid/determine any potential pollution concerns.

Heating hot water is circulated throughout the building within a fiberglass- insulated combination copper and schedule 40 steel piping system. Steam and condensate are circulated throughout the original building within an insulated schedule 40 steel piping system. The steam piping system insulation appears to have been installed recently, but was not included on any of the elbows or fittings. (Figure 2) The 1982 addition is served heating hot water from two (2) base-mounted circulator pumps piped in parallel for redundancy; these pumps have 3 HP motors with wall-mounted variable frequency drives for varying the pump speeds to match the zone heating load. (Figure 3)

Flue gases from each boiler are vented to the outdoors via a common insulated breeching system that communicates with a masonry chimney for termination above the roof. The insulation on this breeching system may contain asbestos and should be tested/abated. This common vent breeching system includes a barometric damper within the boiler room to enhance the stack effect in the vertical masonry chimney.

Combustion air is provided to the boiler room via two (2) outdoor intake louvers that are each ducted to grilles located high and low within the space; this condition is in compliance with the building code and is sufficiently sized for the equipment within the room.

All components of the heating plant are antiquated and beyond their expected service life.

Specific Issues	*Recommendations*
Insulation associated with the Heating Plant breeching system may contain asbestos.	Test and abate all insulation as required for removal of toxins within the educational environment.
Abandoned fuel-oil system may be a cause for pollution concerns beneath the ground.	Remove/ test fuel-oil system as required to alleviate all pollution concerns.
Damaged and missing hot water and steam piping insulation within boiler room and likely throughout building.	Add and replace with new insulation as required for complete system coverage.

Figure 1

Figure 2

Figure 3

Classroom, Admin, & Media Center HVAC:

Generally, all regularly occupied spaces within the building are provided with heating and ventilation from unit ventilators within each space. Many of the unit ventilators are floor-mounted along an exterior wall with outdoor air and exhaust louvers and a hot water heating coils; the remaining units are horizontal unit ventilators with hot water heating coils that are ducted to fresh air intake hoods on the roof. All regularly occupied spaces are also tied into a general exhaust system to maintain a neutral building pressure by means of roof-mounted exhaust fans and duct distribution systems. The unit ventilators have all surpassed their expected service lives and operate at efficiencies significantly lower than that of current technologies. (Figures 4, 5, 6)

Specific Issues	*Recommendations*
Existing unit ventilator systems do not utilize demand control ventilation to limit the amount of Outdoor Air introduced based on space CO2 levels for energy conservation and current code compliance.	Replace existing unit ventilators and associated control systems with current technologies for compliance with the current building code and general energy efficiency.
No supplemental Hot water heating units are installed for maintenance of unoccupied heating space temperature set-points to avoid running the unit ventilators when unnecessary	Provide supplemental hot water heating terminal units within the space as the primary occupied and unoccupied heating source.

Gymnasium:

The Gym space is provided with two (2) horizontal unit ventilators with hot water coils ducted to roof-mounted fresh air intake hoods. These unit ventilators deliver air high in the space for heating and ventilating purposes while low-wall exhaust grilles communicate to roof-mounted exhaust fans for maintenance of a neutral building pressure. Although these systems are not provided with cooling capabilities, they appear to be adequate for heating and ventilating the space. De-stratification fans are installed at the ceiling to enhance the mixing of air within the tall space. All HVAC equipment serving the gymnasium has exceeded its anticipated service life and operates at efficiencies significantly lower than that of current technologies. (Figure 7)

Specific Issues	*Recommendations*
Existing systems do not utilize demand control ventilation to limit the amount of Outdoor Air introduced based on space CO2 levels for energy conservation and current code compliance.	Replace existing air-handling and control systems with current technologies for compliance with the current building code and general energy efficiency.
No supplemental hot water heating units are installed for maintenance of unoccupied heating space temperature set-points to avoid running the unit ventilators when unnecessary.	Provide supplemental hot water heating terminal units within the space as the primary occupied and unoccupied heating source.

Figure 4

Figure 5

Figure 6

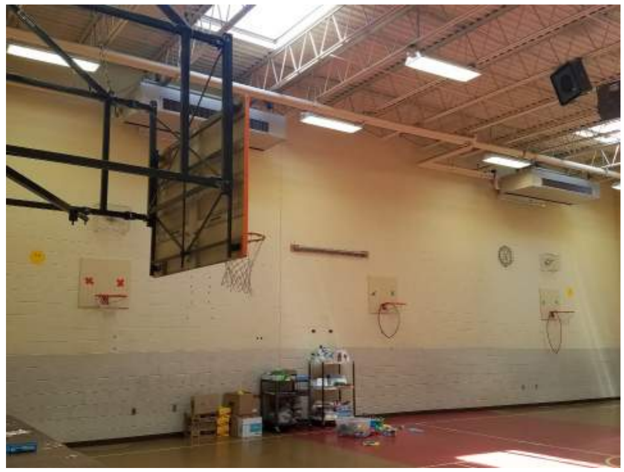

Figure 7

CAFETORIUM:

The Cafetorium space is provided with heating and ventilation from three (3) horizontal unit ventilators with hot water heating coils mounted high in the space. Roof-mounted exhaust fans provide general exhaust to the space via high space grilles above the stage and low-wall grilles in the cafetorium space for maintenance of a neutral pressure within the space. These units appear to be original to the building and have surpassed their expected service lives.

Specific Issues	*Recommendations*
Existing unit ventilator systems do not utilize demand control ventilation to limit the amount of Outdoor Air introduced based on space CO2 levels for energy conservation and current code compliance.	Replace existing unit ventilators and associated control systems with current technologies for compliance with the current building code and general energy efficiency.
No supplemental hot water heating units are installed for maintenance of unoccupied heating space temperature set-points to avoid running the unit ventilators when unnecessary.	Provide supplemental hot water heating terminal units within the space as the primary occupied and unoccupied heating source.

PUBLIC AND PRIVATE TOILET ROOMS:

All toilet rooms within the building are provided with hot water or steam terminal heating unit for space heating. All toilet rooms are also provided with general exhaust systems connected to roof-mounted exhaust fans. All systems have surpassed their expected service lives. (Figure 8)

Specific Issues	*Recommendations*
None.	None.

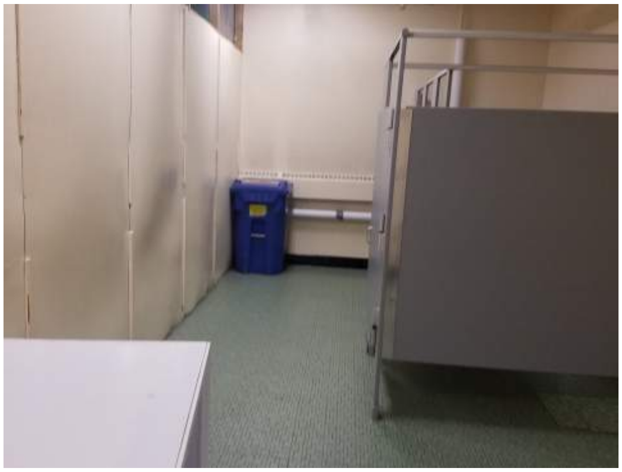

Figure 8

Corridors, Entryways, and Stairwells:

All Corridors, Entryways, and Stairwells are provided with hot water heating or steam heating terminal units such as: cabinet unit heaters, convectors, and baseboard radiators. There did not appear to be any means of ventilation within the corridors. All systems have surpassed their expected service lives. (Figures 9, 10)

Specific Issues	*Recommendations*
Code-required ventilation for Corridors is not provided.	Add a mechanical means of ventilation to the corridors.

Automatic Temperature Controls:

A pneumatic control system is utilized in the Northbridge Elementary School. An air compressor is installed in the boiler room and provides compressed air to the central control panel and individual components throughout the building. (Figure 11) Many spaces are provided with two (2) pneumatic temperature sensors; one for use during occupied building schedule periods and one for unoccupied building set-back temperatures. (Figure 12) In general, the controllability and dependability of pneumatic control systems are lacking and do not compare to current electronic communication technologies.

Specific Issues	*Recommendations*
Pneumatic Control System air leaks were noted in various spaces throughout the building and at the boiler room control panel.	Replace control system entirely with Direct Digital Control System.

Figure 9

Figure 10

Figure 11

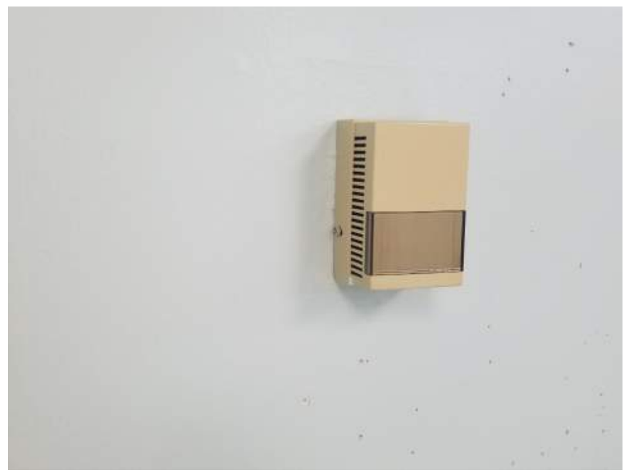

Figure 12

ELECTRICAL ASSESSMENT

Executive Summary

Presently, the majority of the systems are original vintage and although most are functioning, they are beyond the end of their serviceable life. There are two services to the building. One that serves the main structure and a second that serves the modular classrooms that have been added.

The power distribution system is in poor condition. Most of the lighting systems have been upgraded to fluorescent, however, the lighting is not in good condition.

The fire alarm system is obsolete and in poor condition, and there is no emergency generator. Emergency lighting is accomplished with battery units.

It is our recommendation, taking into consideration the age and general condition of the existing equipment, that all electrical systems be replaced with new energy efficient, code compliant systems, including fire alarm, emergency standby power, lighting, and power distribution.

Power Distribution System

There are two services to the Northbridge Elementary School, one for the main building which is fed underground from a pole riser on a utility pole rated at 1000 amperes, 120/208 volt, 3 phase, 4 wire (Figure 1) and one that serves the modular classroom addition which is fed overhead from a utility pole rated at 400 amperes, 120/240 volt, 1 phase (Figure 2).

Receptacles in kitchen are generally not GFI protected.

Typical classrooms have minimal receptacles resulting in the use of extension cords and plug strips.

GFI protection of receptacles is not compliant.

Specific Issues	*Recommendations*
Main building switchgear is beyond its serviceable life, and in poor condition.	Upgrade service equipment and provide with transient voltage surge suppression and replace all panelboards with exception to the modular classrooms throughout the facility. Extend and reconnect existing branch circuits to new panelboards.
GFI protection is non-compliant.	Add GFI outlets/breakers for devices within 6' of a water source and protect all 15A and 20A devices in the kitchen.
Lack of receptacles.	Add receptacles for computer equipment and A/V that has been added over the years.

Emergency Stand-By System

The facility does not contain an emergency stand-by generator. Emergency lighting is accomplished using battery units with either integral heads or remote heads. (Figure 3) Existing signs are provided with integral batteries and self diagnostics. (Figure 4) The condition of the emergency lighting varies from poor to good condition. The lack of generator means there is no ability to provide freeze protection in the case of a power outage, leaving the facility vulnerable to freezing pipes and potential water damage.

Specific Issues	*Recommendations*
Battery units and exit sign condition vary and require maintenance on each unit. There is no generator at the facility.	Provide a new emergency stand-by generator and a normal/emergency distribution system that will serve emergency lighting, life safety loads, and optional stand-by loads. The existing battery units can be eliminated and maintenance will be limited to the generator and transfer equipment only.

Figure 1

Figure 2

Figure 3

Figure 4

Interior Lighting

The corridor lighting consists of 1x4 surface wraparound fixtures with (2) T8 lamps controlled with local switches. (Figure 5)

The typical classroom has three rows of pendant wraparound fixtures with (2) T8 lamps controlled by row with (3) local switches. A ceiling occupancy sensor also controls lights. (Figure 6)

The cafetorium lighting consists of recessed 2x4 acrylic troffers. The platform has incandescent track lighting. All lighting is switched controlled, with dimmer switches for the platform fixtures. (Figure 7)

The kitchen has recessed 2x4 lensed troffers with acrylic lens and (2) T8 lamps controlled with (2) local switches. The hood has incandescent globes without guard with compact fluorescent lamps.

The gym has 2x4 suspended fluorescent high bay with (3) T5HO lamps on local switches. (Figure 8)

The media center and offices have recessed 2x4 fixtures with (2) T8 lamps on local switches.

The modular classroom consists of 2x4 acrylic recessed troffers with fluorescent lamps and occupancy sensor control.

The lighting consists of utility grade fixtures added or retrofitted over the years and is generally in fair condition. However, the wiring and switches are original, with the addition of occupancy sensors in some locations.

Specific Issues	*Recommendations*
Lighting fixtures are not energy efficient.	Replace existing lighting throughout the building with LED fixtures and provide an automated lighting control system with occupancy sensors and daylight dimming sensors to reduce energy usage and comply with the latest energy code.

Figure 5

Figure 6

Figure 7

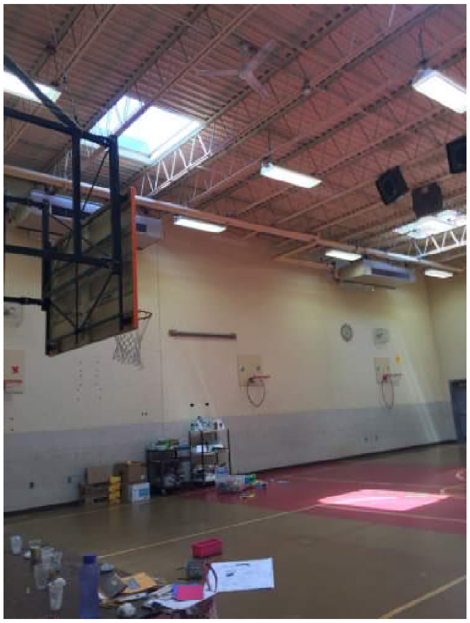

Figure 8

Exterior Lighting

HID wall packs exist on the main building (Figure 9) and fluorescent wall packs existing on the modular building (Figure 10). However, some exterior doors do not have a light fixture.

Exterior fixtures are in poor condition.

The exterior lights are controlled with time clocks.

Specific Issues	*Recommendations*
Lighting fixtures are lacking in Parking Areas.	Provide LED cut-off fixtures for roadway and parking areas.
Lighting fixtures are not energy efficient, and in poor condition.	Provide building mounted LED sconces over all exterior doors. Connect to emergency power or provide remote battery backup.

Fire Alarm System

The fire alarm system consists of a Mircomm 10000 non-addressable control panel located in the Electric Room (Figure 11). An exterior pull station and strobe is located at the main entrance. The form of alarm transmission is via a AES Intellinet radio master box with exterior antenna (Figure 12). The exterior master box with pull lever is still in place with a red beacon above.

The audible/visual signal devices consist of horns and strobes. The strobes are not ADA compliant and there were some that were not compliant with NFPA72. (Figure 13)

Detection coverage is minimal. An educational use group with no sprinklers should be provided with full coverage.

Heat detectors exist in the boiler room, media center, gym, cafetorium, platform, kitchen and toilet rooms. The building does not have a sprinkler system.

Pull stations exist at exterior exit discharge doors.

The fire alarm system, has poor coverage and it does not comply with current codes which require voice evacuation throughout the school. The system should be replaced under a renovation program.

Specific Issues	*Recommendations*
Fire alarm system is non-addressable and in poor condition. Voice evacuation is required in E-use group.	The fire alarm system should be replaced.

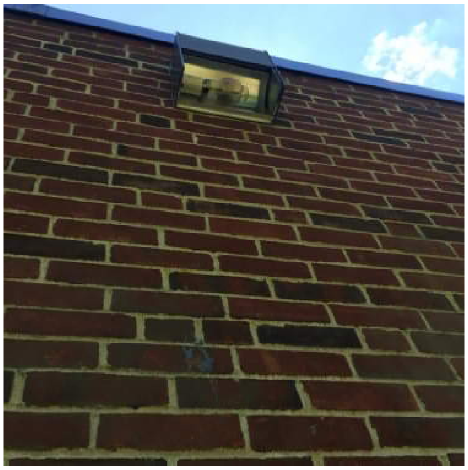

Figure 9

Figure 10

Figure 11

Figure 12

Figure 13

TECHNOLOGY AND COMMUNICATIONS ASSESSMENT

Executive Summary

The technology and communication systems within the Northbridge Elementary School reflect a similar strategy to the Balmer Elementary School. Investments in a wide area network strategically connecting all the district schools to the High School, enhancements to the wireless network, cloud based computing using Google Chromebooks, and upgraded security systems are all notable achievements. These initiatives have been correctly identified as essential elements to any and all future technology plans.

The structured cabling system throughout the building, which is the system that supports wireless, computer networks, printing, etc. is doing an adequate job of supporting these systems currently, but is in poor condition. Many of the wiring centers are located in shared storage rooms, copy centers, etc. This is typical of schools where technology has evolved within a building structure that was never originally designed to support technology. The technology infrastructures, including network cabling and the power required to support technology and communication systems, should all be upgraded.

The school's distributed communication equipment, which includes the public address and clock systems, are in fair condition, but have reached their functional end of life similar to the Balmer School.

The Use of interactive instructional technologies in the classroom are consistent with Balmer Elementary School and are based on Smart Technology Smartboards and are in fair condition, but are showing age and should be refreshed and updated.

Network switching and wide area network design are in good condition. Progress into upgrading the wireless network by adding access points and increasing the district's ISP bandwidth will produce an infrastructure that will better support additional mobile computing devices and greater Cloud based resources, both of which are excellent guiding strategies for the future.

Personal printing is being minimized with reliance on larger and more cost effective copier/printers.

Recent initiatives into "state of the art" security systems similar to Balmer Elementary School, including video surveillance, access control and intrusion detection have resulted in security systems that are in good condition and should be maintained and expanded.

Infrastructure Cabling

The Northbridge Elementary School has at least two Category 5 data cable and jacks to support two desktop computers in each classroom. Data jacks are also located in office and administrative rooms. Power is insufficient to support the technology (Figure 1). The computer lab has multiple jacks in surface mount raceway (Figure 14). Cabling is from the late 80's and early 90's, with most originated from volunteer during Netday events back in the mid 1990's . The MDF and IDF's are connected with Category 6 copper cabling. One of the IDF's is a free standing equipment cabinet in a shared utility closet. The MDF is currently a wall mount rack in a shared closet space (Figure 2). Both spaces do not have adequate power or air conditioning.

Specific Issues	*Recommendations*
Network Cabling is older and needs to be updated	Install all new data cabling with multiple drops per room to accommodate future wireless, instructional AV, and other network services. Cable should be Category 6A to future proof the school.
Lack of dedicated and secure MDF and IDF rooms for terminations and equipment.	Create new MDF and IDF's rooms that are dedicated and secure spaces, which can be equipped with adequate power and air conditioning.
Fiber optic cabling is limited or not used between IDF's and MDF	Upgrade to fiber OM4 50 micron multimode as well as single mode between IDF's and MDF, to support future bandwidth demands.

Network Switches

Currently the school district is standardized on HP Procure network switches, utilizing a 5406zl series chassis in the MDF and IDF racks. All of the current network switches are state of the art and in good working condition, but they have recently been discontinued and are no longer supported by the manufacturer.

Specific Issues	*Recommendations*
The 5400zl series chassis have reached end of life with HP as of December of 2015.	Upgrade and replace the 5400zl series with the newer 5400R series of chassis switches. Existing Switches can be redeployed elsewhere as long as they are working condition. Chassis switches should be equipped with SFP+ fiber optic modules, GbE and Gb PoE network ports and management modules. Minimum backbone optics between MDF and IDF should be based on 20GbE.

Figure 1-IDF showing insufficient power distribution for equipment

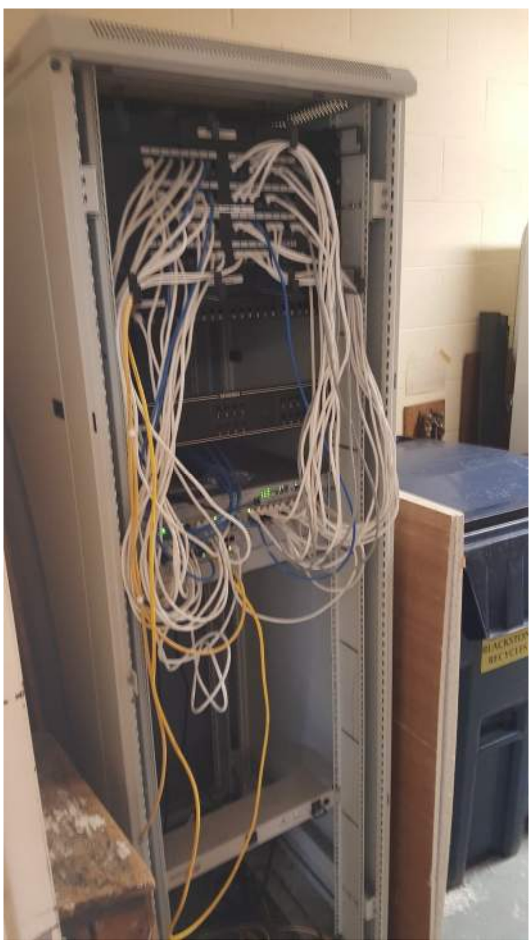

Figure 2 -MDF

Figure 3 - IDF in shared space

Public Address and Clock System

The Distributed Communication System, (public address system) including the master clock system is in poor condition, and is based on an older version of the Rauland Telecenter system (Figure 4). Not all of the secondary analog clocks in classrooms (Figure 5) are synchronized with the master clock. Announcements are not heard in all spaces or rooms. Classroom telephone handsets are dedicated to the public address system and not part of the schools telephone system.

Specific Issues	*Recommendations*
Public address system cabling and speakers are original and in poor condition. The system's main equipment is older and outdated.	Replace with a new public address system, with new main equipment and speakers throughout. Move main equipment to the MDF room.
Master and secondary analog clock system is not working properly in all areas.	Replace existing clock system with new equipment that provides for synchronized secondary clocks throughout the school.
Public address system handsets (Figure 5) in all rooms tie back to the main office, but do not provide outside dialing capability.	Utilize telephone handsets that connect to the public address system to provide both internal and external communications. Add call switches to the rooms for separate independent calling capability.
Main System Equipment is located in main office area	Move main equipment and connections to the MDF.

Telephone System

The Telephone System is an older hybrid digital/VoIP Vodavi System that is in fair condition and provides office and administrative spaces with telephone system capability for making and receiving outside calls. (Figure 6). Classroom telephone handsets are not part of this system. The telephone handsets in classrooms are dedicated to only the public address system and do not provide outside calling capability.

Specific Issues	*Recommendations*
Older system provides only administrative offices with telephone capability. It is linked to the Public Address system so that announcements can be initiated at any administrative telephone handset.	Telephone system should be expanded or upgraded to provide telephone handsets that are distributed throughout the school with voicemail capability provided for all teachers and staff in addition to administrators. Voicemail should also be integrated with email, so that messages are received through both the telephone system and the district's email system.

Figure 4 - Public Address System

Figure 5 -Clock/Speaker/PA Handset

Figure 6 - Telephone System

Figure 7- UPS Rack for PA System

Classroom Instructional Audio-Visual

Instructional audio-visual equipment is in good condition and is currently installed in most of the teaching spaces throughout the school. It is based on standard throw, short throw, and ultra-short throw projection technology, depending on when it was purchased and deployed (figures 8 and 9). SMART Technology Smartboards of varying vintages are also deployed in various locations. The equipment deployed ranges in age from 5-10 years old to a few months. There are no standards for this equipment as it has been obtained through multiple procurement cycles. Audio systems integrated with the Smartboards for program playback purposes were observed in some but not all cases. Voice lift or speech reinforcement systems were not observed to be installed.

Specific Issues	*Recommendations*
Older projection technology with multiple manufacturers.	Newer and standardized ultrashort projection technology should be deployed.
Older interactive electronic smartboard technology is deployed. This technology is electronic and therefore will fail at some point.	Update to newer interactive projection technology, which can be used with standard porcelain on steel marker boards and not screens. Newer projectors are brighter and use less energy and have less expensive lamps.
No Document Cameras were observed	Deploy cost effective document camera technology for the classroom
Assisted listening technology was lacking or limited in deployment	Deploy modern classroom voice reinforcement technology throughout all classrooms and learning spaces to serve all students and teachers. This equipment can also be linked to personal hearing aid equipment for the hearing impaired.

Audio-Visual for Large Venue Spaces

The Cafeteria, which is the group assembly space for the school has a performance stage with an audio system and speakers that did not appear to be functional (Figure 10). Portable audio and projection systems are used when assemblies or performances are held in the space (Figure 12 and 13).

The Gymnasium has poor quality audio system speakers and no real permanent audio system.

Specific Issues	*Recommendations*
Audio system in the primary assembly area was not working.	Install new permeant sound equipment.
There is a portable projection cart with a low lumen projector used in Cafeteria.	Install a permanent mounted high lumen projector with connections to new audio system and inputs at the state for presentations. Upgrade screen.
Gymnasium is without permanent AV equipment	Install new audio system and projection screen on the wall. Upgrade portable cart with high lumen projector for use in the Gym.

Figure 8- Classroom Projection

Figure 9 - Classroom Projection

Cafeteria Stage-Figure 10

Figure 11-Gym Sound System

Figure 12-Portable Equipment

Figure 13-Multimedia Cart

Network Computer Equipment

There are two desktop computers in each classroom (figure 15), with one permanently connected to the projection system. These computers serve teacher and student needs in the classroom. There are also eight (8) mobile carts in the school with 30 Chromebooks in each cart for student to use. Chromebooks are all based on Acer, with Bretford charging charts being the preferred mobile cart.

There are multiple desktop computer workstations in the computer lab (Figure 14). There is a need for better cabling and power distribution in the computer lab to support computers. Computer network servers are centralized at the High school and connect to the school via leased fiber optic cabling from Charter Communications. Currently Charter is also the internet service provider and the School District is considering upgrading their internet bandwidth from 100Mbps to 500Mpps up and down.

Specific Issues	*Recommendations*
Additional student devices are required to move school closer to the ideal of a one-to-one computer to student ratio.	Chromebooks are an excellent platform for cost effectively increasing the ratio of computers to students and additional Chromebooks and charging carts should be procured as needed.
Computer Lab is lacking cable and power distribution methods for desktop computers.	Replace furniture with fabricated casework or furniture that includes cabling distribution and management systems

Wireless Network Equipment

The Balmer Elementary School is currently upgrading their wireless network through E-rate funding, and the wireless access points that will be replaced as a result of this upgrade, will be moved and added to the wireless network at the Northbridge Elementary School. The wireless network will be based on Aruba (Figure 16), which will increase the quantity of Aruba wireless access points and the school's ability to support additional mobile technology. Deploying the Aerohive enterprise district standard should be considered for future upgrade projects.

Specific Issues	*Recommendations*
Ensure that there is an adequate concentration of wireless access points to meet existing and future wireless connection needs.	Increase the number of wireless access points to at least one per classroom and provide multiple access points in larger assembly spaces like the cafeteria, library, gymnasium, etc. Cover all administrative areas. Perform a heat map and deploy wireless access points for optimum coverage to support a one-to-one deployment of user devices.
Aruba is legacy wireless technology in the district.	Upgrade the Aruba wireless access point network to the District Aerohive wireless network standard.

Figure 14—Computer Lab

Figure 15– Computers in Classrooms
Wireless AP Above

Figure 16—Wireless Access Point

Printing

The school is utilizing more cost effective and centralized large format copier/printer technology. They currently rely on Konica Minolta and Toshiba copier/printers distributed in various locations (Figure 21). The School is also investigating other manufacturers such as Ricoh. They lease the copiers and supplement sparingly with HP laser printers in strategic areas (Figure 22). The HP Lasers are purchased without manufacturer Carepacks and are serviced directly by the district.

Specific Issues	*Recommendations*
No Issues—Centralized and work group printing is being implemented, with private printers deployed on a limited basis.	Maintain strategy and evaluate age of printers. Upgrade Copier Printers and select more current laser printer technology to reduce the cost of printing.

Digital Signage

There is no digital signage currently deployed within the school

Specific Issues	*Recommendations*
No digital signage	Consider digital flat panel signage for strategic areas within the school to enhance the paperless dissemination of public announcements and information to both staff and the public.

Security

There was a security system upgrade and installation involving surveillance cameras, access control, and a multi-zone intrusion detection system about 4 years ago (Summer of 2013). The core system is based around Genetec's Security Center 5.4 platform, which is an excellent platform for integrating security between surveillance, access control and intrusion across the District. Honeywell is the basis of design for intrusion detection (Figure 18). Surveillance cameras are located on the interior and exterior (Figure 19 and 20). A local host server is located in the school which is based on Dell R320 that sends stored video to an archive server located at the High School, maintaining 30 days of stored video. Staff use key fobs with the access control reader located at the main entrance doors (Figure 17). The main door integrates a door buzzer with an intercom system and a security camera so that the main office can see and communicate with someone seeking entrance to the school and remotely control unlocking the door.

Specific Issues	*Recommendations*
Possible lack of coverage by surveillance system cameras and alarm system notion sensors.	Increase the number of cameras and areas of coverage as required or needed. Adjust and modify with additional motion sensors for greater intrusion detection. Maintain system software assurance for best return on investment.

Figure 17 - Access Control

Figure 18 -Intrusion Keypad

Figure 19 -Motion Detector Inside Dome Camera

Figure 20 - Exterior Camera

Figure 21 -Copier/Printer

Figure 22 - Workgroup Printer

PLUMBING ASSESSMENT

Executive Summary

The majority of piping, fixtures, and equipment are original to the building and past their serviceable life, and are in poor condition. We recommend replacing all piping, fixtures, and equipment.

Terminology

Building Condition scale of terms used throughout this report are as follows:

- "Excellent": new or nearly new condition with few or no blemishes or compromises of quality or function.
- "Very Good": highly functional condition with slight wear and tear and/or minor compromises of quality or function.
- "Good": median functional condition with noticeable wear and tear and/or compromises of quality or function.
- "Fair": below median functional condition with significant wear and tear and/or major compromises of quality or function. Seriously worn parts or elements, minor structural compromise. Possible near-future safety hazard.
- "Poor": nearly– or completely non-functional condition with major wear and tear and/or serious compromises of quality or usability. Missing parts or elements, major structural damage or condition. Immediate safety hazard or danger.

INTERIOR

BATHROOMS

Plumbing fixtures are of a variety of types and eras. Urinals are floor mount, and appear to be original to the building. Toilets are a variety of types, and include both flush valve and tank types, and consist of different sizes that relate to the ages served. None of the fixtures are water-conserving type.

One toilet room has been appropriated for use as janitors' closet..

Specific Issues	*Recommendations*
Toilets are a combination of tank and flush valve types, and are not water conserving types. (Figures 2, 4)	Consider replacing all toilets with consistent type throughout building, and featuring low-flow (1.28 gpm) flush valves.
Urinals are floor mounted and 1gallon per flush. Floor mounted urinals do not meet current accessibility codes. Urinals are not shielded for privacy, which is a violation of the plumbing code. (Figure 1).	Replace all urinals with code compliant wall mount types, and replace all flush valves with low-flow (1/8 gpf) types.
Toilet room has been adapted for use as a janitor's closet, (Figure 3).	Determine appropriate use of room; if for storage, remove and cap off toilet.
A lavatory has a chemical dispenser connected to it (Figure 4.)	This is a plumbing code violation and should be removed.
Supply and waste piping at sinks is not typically insulated in conformance with accessibility rules.	Insulate all piping at sinks that could be used by disabled persons.

Figure 1— Urinals

Figure 2— Small pre-k toilket

Figure 3 — Toilet and Janitor's Sink

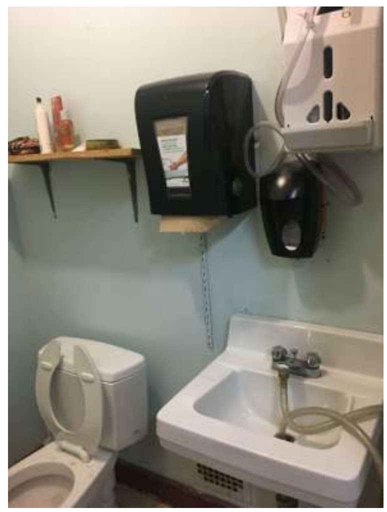

Figure 4—Tank type toilet and chemical dispenser

INTERIOR

SERVICES

Specific Issues	*Recommendations*
The backflow preventer and pressure reducing valve for the HVAC supply system are in fair to good condition. (Figure 5)	None
Incoming water service is congested by stored materials, which are capable of damaging the piping. Some insulation is slightly damaged and incomplete. (Figure 6)	Remove stored material from the vicinity of the water service piping.
The gas meter is obstructed with vegetation. The concrete pad under the meter appears to be insufficient. (Figure 7)	Remove vegetation from in front of the gas meter. Replace the concrete paver below the meter with a more substantial concrete slab.
The existing gas fired hot water heater is approaching the end of its service life. (Figure 8).	Consider replacing it with a new, high-efficiency gas fired hot water heater.

Figure 5— Backflow preventer and PRV (HVAC)

Figure 6— Water Service

Figure 7— Gas service and meter

Figure 8— 75 gallon domestic hot water heater

MISCELLANEOUS

Specific Issues	*Recommendations*
Classroom sinks are generally not accessible. (Figure 9)	Refer to the Regulatory Assessment and Architectural Assessment sections of this report for further discussion.
Janitor's sink has a chemical dispenser. However, there is no backflow preventer installed to prevent cross-contamination (Figure 10).	Backflow preventers are required and will need to be installed per plumbing code.
A classroom sink in the modular classroom building does not have piped plumbing. The clean water is sourced from the container in the left side of the cabinet, and the dirty water is drained into the right container in the cabinet. As a result the sink is also not accessible. (Figure 11)	Provide piped potable hot and cold water supply and sanitary drainage piping to all fixtures.

Figure 9 — Classroom sink

Figure 10 — Janitor's sink

Figure 11 — Classroom sink

FIRE PROTECTION ASSESSMENT

Executive Summary

The existing building does not have a fire suppression system. The existing building is 56, 560 square feet, and consists of a one story building wing and a three story wing (48,510 sq.ft.), and a one story modular building (8,050 sq.ft.). Per the current building code, a building over 7,500 square feet in area requires a fully automatic sprinkler system in compliance with NFPA 13— The Standard for the Installation of Sprinkler Systems.

Since the existing building does not meet the current code, any additions or renovations would trigger the need to install a new fire suppression system throughout the building.

Recommendations

Install a new fire suppression system throughout the building in compliance with NFPA 13.

FOODSERVICE EQUIPMENT ASSESSMENT

EXECUTIVE SUMMARY

The Northbridge Elementary School serves Pre-Kindergarten, Kindergarten, and First Grade students Current enrollment is approximately 480 students. This school receives prepared meals from an alternate location. It does not have a defined kitchen. Food is served in the Cafetorium with an area set aside for serving equipment and some storage.

There is no plumbed hand sink, and a portable self contained unit is used for the washing of hands. The three bay wash sink is done in a similar manner. There is a small reach in refrigerator to store cold food, and alternate hot food when it arrives is held as well. There is a double-stack electric convection oven used to reheat food and possibly cooking of some items on site. The serving of hot food is done in a portable hot food well unit. Cold food is serviced in an ice-cooled unit. It is not clear where the ice is obtained to for use in this unit.

In summary there is no permanent kitchen facility. The staff are doing the best they can with not very much. It is clear that a kitchen space is needed. It must be equipped with the proper equipment to facilitate the reparation and serving of food.

At a minimum, the ability to conveniently wash hands and utensils must be a priority. Further study is needed as to whether this kitchen should continue to have meals prepared off site or be able to stand alone as a full functioning facility. It is our recommendation that is be a self contained fully functioning facility as this will greatly improve the quality of the food and provide more flexibility in the type of food that can be offered.

KITCHEN

Back of house Equipment

Specific Issues	*Recommendations*
The space where the kitchen serving equipment is located is not able to be secured when not in use. Additionally the space was not designed to be a kitchen space. The floor and ceiling finishes are not appropriate for a kitchen environment. (Figure 1).	A full commercial kitchen, complete with modern equipment, sanitation, and storage facilities is needed.
The three bay sink is a self contained portable unit. The bowls are too small for anything more than washing serving utensils. (Figure 2).	See recommendation for Figure 1
The hand sink is a self contained portable unit. It meets the requirements of the health codes, but a plumbed-in hand sink would offer unlimited water volume and consistent wash temperatures. (Figure 3).	See the recommendation for figure 1.
The cold food serving counter is ice cooled. Ice is a less consistent cooling medium than a mechanically chilled serving pan. (Figure 4).	Replace with a modern mechanically cooled unit.

Figure 1—The kitchen space at the rear

Figure 2—Three bay sink

Figure 3—The hand washing station

Figure 4-The cold food serving counter

UEC universal environmental consultants

August 2, 2017

Mr. Thomas Hengelsberg
Dore & Whittier Architects
260 Merrimac Street
Newburyport, MA 01950

Reference: Hazardous Materials Determination Survey
Northbridge Elementary School, Northbridge, MA

Dear Mr. Hengelsberg:

Thank you for the opportunity for Universal Environmental Consultants (UEC) to provide professional services.

Enclosed please find the report for hazardous materials determination survey at the Northbridge Elementary School, Northbridge, MA.

Please do not hesitate to call should you have any questions.

Very truly yours,

Universal Environmental Consultants

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Ammar M. Dieb
President

UEC:\217 265.00\Report-Northbridge Elementary School.DOC

Enclosure

REPORT
FOR
HAZARDOUS MATERIALS DETERMINATION
SURVEY
AT THE
NORTHBRIDGE ELEMENTARY SCHOOL
NORTHBRIDGE, MASSACHUSETTS

PROJECT NO: 217 265.00

Survey Dates:
July 24-27, 2017

SURVEY CONDUCTED BY:

UNIVERSAL ENVIRONMENTAL CONSULTANTS
12 BREWSTER ROAD
FRAMINGHAM, MA 01702

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 eight years of experience.

UEC was contracted by Dore & Whittier Architects to conduct the following services at the Northbridge Elementary School, Northbridge, MA:

- Inspection and Testing for Asbestos Containing Materials (ACM);
- Inspection for Polychlorinated Biphenyls (PCB's)-Electrical Equipment and Light Fixtures;
- Inspection for PCB's-Caulking;
- Inspection for Lead Based Paint (LBP);
- Mercury in Rubber Flooring inspection and sampling;
- Airborne Mold inspection and sampling;
- Radon sampling;
- Other hazardous materials.

A comprehensive survey per the Environmental Protection Agency (EPA) NESHAP regulation would be required prior to any renovation or demolition activities.

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 a Massachusetts licensed asbestos inspector Mr. Jason Becotte (AI-034963) and analyzed by a Massachusetts licensed laboratory Asbestos Identification Laboratory, Woburn, MA.

Mercury samples were analyzed by an EPA licensed laboratory, EMSL, Cinnaminson, NJ in accordance with EPA method 7471B.

Airborne mold samples were analyzed by an EPA trained laboratory EMSL, Woburn, MA.

Radon samples were analyzed by an EPA licensed laboratory AccuStar, Medway, MA.

Refer to samples results.

2.0 FINDINGS:

Asbestos Containing Materials (ACM):
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 greater than 1 percent 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
Ninety five (95) bulk samples were collected from the following materials suspected of containing asbestos:

Type and Location of Material

1. Pyro block at 1952 building attic
2. Pyro block at 1952 building attic
3. Batting insulation at 1952 building attic
4. Batting insulation at 1952 building attic
5. Wall plaster at 1952 building first floor hallway
6. Wall plaster at 1952 building second floor hallway
7. Wall plaster at 1952 building room 203
8. Wall plaster at 1952 building room 303
9. Wall plaster at 1952 building third floor closet
10. Ceiling plaster at 1952 building first floor boy's room
11. Ceiling plaster at 1952 building room 306
12. Joint compound at 1952 building first floor conference room
13. Joint compound at 1952 building library
14. Textured ceiling plaster at boiler room
15. Textured ceiling plaster at boiler room
16. Textured ceiling plaster at boiler room
17. Old tan/grey 12" x 12" vinyl floor tile at 1952 building first floor OT/PT room
18. Old tan/grey 12" x 12" vinyl floor tile at 1952 building first floor OT/PT room
19. Mastic for old tan/grey 12" x 12" vinyl floor tile at 1952 building first floor OT/PT room
20. Mastic for old tan/grey 12" x 12" vinyl floor tile at 1952 building first floor OT/PT room
21. Old off white/green 12" x 12" vinyl floor tile at 1952 building first floor library
22. Old off white/green 12" x 12" vinyl floor tile at 1952 building first floor library
23. Mastic for old off white/green 12" x 12" vinyl floor tile at 1952 building first floor library
24. Mastic for old off white/green 12" x 12" vinyl floor tile at 1952 building first floor library
25. New 12" x 12" vinyl floor tile at 1952 building first floor hallway
26. New 12" x 12" vinyl floor tile at 1952 building first floor hallway
27. Mastic for new 12" x 12" vinyl floor tile at 1952 building first floor hallway
28. Mastic for new 12" x 12" vinyl floor tile at 1952 building first floor hallway
29. New 12" x 12" vinyl floor tile at 1952 building room 203 (top layer)
30. New 12" x 12" vinyl floor tile at 1952 building room 205 (top layer)
31. New 12" x 12" vinyl floor tile at 1952 building room 304 (top layer)
32. Hidden poured flooring at 1952 building room 203
33. Hidden poured flooring at 1952 building room 205
34. Hidden poured flooring at 1952 building room 304
35. Flooring plaster at 1952 building room 203
36. Flooring plaster at 1952 building room 205
37. Flooring plaster at 1952 building room 304
38. Black flooring paper at 1952 building room 203 (bottom layer)
39. Black flooring paper at 1952 building room 205 (bottom layer)
40. Black flooring paper at 1952 building room 304 (bottom layer)
41. Boiler exhaust insulation at boiler room
42. Boiler exhaust insulation at boiler room
43. Boiler exhaust insulation at boiler room
44. 2' x 4' Suspended acoustical ceiling tile at 1952 building first floor library
45. 2' x 4' Suspended acoustical ceiling tile at 1952 building first floor conference room
46. Exterior door framing caulking at 1952 building
47. Exterior window glazing caulking at 1952 building
48. Exterior window glazing caulking at 1952 building
49. Exterior unit vent grille caulking at 1952 building

50. Exterior unit vent grille caulking at 1952 building
51. Sheetrock wall panel at modular building hallway
52. Sheetrock wall panel at modular building room 5
53. Tan/brown 12” x 12” vinyl floor tile at modular building hallway
54. Tan/brown 12” x 12” vinyl floor tile at modular building room 5
55. Yellow glue for tan/brown 12” x 12” vinyl floor tile at modular building hallway
56. Yellow glue for tan/brown 12” x 12” vinyl floor tile at modular building room 5
57. 2’ x 4’ Suspended acoustical ceiling tile at modular building hallway
58. 2’ x 4’ Suspended acoustical ceiling tile at modular building room 5
59. Black sink coating at modular building teacher’s room
60. Black sink coating at modular building teacher’s room
61. Ceramic cove base glue at 1983 building boy’s room
62. Ceramic cove base glue at 1983 building boy’s room
63. 2’ x 4’ Suspended acoustical ceiling tile at 1983 building room 108
64. 2’ x 4’ Suspended acoustical ceiling tile at 1983 building room 104
65. Old off white 12” x 12” vinyl floor tile at 1983 building nurse
66. Old off white 12” x 12” vinyl floor tile at 1983 building teacher’s room
67. Mastic for old off white 12” x 12” vinyl floor tile at 1983 building nurse
68. Mastic for old off white 12” x 12” vinyl floor tile at 1983 building teacher’s room
69. Old grey/tan 12” x 12” vinyl floor tile at 1983 building hallway
70. Old grey/tan 12” x 12” vinyl floor tile at 1983 building room 101
71. Mastic for old grey/tan 12” x 12” vinyl floor tile at 1983 building hallway
72. Mastic for old grey/tan 12” x 12” vinyl floor tile at 1983 building room 101
73. New tan/brown 12” x 12” vinyl floor tile at 1983 building room 108
74. New tan/brown 12” x 12” vinyl floor tile at 1983 building room 109
75. Mastic for new tan/brown 12” x 12” vinyl floor tile at 1983 building room 108
76. Mastic for new tan/brown 12” x 12” vinyl floor tile at 1983 building room 109
77. New beige 12” x 12” vinyl floor tile at 1983 building room 112
78. New beige 12” x 12” vinyl floor tile at 1983 building room 112
79. Red duct sealant at 1983 building stage
80. Red duct sealant at 1983 building room 104 storage
81. Interior window glazing caulking at 1983 building hallway
82. Interior window glazing caulking at 1983 building teacher’s lounge
83. Interior door glazing caulking at 1983 building hallway
84. Interior door glazing caulking at 1983 building hallway
85. Interior window sill at 1983 building room 106
86. Interior window sill at 1983 building room 109
87. Wood door insulation at 1983 building room 107
88. Exterior window framing caulking 1983 building
89. Exterior window framing caulking 1983 building
90. Exterior window glazing caulking 1983 building
91. Exterior window glazing caulking 1983 building
92. Exterior door framing caulking 1983 building
93. Exterior door framing caulking 1983 building
94. Exterior unit vent grille framing caulking 1983 building
95. Exterior unit vent grille framing caulking 1983 building

Samples Results

Type and Location of Material	Sample Result
1. Pyro block at 1952 building attic	No Asbestos Detected
2. Pyro block at 1952 building attic	No Asbestos Detected
3. Batting insulation at 1952 building attic	No Asbestos Detected
4. Batting insulation at 1952 building attic	No Asbestos Detected

5.	Wall plaster at 1952 building first floor hallway	No Asbestos Detected
6.	Wall plaster at 1952 building second floor hallway	No Asbestos Detected
7.	Wall plaster at 1952 building room 203	No Asbestos Detected
8.	Wall plaster at 1952 building room 303	No Asbestos Detected
9.	Wall plaster at 1952 building third floor closet	No Asbestos Detected
10.	Ceiling plaster at 1952 building first floor boy’s room	No Asbestos Detected
11.	Ceiling plaster at 1952 building room 306	No Asbestos Detected
12.	Joint compound at 1952 building first floor conference room	No Asbestos Detected
13.	Joint compound at 1952 building library	No Asbestos Detected
14.	Textured ceiling plaster at boiler room	No Asbestos Detected
15.	Textured ceiling plaster at boiler room	No Asbestos Detected
16.	Textured ceiling plaster at boiler room	No Asbestos Detected
17.	Old tan/grey 12” x 12” vinyl floor tile at 1952 building first floor OT/PT room	No Asbestos Detected
18.	Old tan/grey 12” x 12” vinyl floor tile at 1952 building first floor OT/PT room	No Asbestos Detected
19.	Mastic for tan/grey 12” x 12” floor tile at 1952 building first floor OT/PT room	No Asbestos Detected
20.	Mastic for tan/grey 12” x 12” floor tile at 1952 building first floor OT/PT room	No Asbestos Detected
21.	Old off white/green 12” x 12” vinyl floor tile at 1952 building first floor library	No Asbestos Detected
22.	Old off white/green 12” x 12” vinyl floor tile at 1952 building first floor library	No Asbestos Detected
23.	Mastic for off white/green 12” x 12” floor tile at 1952 building first floor library	No Asbestos Detected
24.	Mastic for off white/green 12” x 12” floor tile at 1952 building first floor library	No Asbestos Detected
25.	New 12” x 12” vinyl floor tile at 1952 building first floor hallway	No Asbestos Detected
26.	New 12” x 12” vinyl floor tile at 1952 building first floor hallway	No Asbestos Detected
27.	Mastic for new 12” x 12” vinyl floor tile at 1952 building first floor hallway	No Asbestos Detected
28.	Mastic for new 12” x 12” vinyl floor tile at 1952 building first floor hallway	No Asbestos Detected
29.	New 12” x 12” vinyl floor tile at 1952 building room 203 (top layer)	No Asbestos Detected
30.	New 12” x 12” vinyl floor tile at 1952 building room 205 (top layer)	No Asbestos Detected
31.	New 12” x 12” vinyl floor tile at 1952 building room 304 (top layer)	No Asbestos Detected
32.	Hidden poured flooring at 1952 building room 203	5% Asbestos
33.	Hidden poured flooring at 1952 building room 205	No Asbestos Detected
34.	Hidden poured flooring at 1952 building room 304	No Asbestos Detected
35.	Flooring plaster at 1952 building room 203	2% Asbestos
36.	Flooring plaster at 1952 building room 205	2% Asbestos
37.	Flooring plaster at 1952 building room 304	2% Asbestos
38.	Black flooring paper at 1952 building room 203 (bottom layer)	No Asbestos Detected
39.	Black flooring paper at 1952 building room 205 (bottom layer)	No Asbestos Detected
40.	Black flooring paper at 1952 building room 304 (bottom layer)	No Asbestos Detected
41.	Boiler exhaust insulation at boiler room	No Asbestos Detected
42.	Boiler exhaust insulation at boiler room	No Asbestos Detected
43.	Boiler exhaust insulation at boiler room	No Asbestos Detected
44.	2’ x 4’ Suspended acoustical ceiling tile at 1952 building first floor library	No Asbestos Detected
45.	2’ x 4’ Suspended acoustical ceiling tile at 1952 building first floor conference room	No Asbestos Detected
46.	Exterior door framing caulking at 1952 building	2% Asbestos
47.	Exterior window glazing caulking at 1952 building	<1% Asbestos
48.	Exterior window glazing caulking at 1952 building	2% Asbestos
49.	Exterior unit vent grille caulking at 1952 building	5% Asbestos
50.	Exterior unit vent grille caulking at 1952 building	5% Asbestos
51.	Sheetrock wall panel at modular building hallway	No Asbestos Detected
52.	Sheetrock wall panel at modular building room 5	No Asbestos Detected
53.	Tan/brown 12” x 12” vinyl floor tile at modular building hallway	No Asbestos Detected
54.	Tan/brown 12” x 12” vinyl floor tile at modular building room 5	No Asbestos Detected
55.	Yellow glue for tan/brown 12” x 12” vinyl floor tile at modular building hallway	No Asbestos Detected
56.	Yellow glue for tan/brown 12” x 12” vinyl floor tile at modular building room 5	No Asbestos Detected
57.	2’ x 4’ Suspended acoustical ceiling tile at modular building hallway	No Asbestos Detected
58.	2’ x 4’ Suspended acoustical ceiling tile at modular building room 5	No Asbestos Detected
59.	Black sink coating at modular building teacher’s room	2% Asbestos

60.	Black sink coating at modular building teacher's room	2% Asbestos
61.	Ceramic cove base glue at 1983 building boy's room	No Asbestos Detected
62.	Ceramic cove base glue at 1983 building boy's room	No Asbestos Detected
63.	2' x 4' Suspended acoustical ceiling tile at 1983 building room 108	No Asbestos Detected
64.	2' x 4' Suspended acoustical ceiling tile at 1983 building room 104	No Asbestos Detected
65.	Old off white 12" x 12" vinyl floor tile at 1983 building nurse	No Asbestos Detected
66.	Old off white 12" x 12" vinyl floor tile at 1983 building teacher's room	No Asbestos Detected
67.	Mastic for old off white 12" x 12" vinyl floor tile at 1983 building nurse	5% Asbestos
68.	Mastic for old off white 12" x 12" vinyl floor tile at 1983 building teacher's room	5% Asbestos
69.	Old grey/tan 12" x 12" vinyl floor tile at 1983 building hallway	No Asbestos Detected
70.	Old grey/tan 12" x 12" vinyl floor tile at 1983 building room 101	No Asbestos Detected
71.	Mastic for old grey/tan 12" x 12" vinyl floor tile at 1983 building hallway	2% Asbestos
72.	Mastic for old grey/tan 12" x 12" vinyl floor tile at 1983 building room 101	5% Asbestos
73.	New tan/brown 12" x 12" vinyl floor tile at 1983 building room 108	No Asbestos Detected
74.	New tan/brown 12" x 12" vinyl floor tile at 1983 building room 109	10% Asbestos
75.	Mastic for new tan/brown 12" x 12" vinyl floor tile at 1983 building room 108	No Asbestos Detected
76.	Mastic for new tan/brown 12" x 12" vinyl floor tile at 1983 building room 109	10% Asbestos
77.	New beige 12" x 12" vinyl floor tile at 1983 building room 112	No Asbestos Detected
78.	New beige 12" x 12" vinyl floor tile at 1983 building room 112	No Asbestos Detected
79.	Red duct sealant at 1983 building stage	No Asbestos Detected
80.	Red duct sealant at 1983 building room 104 storage	No Asbestos Detected
81.	Interior window glazing caulking at 1983 building hallway	5% Asbestos
82.	Interior window glazing caulking at 1983 building teacher's lounge	5% Asbestos
83.	Interior door glazing caulking at 1983 building hallway	5% Asbestos
84.	Interior door glazing caulking at 1983 building hallway	10% Asbestos
85.	Interior window sill at 1983 building room 106	No Asbestos Detected
86.	Interior window sill at 1983 building room 109	No Asbestos Detected
87.	Wood door insulation at 1983 building room 107	No Asbestos Detected
88.	Exterior window framing caulking 1983 building	No Asbestos Detected
89.	Exterior window framing caulking 1983 building	No Asbestos Detected
90.	Exterior window glazing caulking 1983 building	10% Asbestos
91.	Exterior window glazing caulking 1983 building	5% Asbestos
92.	Exterior door framing caulking 1983 building	No Asbestos Detected
93.	Exterior door framing caulking 1983 building	No Asbestos Detected
94.	Exterior unit vent grille framing caulking 1983 building	No Asbestos Detected
95.	Exterior unit vent grille framing caulking 1983 building	No Asbestos Detected

Observations and Conclusions:
The condition of ACM is very important. ACM in good condition does not present a health issue unless it is disturbed. Therefore, it is not necessary to remediate ACM in good condition unless it will be disturbed through renovation, demolition or other activity.

1. Hidden poured flooring at 1952 building was found to contain asbestos.
2. Flooring plaster at 1952 building was found to contain asbestos.
3. Exterior door framing caulking at 1952 building was found to contain asbestos.
4. Exterior window glazing caulking at 1952 building was found to contain asbestos.
5. Exterior unit vent grille caulking at 1952 building was found to contain asbestos.
6. Black sink coating at modular building was found to contain asbestos.
7. Mastic for old off white 12" x 12" vinyl floor tile at 1983 building was found to contain asbestos.
8. Mastic for old grey/tan 12" x 12" vinyl floor tile at 1983 building was found to contain asbestos.
9. New tan/brown 12" x 12" vinyl floor tile at 1983 building was found to contain asbestos.
10. Mastic for new tan/brown 12" x 12" vinyl floor tile at 1983 building was found to contain asbestos.
11. Interior window glazing caulking at 1983 building was found to contain asbestos.
12. Interior door glazing caulking at 1983 building was found to contain asbestos.
13. Exterior window glazing caulking 1983 building was found to contain asbestos.

14. Interior window glazing caulking at 1952 building was assumed to contain asbestos.
15. Interior door caulking at 1952 building was assumed to contain asbestos.
16. Pipe insulation was assumed to contain asbestos.
17. Boiler exhaust duct insulation was assumed to contain asbestos.
18. Insulation and rope inside boilers was assumed to contain asbestos.
19. Glue holding blackboard was assumed to contain asbestos.
20. Transite panel over doors at 1983 building was assumed to contain asbestos.
21. Paper/glue under stage hardwood floor was assumed to contain asbestos.
22. Roofing material was assumed to contain asbestos. Roofing material does not have to be removed by a licensed asbestos contractor. However, the Demolition/Roofing Contractor must comply with OSHA regulation during demolition and with state regulations for proper disposal. A non-traditional abatement plan would have to be prepared and submitted to the DEP for approval
23. 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. A non-traditional abatement plan would have to be prepared and submitted to the DEP for approval.
24. Thru-wall flashing was assumed to contain asbestos. The demolition contractor will have to segregate the ACM from non-ACM building surfaces for proper disposal. A non-traditional abatement plan would have to be prepared and submitted to the DEP for approval.
25. Underground sewer pipes were assumed to contain asbestos.
26. All other suspect materials were found not to contain asbestos. Hidden ACM may be found during demolition activities.

Polychlorinated Biphenyls (PCB’s)-Electrical Equipment and Light Fixtures:
Observations and Conclusions
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 since there were labels indicating that “No PCB’s” was found. Tubes in light fixtures, thermostats, 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 treated as if containing mercury and disposed in an EPA approved landfill as part of the demolition project.

PCB’s in Caulking:
Observations and Conclusions
Caulking was assumed to contain PCB’s.

Lead Based Paint (LBP):
Observations and Conclusions
LBP was assumed to exist on painted surfaces in the 1952 building. A school is not considered a regulated facility. 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. According to OSHA, any amount of LBP triggers compliance.

Mercury in Rubber Flooring:
Number of Samples Collected

Two (2) bulk samples were collected from the following.

Type and Location of Material

1. Rubber flooring at 1983 gymnasium
2. Rubber flooring at 1983 gymnasium

Sample Results

Type and Location of Material	**Sample Result**
1. Rubber flooring at 1983 gymnasium	0.050 mg/kg
2. Rubber flooring at 1983 gymnasium	ND

Observations and Conclusions:
Samples results of the rubber flooring indicated low level of mercury.

Airborne Mold:
Airborne mold testing was performed utilizing Zefon International Incorporated’s Air-O-Cell® sampling device following all manufacturer supplied recommended sampling procedures.

The Air-O-Cell® is a direct read total particulate air sampling device. It works using the inertial impaction principle similar to other spore trap devices. It is designed for the rapid collection and analysis of airborne particulate including bioaerosols. The particulate includes fibers (e.g. asbestos, fiberglass, cellulose, clothing fibers) opaque particles (e.g. fly ash, combustion particles, copy toner, oil droplets, paint), and bioaerosols (e.g. mold spores, pollen, insect parts, skin cell fragments).[1]

The method involves drawing a known quantity of air through a sterile sampling cassette. Subsequent to sampling, the cassette is sealed and transferred to a microbiology laboratory under chain of custody protocol for microscopic analysis. This method counts both viable and nonviable mold spores.

AIRBORNE MOLD and PARTICULATE

Lab ID #	Location	Total Mold Counts/M^3	Pollen	Insect Fragment	Hyphal Fragments
131604724-0001	Room M-4	280	ND	ND	ND
131604724-0002	Room 104	130	ND	ND	ND
131604724-0003	Library	2,030	ND	ND	ND
131604724-0004	Room 201	3,260	ND	ND	ND
131604724-0005	Room 301	1,720	ND	ND	20
131604724-0006	Outside	13,874	ND	ND	ND

AIRBORNE MOLD and PARTICULATE
(Subjective Scales)

Lab ID #	Location	Skin Fragment Density (SFD)	Fibrous Particulates (FP)	Total Background Particulate (TBP)
131604724-0001	Room M-4	2	1	1
131604724-0002	Room 104	2	1	1
131604724-0003	Library	2	1	1
131604724-0004	Room 201	2	1	1
131604724-0005	Room 301	2	1	1
131604724-0006	Outside	1	1	1

Legend:
ND - Not Detected

[1] Zefon International Inc. <www.zefon.com>

Observations:
There are currently no guidelines or standards promulgated by a government agency or widely recognized scientific organization for the interpretation of airborne mold spore levels. The most commonly employed tool used to assess if mold growth is occurring in a structure is to compare quantities and species of mold outdoors to indoor. If there were more mold indoor, and/or if species were present indoor which were not present outdoors, then growth is occurring and remediation is recommended.

The indoor airborne mold spore concentrations were much lower than the outside sample. Based on comparisons with historical data from projects of similar type, building utilization, geographic location and season, the indoor airborne levels are considered low. Indoor mold spore counts in the summer are typically in the 5,000-9,500-spores/cubic meter range.

Pollen, insect fragments and Hyphal fragments were either not present or low in the samples. Hyphal fragment is a non-reproductive part of the mold.

Total background particulate on all samples was assessed as “1” on a scale of 1-5 where 1 is low and 5 is high. Skin fragment density on all samples was assessed as “1-2” on a scale of 1-4 where 1 is low and 4 is high. The total background levels are measured to determine airborne dust not related to airborne mold. Skin fragments are measured to determine proper housing cleaning.

No visible mold growth was observed during sampling.

Radon:
Number of Samples Collected

Five (5) air samples were collected at the following locations:

Location of Sample

1. First Floor Library
2. First Floor Cafeteria
3. First Floor Gymnasium Office
4. First Floor Room 105
5. First Floor Room 111

Location of Sample	**Sample Result**
1. First Floor Library	0.8 pCi/L
2. First Floor Cafeteria	<0.4 pCi/L
3. First Floor Gymnasium Office	2.8 pCi/L
4. First Floor Room 105	<0.4 pCi/L
5. First Floor Room 111	1.2 pCi/L

Observations and Conclusions:
The measured radon concentrations of the samples were found to be much lower than the EPA guideline of 4 picoCuris of radon per liter of air (pCi/L). No further action is required.

Underground Storage Oil Tanks (UST):
Observations and Conclusions
One (10,000 Gallons) UST was found at the school. There were no records on-site to review.

3.0 COST ESTIMATES:

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

Location	Material	Approximate Quantity	Cost Estimate ($)
1952 Building:			
	Flooring Materials (Second/Third Floors)	9,000 SF	90,000.00
	Interior Windows	8 Total	1,600.00
	Interior Doors	24 Total	4,800.00
	Chalkboards/Tackboards	120 Total	24,000.00
	Light Fixtures Tubes	220 Total	4,400.00
	Hidden ACM	Unknown	15,000.00
	Miscellaneous Hazardous Materials	Unknown	15,000.00
Boiler Room	Boilers	2 Total	19,000.00
	Exhaust Duct Insulation	200 SF	5,000.00
	Pipe Insulation	75 LF	1,500.00
Exterior	Windows	80 Total	24,000.00
	Doors	2 Total	600.00
	Unit Vent Grilles	7 Total	1,400.00
1983 Building:			
	Flooring Materials and Mastic	20,000 SF	80,000.00
	Interior Windows	6 Total	1,200.00
	Interior Doors	10 Total	2,000.00
	Chalkboards/Tackboards	22 Total	4,400.00
	Transite Panels	20 Total	2,000.00
	Light Fixtures Tubes	245 Total	4,900.00
	Sink	1 Total	300.00
	Hidden ACM	Unknown	15,000.00
	Miscellaneous Hazardous Materials	Unknown	15,000.00
Stage	Hardwood Floor Paper/Mastic	800 SF	8,000.00
Exterior	Windows	33 Tot	9,900.00
Modular Building:			
	Light Fixtures Tubes	70 Total	1,400.00
	Sink	1 Total	300.00
Exterior of School	Roofing Material	48,510 SF	97,020.00
	Transite Sewer Pipes	Unknown [1]	50,000.00
	Thru-Wall Flashing	Unknown [1]	50,000.00
	Dampproofing on Foundation Walls	1,500 Tons [1]	225,000.00
	UST	1 Total	20,000.00
PCB's Remediation[2]			50,000.00
Estimated costs for ACM NESHAP Inspection and Testing Services			10,000.00
Estimated costs for PCB's Testing and Abatement Plans Services[2]			25,000.00
Estimated costs for Design, Construction Monitoring and Air Sampling Services			94,280.00
		Total:	**970,000.00**

[1]: Part of total demolition. [2]: Should results exceed EPA limit.

4.0 DESCRIPTION OF SURVEY METHODS AND LABORATORY ANALYSES:

Asbestos:
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.

The samples were analyzed by an EPA approved laboratory EMSL, Woburn, MA.

Mercury in Rubber Flooring:
The bulk sample was analyzed in accordance with EPA method 7471B.

Airborne Mold:
The samples were analyzed by an EPA approved laboratory EMSL, Woburn, MA.

Radon:
Radon samples were analyzed by an EPA licensed laboratory AccuStar, Medway, MA.

Inspected By:

Jason Becotte

Jason Becotte
Asbestos Inspector (AI-034963)

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.

Asbestos Identification Laboratory

165 New Boston St., Ste 227
Woburn, MA 01801
781-932-9600

Web: www.asbestosidentificationlab.com
Email: mikemanning@asbestosidentificationlab.com

Batch: 24622

Lab Code: 200919-0

July 31, 2017

Ammar Dieb
Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702

Project Number:
Project Name: Northbridge Elementary, Northbridge, MA

Date Sampled: 2017-07-27
Work Received: 2017-07-28
Work Analyzed: 2017-07-28

Analysis Method: BULK PLM ANALYSIS EPA/600/R-93/116

Dear Ammar Dieb,

Asbestos Identification Laboratory has completed the analysis of the samples from your office for the above referenced project .

The information and analysis contained in this report have been generated using the EPA /600/R-93/116 Method for the Determination of Asbestos in Bulk Building Materials. Materials or products that contain more than 1% of any kind or combination of asbestos are considered an asbestos containing building material as determined by the EPA. This Polarized Light Microscope (PLM) technique may be performed either by visual estimation or point counting. Point counting provides a determination of the area percentage of asbestos in a sample. If the asbestos is estimated to be less than 10% by visual estimation of friable material, the determination may be repeated using the point counting technique. The results of the point counting supersede visual PLM results. Results in this report only relate to the items tested. This report may not be used by the customer to claim product endorsement by NVLAP or any other U.S. Government Agency.

Laboratory results represent the analysis of samples as submitted by the customer. Information regarding sample location, description, area, volume, etc., was provided by the customer. Asbestos Identification Laboratory is not responsible for sample collection activities or analytical method limitations. Unless notified in writing to return samples, Asbestos Identification Laboratory discards customer samples after 30 days. Samples containing subsamples or layers will be analyzed separately when applicable. Reports are kept at Asbestos Identification Laboratory for three years. This report shall not be reproduced, except in full, without the written consent of Asbestos Identification Laboratory.

- NVLAP Lab Code: 200919-0
- Massachusetts Certification License: AA000208
- State of Connecticut, Department of Public Health Approved Environmental Laboratory Registration Number: PH-0142
- State of Maine, Department of Environmental Protection Asbestos Analytical Laboratory License Number: LB-0078(Bulk) LA-0087(Air)
- State of Rhode Island and Providence Plantations. Department of Health Certification: AAL-121
- State of Vermont, Department of Health Environmental Health License AL934461

Thank you Ammar Dieb for your business.

Michael Manning

Michael Manning
Owner/Director

July 31, 2017

Ammar Dieb
Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702

Project Number:
Project Name: Northbridge Elementary, Northbridge, MA

Date Sampled: 2017-07-27
Work Received: 2017-07-28
Work Analyzed: 2017-07-28

Analysis Method: BULK PLM ANALYSIS EPA/600/R-93/116

FieldID / LabID	Material	Location	Color	Non-Asbestos %	Asbestos %
1 / 276653	Pyro Block	1930 Attic	gray	Cellulose 2 Non-Fibrous 98	None Detected
2 / 276654	Pyro Block	1930 Attic	gray	Cellulose < 1 Non-Fibrous 100	None Detected
3 / 276655	Batting Insulation	1930 Attic	brown	Cellulose 100	None Detected
4 / 276656	Batting Insulation	1930 Attic	brown	Cellulose 100	None Detected
5 / 276657	Plaster	1930 1st FL Hall Wall	multi	Non-Fibrous 100	None Detected
6 / 276658	Plaster	1930 2nd FL Hall Wall	multi	Non-Fibrous 100	None Detected
7 / 276659	Plaster	1930 Rm 203 Wall	multi	Non-Fibrous 100	None Detected
8 / 276660	Plaster	1930 Rm 303 Wall	multi	Non-Fibrous 100	None Detected
9 / 276661	Plaster	1930 3rd FL Closet Wall	multi	Non-Fibrous 100	None Detected
10 / 276662	Plaster	1930 1st FL Boy's Room Ceiling	multi	Non-Fibrous 100	None Detected
11 / 276663	Plaster	1930 Rm 306 Ceiling	multi	Non-Fibrous 100	None Detected
12 / 276664	Joint Compound	1930 1st FL Conference	white	Non-Fibrous 100	None Detected
13 / 276665	Joint Compound	1930 Library	white	Non-Fibrous 100	None Detected
14 / 276666	Textured Ceiling Plaster	Boiler Room	gray	Non-Fibrous 100	None Detected

FieldID / LabID	Material	Location	Color	Non-Asbestos %	Asbestos %
15 / 276667	Textured Ceiling Plaster	Boiler Room	gray	Non-Fibrous 100	None Detected
16 / 276668	Textured Ceiling Plaster	Boiler Room	gray	Non-Fibrous 100	None Detected
17 / 276669	Old Tan + Gray 12x12 VFT	1930 1st FL OT/PT Room	white	Non-Fibrous 100	None Detected
18 / 276670	Old Tan + Gray 12x12 VFT	1930 1st FL OT/PT Room	tan	Non-Fibrous 100	None Detected
19 / 276671	Black Mastic	1930 1st FL OT/PT Room	black	Cellulose 10 Non-Fibrous 90	None Detected
20 / 276672	Black Mastic	1930 1st FL OT/PT Room	black	Cellulose 10 Non-Fibrous 90	None Detected
21 / 276673	Old Off White/Green 12x12 VFT	1930 1st FL Library	green	Non-Fibrous 100	None Detected
22 / 276674	Old Off White/Green 12x12 VFT	1930 1st FL Library	green	Non-Fibrous 100	None Detected
23 / 276675	Black Mastic	1930 1st FL Library	black	Cellulose 10 Non-Fibrous 90	None Detected
24 / 276676	Black Mastic	1930 1st FL Library	black	Cellulose 10 Non-Fibrous 90	None Detected
25 / 276677	New 12x12 VFT	1930 1st FL Hallway	gray	Non-Fibrous 100	None Detected
26 / 276678	New 12x12 VFT	1930 1st FL Hallway	white	Non-Fibrous 100	None Detected
27 / 276679	Old Black Mastic	1930 1st FL Hallway	black	Cellulose 10 Non-Fibrous 90	None Detected
28 / 276680	Old Black Mastic	1930 1st FL Hallway	black	Cellulose 10 Non-Fibrous 90	None Detected
29 / 276681	New 12x12 VFT	1930 Room 203 Top Layer	tan	Non-Fibrous 100	None Detected
30 / 276682	New 12x12 VFT	1930 Room 205 Top Layer	tan	Non-Fibrous 100	None Detected
31 / 276683	New 12x12 VFT	1930 Room 304 Top Layer	tan	Non-Fibrous 100	None Detected
32 / 276684	Hidden Poured Flooring	1930 Room 203	brown	Non-Fibrous 95	**Detected** **Chrysotile 5**

FieldID / LabID	Material	Location	Color	Non-Asbestos %	Asbestos %
33 / 276685	Hidden Poured Flooring	1930 Room 205	black	Non-Fibrous 100	None Detected
34 / 276686	Hidden Poured Flooring	1930 Room 304	black	Non-Fibrous 100	None Detected
35 / 276687	Flooring Plaster	1930 Room 203	white	Cellulose 15 Non-Fibrous 83	**Detected** **Chrysotile 2**
36 / 276688	Flooring Plaster	1930 Room 205	gray	Cellulose 15 Non-Fibrous 83	**Detected** **Chrysotile 2**
37 / 276689	Flooring Plaster	1930 Room 304	gray	Cellulose 15 Non-Fibrous 83	**Detected** **Chrysotile 2**
38 / 276690	Black Flooring Paper	1930 Room 203 Bottom Layer	black	Cellulose 50 Non-Fibrous 50	None Detected
39 / 276691	Black Flooring Paper	1930 Room 205 Bottom Layer	black	Cellulose 50 Non-Fibrous 50	None Detected
40 / 276692	Black Flooring Paper	1930 Room 304 Bottom Layer	black	Cellulose 40 Non-Fibrous 60	None Detected
41 / 276693	Boiler Exhaust Insulation	Boiler Room	white	Synthetic 5 Non-Fibrous 95	None Detected
42 / 276694	Boiler Exhaust Insulation	Boiler Room	gray	Mineral Wool 35 Non-Fibrous 65	None Detected
43 / 276695	Boiler Exhaust Insulation	Boiler Room	gray	Mineral Wool 35 Non-Fibrous 65	None Detected
44 / 276696	2x4 SAT Craggy	1930 1st FL Library	multi	Mineral Wool 40 Cellulose 40 Non-Fibrous 20	None Detected
45 / 276697	2x4 SAT Craggy	1930 1st FL Conference Room	multi	Mineral Wool 40 Cellulose 40 Non-Fibrous 20	None Detected
46 / 276698	Door Frame Caulk	1930 Exterior Door	black	Non-Fibrous 98	**Detected** **Chrysotile 2**
47 / 276699	Window Glaze	1930 Exterior Window	white	Non-Fibrous 100	**Detected** **Chrysotile < 1**
48 / 276700	Window Glaze	1930 Exterior Window	white	Non-Fibrous 98	**Detected** **Chrysotile 2**
49 / 276701	Unit Vent Caulk	1930 Exterior Vent	multi	Non-Fibrous 95	**Detected** **Chrysotile 5**
50 / 276702	Unit Vent Caulk	1930 Exterior Vent	gray	Non-Fibrous 95	**Detected** **Chrysotile 5**

FieldID / LabID	Material	Location	Color	Non-Asbestos %	Asbestos %
51 / 276703	Sheetrock Wall Panel	Modular Hallway	multi	Fiberglass 2 Cellulose 5 Non-Fibrous 93	None Detected
52 / 276704	Sheetrock Wall Panel	Modular Room 5	multi	Fiberglass 2 Cellulose < 1 Non-Fibrous 98	None Detected
53 / 276705	Tan w/ Brown 12x12 VFT	Modular Hallway	tan	Non-Fibrous 100	None Detected
54 / 276706	Tan w/ Brown 12x12 VFT	Modular Room 5	yellow	Non-Fibrous 100	None Detected
55 / 276707	Yellow Glue	on #53	tan	Non-Fibrous 100	None Detected
56 / 276708	Tan w/ Brown 12x12 VFT	on #54	yellow	Non-Fibrous 100	None Detected
57 / 276709	2x4 SAT Modern	Modular Hallway	multi	Cellulose 70 Non-Fibrous 30	None Detected
58 / 276710	2x4 SAT Modern	Modular Room 5	multi	Mineral Wool 30 Cellulose 50 Non-Fibrous 20	None Detected
59 / 276711	Black Sink Coating	1983 Teacher's Room	black	Non-Fibrous 98	**Detected** **Chrysotile 2**
60 / 276712	Black Sink Coating	1983 Teacher's Room	black	Non-Fibrous 98	**Detected** **Chrysotile 2**
61 / 276713	Ceramic Cove Base Glue	1983 Boy's Room	yellow	Non-Fibrous 100	None Detected
62 / 276714	Ceramic Cove Base Glue	1983 Boy's Room	yellow	Non-Fibrous 100	None Detected
63 / 276715	2x4 SAT Craggy	1983 Rm 108	multi	Mineral Wool 40 Cellulose 40 Non-Fibrous 20	None Detected
64 / 276716	2x4 SAT Craggy	1983 Rm 104	multi	Mineral Wool 30 Cellulose 40 Non-Fibrous 30	None Detected
65 / 276717	Old Off White/Green 12x12 VFT	1983 Nurse	green	Non-Fibrous 100	None Detected
66 / 276718	Old Off White/Green 12x12 VFT	1983 Teacher's Lounge	green	Non-Fibrous 100	None Detected
67 / 276719	Black Mastic	on #65	black	Non-Fibrous 95	**Detected** **Chrysotile 5**
68 / 276720	Black Mastic	on #66	black	Non-Fibrous 95	**Detected** **Chrysotile 5**

FieldID / LabID	Material	Location	Color	Non-Asbestos %	Asbestos %
69 / 276721	Old Gray/Tan 12x12 VFT	1983 Hallway	tan	Non-Fibrous 100	None Detected
70 / 276722	Old Gray/Tan 12x12 VFT	1983 Rm 101	white	Non-Fibrous 100	None Detected
71 / 276723	Black Mastic	on #69	black	Non-Fibrous 98	**Detected** **Chrysotile 2**
72 / 276724	Black Mastic	on #70	black	Non-Fibrous 95	**Detected** **Chrysotile 5**
73 / 276725	New Tan/Brown 12x12 VFT	1983 Rm 108	tan	Non-Fibrous 100	None Detected
74 / 276726	New Tan/Brown 12x12 VFT	1983 Rm 109	black	Non-Fibrous 90	**Detected** **Chrysotile 10**
75 / 276727	Black Mastic	on #73	brown	Non-Fibrous 100	None Detected
76 / 276728	Black Mastic	on #74	black	Non-Fibrous 90	**Detected** **Chrysotile 10**
77 / 276729	New Beige 12x12 VFT	1983 Rm 112	tan	Non-Fibrous 100	None Detected
78 / 276730	New Beige 12x12 VFT	1983 Rm 112	tan	Non-Fibrous 100	None Detected
79 / 276731	Red Duct Sealant	1983 Stage	red	Non-Fibrous 100	None Detected
80 / 276732	Red Duct Sealant	1983 Rm 104 Storage	red	Non-Fibrous 100	None Detected
81 / 276733	Interior Window Glaze	1983 Hallway	black	Non-Fibrous 95	**Detected** **Chrysotile 5**
82 / 276734	Interior Window Glaze	1983 Teacher's Lounge	black	Non-Fibrous 95	**Detected** **Chrysotile 5**
83 / 276735	Door Glass Glaze	1983 Hallway	black	Non-Fibrous 95	**Detected** **Chrysotile 5**
84 / 276736	Door Glass Glaze	1983 Hallway	black	Non-Fibrous 90	**Detected** **Chrysotile 10**
85 / 276737	Window Sill	1983 Rm 106	black	Non-Fibrous 100	None Detected
86 / 276738	Window Sill	1983 Rm 109	black	Non-Fibrous 100	None Detected

FieldID / LabID	Material	Location	Color	Non-Asbestos %	Asbestos %
87 / 276739	Wood Door Insulation	1983 Rm 107	white	Cellulose 30 Non-Fibrous 70	None Detected
88 / 276740	Window Frame Caulk	1983 Exterior Window	brown	Non-Fibrous 100	None Detected
89 / 276741	Window Frame Caulk	1983 Exterior Window	brown	Non-Fibrous 100	None Detected
90 / 276742	Window Glass Glaze	1983 Exterior Window	black	Non-Fibrous 90	**Detected** **Chrysotile 10**
91 / 276743	Window Glass Glaze	1983 Exterior Window	black	Non-Fibrous 95	**Detected** **Chrysotile 5**
92 / 276744	Door Frame Caulk	1983 Exterior Door	tan	Non-Fibrous 100	None Detected
93 / 276745	Door Frame Caulk	1983 Exterior Door	gray	Non-Fibrous 100	None Detected
94 / 276746	Unit Vent Caulk	1983 Exteiror Vent	gray	Non-Fibrous 100	None Detected
95 / 276747	Unit Vent Caulk	1983 Exteiror Vent	gray	Non-Fibrous 100	None Detected

Analyzed by: Stefanie Billet

Batch: 24622

CHAIN OF COSTODY

Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702
Tel: (508) 628-5486 - Fax: (508) 628-5488
adieb@uec-env.com

PLM
24 hour TAT

Town/City: Northbridge, MA Building Name Northbridge Elementary

Sample	Result	Description of Material	Sample Location
1		Pyro block	1930 Attic
2		| |	| |
3		Batting Insulation	| |
4		| |	| |
5		Plaster	1930 1st fl. hall wall
6		|	1930 2nd fl. hall wall
7		|	1930 Rm 203 wall
8		|	1930 Rm 303 wall
9		|	1930 3rd fl. Closet wall
10		|	1930 1st fl. Boys Room ceiling
11		|	1930 Rm 306 ceiling
12		Joint compound	1930 1st fl. conference
13		| |	1930 Library
14		Textured ceiling plaster	Boiler room
15		| |	| |
16		| |	| |
17		old Tan+Gray 12x12 VFT	1930 1st fl. OT/PT Room
18		| |	| |
19		Black mastic	| |
20		| |	| |

Reported By: Jason Becotte Date: 7-27-17 Due Date:

Received By: [signature] Date: 7/28/17

CHAIN OF CUSTODY

Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702
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PLM
24-hour TAT

Town/City: Northbridge, MA Building Name Northbridge Elementary

Sample	Result	Description of Material	Sample Location
21		old off white/green 12x12 VFT	1930 1st fl. Library
22		| |	| |
23		Black mastic	| |
24		| |	| |
25		new 12x12 VFT	1930 1st fl. hallway
26		| |	| |
27		old Black mastic	| |
28		| |	| |
29		New 12x12 VFT	1930 Room 203 Top Layer
30		| |	1930 Rm 205 top layer
31		| |	1930 Rm 304 top layer
32		Hidden Poured flooring	1930 Rm 203
33		| |	1930 Rm 205
34		| |	1930 Rm 304
35		Flooring Plaster	1930 Rm 203
36		| |	1930 Rm 205
37		| |	1930 Rm 304
38		Black Flooring Paper	1930 Rm 203 Bottom Layer
39		| |	1930 Rm 205 Bottom Layer
40		| |	1930 Rm 304 Bottom Layer

Reported By: Jason Becotte Date: 7-27-17 Due Date:

Received By: Date:

CHAIN OF CUSTODY

Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702
Tel: (508) 628-5486 - Fax: (508) 628-5488
adieb@uec-env.com

PLM
24-hour TAT

Town/City: Northbridge, MA Building Name Northbridge Elementary

Sample	Result	Description of Material	Sample Location
41		Boiler exhaust insulation	Boiler room
42		| |	| |
43		| |	| |
44		2x4 SAT Craggy	1930 1st fl. Library
45		| |	1930 1st fl. conference room
46		Door frame caulk	1930 Exterior door
47		window glaze	1930 exterior window
48		| |	| |
49		unit vent caulk	1930 exterior vent
50		| |	| |
51		sheetrock wall panel	modular Hallway
52		| |	modular Room 5
53		Tan w/Brown 12x12 VFT	modular Hallway
54		| |	modular Room 5
55		yellow glue	on # 53
56		| |	on # 54
57		2x4 SAT modern	modular Hallway
58		| |	modular Room 5
59		Black sink coating	1983 teachers room
60		| |	| |

Reported By: Jason Becotte Date: 7-27-17 Due Date:

Received By: Date:

CHAIN OF CUSTODY

Universal Environmental Consultants
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PLM
24-hour TAT

Town/City: Northbridge, MA **Building Name** Northbridge Elementary

Sample	Result	Description of Material	Sample Location
61		Ceramic Covebase glue	1983 Boys room
62		| |	| |
63		2x4 SAT Craggy	1983 Rm 108
64		| |	1983 Rm 104
65		old offwhite/green 12x12 VFT	1983 nurse
66		| |	1983 Teachers Lounge
67		Black mastic	on # 65
68		| |	on # 66
69		old gray/Tan 12x12 VFT	1983 Hallway
70		| |	1983 Rm 101
71		Black mastic	on # 69
72		| |	on # 70
73		new Tan/Brown 12x12 VFT	1983 Rm 108
74		| |	1983 Rm 109
75		Black mastic	on # 73
76		| |	on # 74
77		new Beige 12x12 VFT	1983 Rm 112
78		| |	| |
79		Red duct sealant	1983 Stage
80		| |	1983 Rm 104 storage

Reported By: Jason Becotte Date: 7-27-17 Due Date:

Received By: Date:

CHAIN OF CUSTODY

Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702
Tel: (508) 628-5486 - Fax: (508) 628-5488
adieb@uec-env.com

PLM
24-hour TAT

Town/City: Northbridge, MA **Building Name** Northbridge Elementary

Sample	Result	Description of Material	Sample Location
81		Interior window glaze	1983 Hallway
82		| |	1983 Teachers Lounge
83		Door glass glaze	1983 Hallway
84		| |	| |
85		window sill	1983 Rm 106
86		| |	1983 Rm 109
87		wood door Insulation	1983 Rm 107
88		window Frame caulk	1983 exterior window
89		| |	| |
90		window glass glaze	1983 exterior window
91		| |	| |
92		Door Frame Caulk	1983 exterior door
93		| |	| |
94		unit vent caulk	1983 exterior vent
95		| |	| |

Reported By: Jason Becotte Date: 7-27-17 Due Date:

Received By: Date:

OrderID: 011706025

011706025

CHAIN OF CUSTODY

Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702
Tel: (508) 628-5486 - Fax: (508) 628-5488
adieb@uec-env.com

Mercury
72-hour TAT

Town/City: Northbridge, MA Building Name Northbridge Elementary

	Sample	Result	Description of Material	Sample Location
1	1		Rubber Flooring	1983 Gym
2	2		" "	" "

Reported By: Jason Bewitt Date: 7-26-17 Due Date:

Received By: [signature] 21.3 Date: 7/28/17 09:45

RECEIVED
JUL 27 2017
By 8:30 RB

dud box

Fx: 7953 1825 8011

EMSL Analytical, Inc.
200 Route 130 North, Cinnaminson, NJ 08077
Phone: (856) 303-2500 Fax: (856) 858-4571 Email: EnvChemistry2@emsl.com

Attn: **Ammar Dieb**
Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702

Phone: (508) 628-5486
Fax: (508) 628-5488

8/2/2017

The following analytical report covers the analysis performed on samples submitted to EMSL Analytical, Inc. on 7/28/2017. The results are tabulated on the attached data pages for the following client designated project:

Northbridge Elementary - Northbridge, MA

The reference number for these samples is EMSL Order #011706025. Please use this reference when calling about these samples. If you have any questions, please do not hesitate to contact me at (856) 303-2500.

Approved By:

Phillip Worby, Environmental Chemistry
Laboratory Director

The test results contained within this report meet the requirements of NELAP and/or the specific certification program that is applicable, unless otherwise noted.
NELAP Certifications: NJ 03036, NY 10872, PA 68-00367, CA ELAP 1877

The samples associated with this report were received in good condition unless otherwise noted. This report relates only to those items tested as received by the laboratory. The QC data associated with the sample results meet the recovery and precision requirements established by the NELAP, unless specifically indicated. All results for soil samples are reported on a dry weight basis, unless otherwise noted. This report may not be reproduced except in full and without written approval by EMSL Analytical, Inc.

EMSL Analytical, Inc.
200 Route 130 North, Cinnaminson, NJ 08077
Phone/Fax: (856) 303-2500 / (856) 858-4571
http://www.EMSL.com EnvChemistry2@emsl.com

EMSL Order:	011706025
CustomerID:	UEC63
CustomerPO:	
ProjectID:	

Attn: **Ammar Dieb**
Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702

Phone: (508) 628-5486
Fax: (508) 628-5488
Received: 07/28/17 9:45 AM

Project: **Northbridge Elementary - Northbridge, MA**

Analytical Results

Client Sample Description 1
Rubber Flooring - 1983 Gym
Collected: 7/26/2017 ***Lab ID:*** *011706025-0001*

Method	*Parameter*	*Result*	*RL*	*Units*	*Prep Date*	*Analyst*	*Analysis Date*	*Analyst*
7471B	Mercury	0.050	0.049	mg/Kg	7/31/2017	LY	7/31/2017	LY

Client Sample Description 2
Rubber Flooring - 1983 Gym
Collected: 7/26/2017 ***Lab ID:*** *011706025-0002*

Method	*Parameter*	*Result*	*RL*	*Units*	*Prep Date*	*Analyst*	*Analysis Date*	*Analyst*
7471B	Mercury	ND	0.049	mg/Kg	7/31/2017	LY	7/31/2017	LY

Definitions:

ND - indicates that the analyte was not detected at the reporting limit
RL - Reporting Limit (Analytical)

OrderID: 131703310

131703310

UEC universal environmental consultants

12 Brewster Road
Framingham, MA 01702
Phone: 508.628.5486
Fax: 508.628.5488

CHAIN OF CUSTODY

BUILDING / SITE NAME: Northbridge Elementary

TOWN / CITY: Northbridge

WORK AREA:

STATE: MA

Analysis Type	6-8 Hr	12 Hr	24 Hr	48 Hr	72 hr
TEM / AHERA					
TEM / Level II					
TEM / Dust					
TEM / Bulk					
TEM / Water					
PLM					
Mold			X		
Other:					

Turnaround Time (x)

Specific Project Notes

SAMPLE ID	MATERIAL DESCRIPTION	SAMPLE LOCATION	START	STOP	TIME	L/MIN	VOLUME
1	24221555	Room M-4	1324	1334	10	15	150
2	24221595	Room 104	1327	1337	10	15	150
3	24219704	Library	1336	1346	10	15	150
4	24219701	Room 209	1340	1350	10	15	150
5	24219675	Room 301	1349	1359	10	15	150
6	24221561	outside	1351	1401	10	15	150

SAMPLED BY: Jason Becotte	DATE/TIME: 7-25-17	RECEIVED BY:	DATE/TIME:
RELINQUISHED BY:	DATE/TIME:	RECEIVED IN LAB BY:	DATE/TIME:

RECEIVED JUL 27 2017 By 8:30 MB

EMSL Analytical, Inc.

5 Constitution Way, Unit A Woburn, MA 01801
Tel/Fax: (781) 933-8411 / (781) 933-8412
http://www.EMSL.com / bostonlab@emsl.com

EMSL Order: 131703310
Customer ID: UEC63
Customer PO:
Project ID:

Attn: Ammar Dieb
Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702

Phone: (617) 984-9772
Fax: (508) 628-5488
Collected: 07/25/2017
Received: 07/27/2017
Analyzed: 07/27/2017

Project: Northbridge Elementary

Test Report: Air-O-Cell(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods EMSL 05-TP-003, ASTM D7391)

Lab Sample Number:	131703310-0001			131703310-0002			131703310-0003		
Client Sample ID:	1			2			3		
Volume (L):	150			150			150		
Sample Location	room M-4			room 104			library		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria	-	-	-	-	-	-	-	-	-
Ascospores	-	-	-	-	-	-	2	40	2
Aspergillus/Penicillium	-	-	-	-	-	-	1	20	1
Basidiospores	13	280	100	4	90	69.2	86	1900	93.6
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	-	-	-	2	40	30.8	3	70	3.4
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	-	-	-	-	-	-	-	-	-
Pithomyces	-	-	-	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis	-	-	-	-	-	-	-	-	-
Stachybotrys	-	-	-	-	-	-	-	-	-
Torula	-	-	-	-	-	-	-	-	-
Ulocladium	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Cercospora	-	-	-	-	-	-	-	-	-
Total Fungi	**13**	**280**	**100**	**6**	**130**	**100**	**92**	**2030**	**100**
Hyphal Fragment	-	-	-	-	-	-	-	-	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	-	-	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	22	-	-	22	-	-	22	-
Analyt. Sensitivity 300x	-	7*	-	-	7*	-	-	7*	-
Skin Fragments (1-4)	-	2	-	-	2	-	-	2	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-
Background (1-5)	-	1	-	-	1	-	-	1	-

Bipolaris++ = Bipolaris/Drechslera/Exserohilum
Myxomycetes++ = Myxomycetes/Periconia/Smut

No discernable field blank was submitted with this group of samples.

Steve Grise, Laboratory Manager
or other approved signatory

High levels of background particulate can obscure spores and other particulates leading to underestimation. Background levels of 5 indicate an overloading of background particulates, prohibiting accurate detection and quantification. Present = Spores detected on overloaded samples. Results are not blank corrected unless otherwise noted. The detection limit is equal to one fungal spore, structure, pollen, fiber particle or insect fragment. "*" Denotes particles found at 300X. "-" Denotes not detected. Due to method stopping rules, raw counts in excess of 100 are extrapolated based on the percentage analyzed. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Woburn, MA AIHA-LAP, LLC --EMLAP Accredited #180179

Initial report from: 07/27/2017 13:37:37

For information on the fungi listed in this report, please visit the Resources section at www.emsl.com

EMSL Analytical, Inc.

5 Constitution Way, Unit A Woburn, MA 01801

Tel/Fax: (781) 933-8411 / (781) 933-8412

http://www.EMSL.com / bostonlab@emsl.com

EMSL Order: 131703310
Customer ID: UEC63
Customer PO:
Project ID:

Attn: Ammar Dieb
Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702

Phone: (617) 984-9772
Fax: (508) 628-5488
Collected: 07/25/2017
Received: 07/27/2017
Analyzed: 07/27/2017

Project: Northbridge Elementary

Test Report: Air-O-Cell(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods EMSL 05-TP-003, ASTM D7391)

Lab Sample Number:	131703310-0004			131703310-0005			131703310-0006		
Client Sample ID:	4			5			6		
Volume (L):	150			150			150		
Sample Location	room 204			room 301			outside		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria	-	-	-	-	-	-	1*	7*	0.1
Ascospores	3	70	2.1	-	-	-	47	1000	7.2
Aspergillus/Penicillium	-	-	-	7	200	11.6	-	-	-
Basidiospores	142	3100	95.1	71	1500	87.2	583	12700	91.5
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	3*	20*	0.6	-	-	-	1	20	0.1
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	3	70	2.1	1	20	1.2	5	100	0.7
Myxomycetes++	-	-	-	-	-	-	2	40	0.3
Pithomyces	-	-	-	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis	-	-	-	-	-	-	-	-	-
Stachybotrys	-	-	-	-	-	-	-	-	-
Torula	-	-	-	-	-	-	-	-	-
Ulocladium	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Cercospora	-	-	-	-	-	-	1*	7*	0.1
Total Fungi	**151**	**3260**	**100**	**79**	**1720**	**100**	**640**	**13874**	**100**
Hyphal Fragment	-	-	-	1	20	-	-	-	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	-	-	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	22	-	-	22	-	-	22	-
Analyt. Sensitivity 300x	-	7*	-	-	7*	-	-	7*	-
Skin Fragments (1-4)	-	2	-	-	2	-	-	1	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-
Background (1-5)	-	1	-	-	1	-	-	1	-

Bipolaris++ = Bipolaris/Drechslera/Exserohilum
Myxomycetes++ = Myxomycetes/Periconia/Smut

No discernable field blank was submitted with this group of samples.

Steve Grise, Laboratory Manager
or other approved signatory

High levels of background particulate can obscure spores and other particulates leading to underestimation. Background levels of 5 indicate an overloading of background particulates, prohibiting accurate detection and quantification. Present = Spores detected on overloaded samples. Results are not blank corrected unless otherwise noted. The detection limit is equal to one fungal spore, structure, pollen, fiber particle or insect fragment. "*" Denotes particles found at 300X. "-" Denotes not detected. Due to method stopping rules, raw counts in excess of 100 are extrapolated based on the percentage analyzed. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Woburn, MA AIHA-LAP, LLC --EMLAP Accredited #180179

Initial report from: 07/27/2017 13:37:37

For information on the fungi listed in this report, please visit the Resources section at www.emsl.com

AccuStar

Radon in Air

NELAC NY 11769
NRPP 101193 AL
NRSB ARL0017

EPA Method #402-R-92-004
Liquid Scintillation
NRPP Device Code 8088
NRSB Device Code 12193

Laboratory Report for:

Universal Environmental Consultant
12 Brewster Road
Framingham MA 01702

Property Tested:

Northbridge Elementary School
30 Cross Street
Whitinsville MA 01588

Log Number	Device Number	Test Exposure Duration:		Area Tested	Result (pCi/L)
2143578	3486390	07/24/2017 2:30 pm	07/27/2017 11:35 am	First Floor Library	0.8
2143579	3486361	07/24/2017 2:33 pm	07/27/2017 11:39 am	First Floor Cafeteria	< 0.4
2143580	3486357	07/24/2017 2:36 pm	07/27/2017 11:40 am	First Floor Gym Office	2.6
2143581	3486354	07/24/2017 2:37 pm	07/27/2017 11:41 am	First Floor Room 105	< 0.4
2143582	3486363	07/24/2017 2:38 pm	07/27/2017 11:42 am	First Floor Room 111	1.2

Comment: Device 3486396 was not received with this datasheet. Universal Environmental Consultant was emailed a copy of this report.

Test Performed By: Jason Becotte

Distributed by: Universal Environmental Consultant

Date Received: 07/27/2017 Date Logged: 07/27/2017 Date Analyzed: 07/28/2017 Date Reported: 07/28/2017

Report Reviewed By: Michele Cleveland

Report Approved By:

Shawn Price, Director of Laboratory Operations, AccuStar Labs

Disclaimer:

The uncertainty of this radon measurement is ~+/- 10 %. Factors contributing to uncertainty include statistical variations, daily and seasonal variations in radon concentrations, sample collection techniques and operation of the dwelling. Interference with test conditions may influence the test results.

This report may only be transferred to a third party in its entirety. Analytical results relate to the samples AS RECEIVED BY THE LABORATORY. Results shown on this report represent levels of radon gas measured between the dates shown in the room or area of the site identified above as "Property Tested". Incorrect information will affect results. The results may not be construed as either predictive or supportive of measurements conducted in any area of this structure at any other time. AccuStar Labs, its employees and agents are not responsible for the consequences of any action taken or not taken based upon the results reported or any verbal or written interpretation of the results.