# 3.1.1 Introduction

In April of 2014 the Lowell School District submitted a Statement of Interest (SOI) to the MSBA regarding the condition of the Lowell High School. Through the course of the eligibility phase, the District worked with the MSBA to define a range of configuration options that could be explored. In November of 2015 the MSBA invited the district to proceed with a Feasibility Study that would explore options for a High School of 3,520 students

Following the Eligibility period the District continued on Forming-the-Team and subsequently engaged Skanska USA Building consulting as the Owner's Project Manager and Perkins Eastman|DPC as the Architect.

The primary reason for the study as stated in the SOI is the age and condition of the existing school building(s), and the prevention of severe overcrowding expected to result from increased enrollments. In order to fully understand the existing building(s), site(s), current educational program, community concerns and overall project goals/objectives, the Feasibility Study process was outlined with several major tracks of study that occurred in an overlapping sequence, including;

1) Existing Conditions Study - the scope of the Feasibility Study included a full assessment of the Existing High School building's facilities.
    a. Architectural staff visited and cataloged the facility conditions of the Lowell High School.
    b. MEP/FP, Structural, Acoustical, Audio Visual, Code, Foodservice, Geo-environmental, and Security, consultants visited and toured the facilities.
    c. Civil Engineers and Landscape Architects visited the site(s) cataloged the conditions as well as observed the morning and evening activities.
    d. Geo-environmental and Hazardous Materials consultants performed both a phase 1 and a full survey of hazardous materials.
    e. Engineers completed a property survey at the downtown site which included all parcels except the Freshman Academy.
    f. Traffic consultants conducted a preliminary traffic study at the downtown, Wang and Cawley sites. A more detailed traffic analysis will be conducted when a final site is selected.
    g. Preliminary geo-technical exploration will be performed at the site finally selected.
    h. Historic Preservation consultants conducted a Preliminary Evaluation of the Lowell High School Existing Conditions and Historic Preservation Regulatory Review. The campus facilities include four buildings identified in the report as the 1922 Building (Kouloheras/Sullivan/Coburn Hall), Lord/Fieldhouse Buildings, Freshman Academy and the Steam Plant.

All buildings are located within either the Lowell National Historic Park and Preservation District, City Hall District or the Downtown Lowell Historic District. Work on these buildings will be subject to Massachusetts Historic Commission, the Lowell Historic Board and the National Park Service.

2) **Alternate Sites** - Different sites throughout the city were examined for a suitable alternate location for the high school. A large list of possible sites was developed which was quickly culled to six potential locations. The six sites were further analyzed in more detail resulting in further reducing the sites to three which were identified as the most suitable for a new high school. The three high school sites include; 1. Existing downtown High School location, 2. Wang Middle School / LeBlanc Park and 3. Cawley Stadium. Test fits were then studied at each site to determine the impact a school of this size would have on the site and the surrounding community.

3) **Educational Visioning** – During the months of October and November of 2016, the Lowell High School Educational Working Group (EWG), a group of approximately 50 Lowell Area Schools (LAS) administrative leaders, and Lowell High School (LHS) teachers, administrators, students, parents, and community partners, participated in three Educational Visioning Workshops run by New Vista Design and Perkins Eastman | DPC. Each workshop was a collaborative session designed to inform the LHS design process. Participants were led through a step – by - step process aimed at capturing their best thinking about LAS's/LHS's current and future educational goals and priorities, and connecting them to the best practices and possibilities in innovative school facility design.

   Educational Workshop 1 - October 14, 2016

   Agenda: Priority Goals, 21st Century Teaching and Learning Practices, Strengths, Challenges, Opportunities and Goals (SCOG Analysis), 21st Century Learning Goals.

   Educational Workshop 2 – November 1, 2016

   Agenda: 21st Century Design Patterns 1.0, Guiding Principles 1.0.

   Educational Workshop 3 – November 17, 2016

   Agenda: Blue Sky Ideas, Key Spaces and Adjacencies, Bubble and Adjacency Diagramming.

   See Appendix for presentation materials and meeting notes.

4) **Educational Programming** – based on the visioning process, public and committee input and ELT direction, the Educational Program was developed, vetted and approved via the School Committee. The space needs were developed in conjunction with the Educational Program and corroborated through the course of numerous ELT meetings and work sessions.

5) **Development of Options** – the development of alternatives began with a preliminary assessment of site options and test-fit studies at each location as mentioned above before extending into plan alternatives. New high school options were examined at the three alternate sites. One new school option was studied at the Wang and Cawley sites and two options were examined at the existing downtown site. In addition to the four new options, six various addition and renovation options were studied at the downtown site, totaling ten preliminary options studied. The ten options in addition to Base Repair were studied as follows:
    a. Base Repair (existing site)
    b. Full Renovation w/ Small Additions (existing site)
    c. Addition / Renovation Option 1A (existing site)
    d. Addition / Renovation Option 2 (existing site)
    e. Addition / Renovation Option 3 (expanded existing site)
    f. Addition / Renovation Option 4 (existing site)
    g. Addition / Renovation Option 5 (expanded existing site)
    h. New School (existing site)
    i. New School (expanded existing site)
    j. New School Wang
    k. New School Cawley

# A. Summary of Deficiencies

Lowell High School (LHS) currently educates over 3,100 students in grades nine through twelve (9 – 12). The high school reflects the great diversity of the City of Lowell with students representing over 50 countries from all over the world. LHS provides a comprehensive high school offering of programs for all Lowell Public School students in grade 9 – 12, as well as ROTC, Culinary arts, and swimming. The facility also houses city-wide services programmed for the students including a community health center, bank, CCTV, DARE, UP and a thrift shop.

Lowell High School's facilities are of an age that the facilities can no longer keep pace with the instructional and program needs of the community. For any comprehensive high school, it is imperative that they maintain a current facility and curriculum. In particular, the science related program offerings are constrained due to outdated and inadequate education spaces within the buildings. Lowell High School facilities must be updated so as to support current needs and be flexible enough to meet future needs as well. The current conditions of the facilities are an obstruction to delivering a 21st Century education while improved facilities will create more opportunities for interdisciplinary teaching and will strengthen student achievement.

The facility's deficiencies are detailed in the Statement of Interest (SOI) included as the appendix , but can be briefly described as follows:

Lowell High School campus sits on four parcels on municipally owned land totaling approximately 6.6 acres. In addition to the 1922 (2.7 acres) and 1980 buildings (3.3 acres), a third building located across the street and not connected to the campus houses the Lowell High School Freshman Academy, as well as the Steam Plant which is adjacent to the Freshman Academy. The LHS Freshman Academy sits on an approximately .4 acre parcel per GIS. The site for the Steam Plant which provides heat to the school buildings is adjacent to the National Park Service Building and is approximately .2 acres. Zoning is Downtown Mixed Use District.

Generally the site is flat, fully developed and bordered either by city streets or adjacent properties. The High School occupies three separate distinct parcels that form the campus. The campus is divided by a canal, or in the case of the Freshman Academy, a city street. Students and staff are required to cross a city street or traverse the second story bridges to travel between buildings. All drop-off / pick-up take place on the adjacent city streets and sidewalks.

There is a city owned parking garage across Father Morissette Boulevard that serves both staff and students. Visitors to the school utilize on street metered parking. There are approximately 3 onsite parking spaces. There are a number of paved courtyards and walks adjacent to the main entrance and the cafeteria. The Merrimack canal runs between the 1922 building on the east side and the Lord Building and Field House on the west side of the canal. The space between is landscaped on each side and provides for a pleasant urban park-like atmosphere. Unfortunately, there is also a Trolley for tourist and visitors to the Lowell Historic Park that parallels the west side of the canal and further divides and separates the main campus. There are two connecting enclosed bridges at the second floor that span the trolley tracks and the canal to accommodate pedestrian traffic between the two buildings. The constrained site does not provide for any outside athletic or physical education opportunities, with the exception of a small irregular shaped green space adjacent to the city parking garage which is used for outside physical education classes.

Lowell High School Buildings Located in the City of Lowell Massachusetts - TOTAL: +/- 626,188 GSF
Freshman Academy- +/- 90,236 SF (1900 & 1939 portions) located at 40 Paige Street
Steam Plant – +/-3,328 SF, no additions located at Paige Street
High School - 1922 Building (Coburn/Kouloheras/Sullivan) – +/-312,052 SF (whole facility) 50 Father Morissette Blvd
High School - 1980 Buildings (Lord & Fieldhouse) –+/- 216,172 SF, no additions 50 Father Morissette Blvd
Connecting Bridges – 1980 and 1997 – 4,400 SF.

### National and State Registers of Historic Places

Lowell High School is listed on the National and State Registers of Historic Places through its inclusion within both the Lowell National Historical Park & Preservation District, the City Hall Historic District and the downtown Lowell Historic District. This applies to the buildings on Kirk Street including Colburn Hall (1892), the Sullivan addition built circa 1922 and the 1997 Kouloheras addition. The 1980 sections (Lord and Fieldhouse) are within the preservation district and within the Lowell Downtown Historic District. All work on these buildings will require Lowell Historic Board and likely MHC review. Three nearby buildings also associated with the high school, the former Lowell Trade School (1901) at 68 John Street, the Lowell High School Annex (1939) at 55 French Street as well as the Steam Plant and associated smokestack on French Street are also listed on the National and State Registers of Historic Places through their inclusion within both the Lowell National Historical Park & Preservation District and the City Hall Historic District.

This report is organized in accordance with MSBA Module 3 – Feasibility Study Guidelines (updated January 2015). The Preliminary design program process took a course that, in general, included determination of the Owner's needs, assessment of existing conditions, analysis/evaluation of alternatives, and recommendation of at least three (3) distinct alternatives for further study. As part of the Feasibility Study scope of work, the Owner also requested that Perkins Eastman|DCP study and evaluate, in addition to the existing facility to review potential New Construction options for the 3,520 student enrollments; this work is presented in 3.1.6 Preliminary Evaluation of Alternatives.

In addition to the problems posed by the physical condition of the buildings, other reviews identified significant programmatic deficiencies. Some of the physical plant issues affecting the educational program are inadequate lighting, poor ventilation and cooling, and some acoustic issues. Others are the size and arrangement of certain spaces, or are simply a lack of the correct type of space. Current classroom sizes are not in compliance with MSBA standards for new construction. In addition, the current high school is not in compliance with sprinkler, seismic, energy, and ADA codes/requirements.

The feasibility study provides an analysis of the Base Repair option for the High School, addressing deficiencies as previously identified in various accreditation reports and review the problems identified in the Statement of Interest.

## B. Date of Invitation to Feasibility

On April 10, 2014, the Owner submitted a Statement of Interest to the MSBA for the Lowell High School. The MSBA Board of Directors invited the Lowell School District to conduct a Feasibility Study to explore a broader range of options that included; renovations, renovation /addition and or new construction option to address the facility's deficiencies. A copy of the MSBA's Board Action Letter dated November 18, 2015 is attached in the appendix section.

## C. Design Enrollment

The agreed-upon Design Enrollment Certification dated October 9, 2015 (MSBA Executed Design Enrollment Certification) calls for the Feasibility Study to consider design alternatives for a Grade 9-12 enrollment of 3,520 students from the districts. A copy of the MSBA's Design Enrollment Certification Letter is attached under the appendix section.

## D. Capital Budget Statement Narrative

The Lowell School district has initiated planning to address deficiencies and issues as identified in the Statement of Interest for the Lowell High School buildings. The aim of the project is to provide adequate, safe and economical facilities that meet the MSBA's Education Program Space Standards and Guidelines for high school building. At the February 7, 2016 School Building Committee meeting the SBC recommended to the City Council to submit the PDP to MSBA and study further four options in more detail; Full Renovation w/ Small Additions, Add/Reno Option 2, Add/Reno Option 3 (with expanded site) and a New School at the Cawley Site.

It is anticipated the gross project cost of the construction range

Base Repair to be approximately $270,770,322

Full Renovation w/ Small Additions to be approximately $331,360,298

Add/Reno Option 2 to be approximately $344,087,262

Add/Reno Option 3 (Expanded Existing Site) to be approximately $334,335,971

New Bldg. at the Cawley Site to be approximately $332,458,871

The School Committee and School Building Committee have carefully reviewed and analyzed the affordability of the project. The funding source for this project would be through bonds paid through debt exclusions supported by the tax levy of the City.

The Capitol Budget Report is included in the appendix.

## E. Project Directory

The project directory is included in the appendix.

## F. Project Schedule

The project schedule is included in the appendix.

# 3.1.6 Preliminary Evaluation of Alternatives

## A. Analysis of School District Assignment Policies

The Lowell Public Schools (LPS) is one of the largest districts in Massachusetts, currently enrolling more than 14,150 students in grades PreK-12. The District consists of 28 schools, including an early childhood center, a PreK-2 STEM Academy, 13 elementary schools (predominantly PreK-4), 2 PreK-8 schools, 9 intermediate schools (typically 5-8), a career academy and 1 High School (grades 9-12).

The City schools have no additional capacity, nor a desire to relocate students or additional grades to the other schools. The preference would be to keep all grades and the projected enrollment on one campus for Lowell High School.

## B. Tuition Agreements

Lowell Public Schools does not have any tuition agreements with other districts.

## C. Rental or Acquisition of Existing Buildings

There are no rental properties or potential acquisitions known to the District that might be made available for school use.

## D. Code Upgrade Option (Base Repair)

The base repair study addresses the scope of work required to bring the current facility into conformance with applicable codes, including egress and accessibility, to repair the facilities to be weather tight and address all building systems, including mechanical, electrical, plumbing and fire protection.

**BUILDABLE ACREAGE = 6.6**
FULL SITE/ALL BUILDINGS

**GREEN SPACE** (SEP. LOT)
APPROX .5 ACRE NEARBY

**PARKING** (via GARAGE) =
1,200 TOTAL CAR CAPACITY
APPROX. 624 LHS PASSES

**BUILDING (GSF) = 628.0k**
RENOVATION = N/A
NEW/ADDITIONS = N/A

**RELATIVE COSTS**
TOTAL PROJECT = $270.8m
EST CITY SHARE = $73.2m

The Base Repair scope and costs provide a perspective of the relative cost of 'doing nothing'. Cost estimates were in the magnitude of $271m Total Project Cost which measures approximately 70-85% of the relative Add/Reno or New Construction Options, but does not meet the space needs (room types/count/sizes), nor the Educational Program objectives. The existing buildings would also remain with windowless labs, problematic solar orientation, inefficient facilities and limited access to green space. It was noted that the repair project, not meeting the school's Educational Program, would not be part of the MSBA's Core Program, but might seek funding through the Emergency Repair or other program(s).

The duration of repairs to the existing building was estimated at 4years and would require a significant number of modular classrooms, along with temporary gymnasium spaces.

## E. Renovation/Addition Option(s)

The range of renovation options studied consist of a Full Renovation of existing buildings (including the existing Freshman Academy) and 5 Addition/Renovation scenarios that add or rebuild portions of the Field House and Lord Building and a few that look at the potential to expand the existing site by acquiring adjacent property.

**Full Renovation Option** keeps all existing High School facilities, excluding the steam plant. Despite the gross size of the facilities that exceeds the program x1.5 grossing factor, small additions are required because of inefficiencies and the need to enlarge specific spaces (in specific locations), despite excess space elsewhere.

This option creates the proper space needs (room types, counts & sizes) and is able to locate some programs in their desired clusters and/or adjacencies, but many exceptions are caused by fitting spaces within the constraints of the existing facilities. The major shortcomings are having the freshman isolated from other shared programs, having the Gym, Library, Cafeteria & Auditorium spaces separated, rather than grouped or semi-clustered as a community core and heart to the school.

**BUILDABLE ACREAGE = 6.4**
6.6 TOTAL ACRES EXIST
- .2 ACRE STEAM PLANT

**GREEN SPACE** (SEP. LOT)
APPROX .5 ACRE NEARBY

**PARKING** (via GARAGE) =
1,200 TOTAL CAR CAPACITY
APPROX. 624 LHS PASSES

**BUILDING (GSF) = 641.6k**
RENOVATION = 623.7k GSF
NEW/ADDITION =17.9k GSF
(1 & 2 STORY ADDITIONS)

**RELATIVE COSTS**
TOTAL PROJECT = $331.4m
EST CITY SHARE = $116.5m

Pro's/Con's

+ Down Town Location is Ideal for Transportation & City/Social Services
+ Adjacent Parking Garage (covered/controlled & no maintenance)
+ Meets All Space Needs (room types/counts/sizes)
+/- Renovated Layout/Adjacencies Meet Some Educational Objectives
- Community Use/Activity Areas Spread & Split-Up among Buildings
- Freshman Academy is Remote (inefficient space use + safety concerns)
- Solar Orientation is Problematic (approx. 45 deg. off direct N/S exposure)
- Windowless Classrooms/Labs Remain
- Limited Access to Green Space
- Inefficient Operations (due to size and existing building envelope)

Construction/Phasing

- Anticipated 5yr Duration
- Significant Temporary Classrooms (Modulars) Required
- Temporary Gymnasium Spaces and/or Alternatives Required

Relative Costs

+ This Option is the Lowest Cost

**Addition/Renovation Option 1A** keeps all existing facilities, except the Freshman Academy (FA) and steam plant. Consolidates all grades onto the main campus and builds new program space over the canal and in front/back of the Lord Building. The new program spaces over the canal would be in the form of 2-story construction (connecting floors 2 & 3 of the existing buildings).

Although extensive reuse of existing facilities does not allow ideal configuration for all educational program objectives, it does integrate the Freshman Academy into historic Coburn Hall and creates opportunities for a new, more centralized entry/lobby core.

**BUILDABLE ACREAGE = 6.0**
6.6 TOTAL ACRES EXIST
- .6 ACRE STEAM/FA BLDG

**GREEN SPACE** (SEP. LOT)
APPROX .5 ACRE NEARBY

**PARKING** (via GARAGE) =
1,200 TOTAL CAR CAPACITY
APPROX. 624 LHS PASSES

**BUILDING (GSF) = 617.4k**
RENOVATION = 529.1k GSF
NEW/ADDITION =88.3k GSF
(2 & 3 STORY ADDITIONS &
NEW 2-STORY BRIDGES)

**RELATIVE COSTS**
TOTAL PROJECT = $341.0m
EST CITY SHARE = $132.5m


Regulatory permissions for air-rights require additional investigations if this option were to proceed as one of the preferred alternatives.

Same Pro's/Con's as Full Renovation, except;
+ Freshman Consolidated onto Main Campus (into Colburn Hall Building)
+ Former Freshman Facility Available for Reuse
+ Creates New Face/Entry to the School & Centralized Lobby/Cafeteria
+ New 2-Tier Bridges Improves Interior Circulation/Safety

Construction/Phasing
+/- Anticipated 4½yr Duration
- Some Temporary Classrooms (Modulars) Required
- Temporary Gymnasium Spaces and/or Alternatives Required

Relative Costs
+ This Option is in the Lower 1/3 of Costs to the City

**Addition/Renovation Option 2** rebuilds the Field House (FH) in the same general location as the existing, but in a more efficient and functional shape that also provides room on site for a new Freshman Academy building and small courtyard. This option would require a temporary solution for PE/Athletics while the new FH and 5 story FA/technology wing are constructed, but thereafter requires no modulars since the 5 story wing would create a 60 classroom equivalent of new space. Freshman would remain in their existing facility for the full duration of construction allowing the new wing to serve as temporary swing space for other programs.

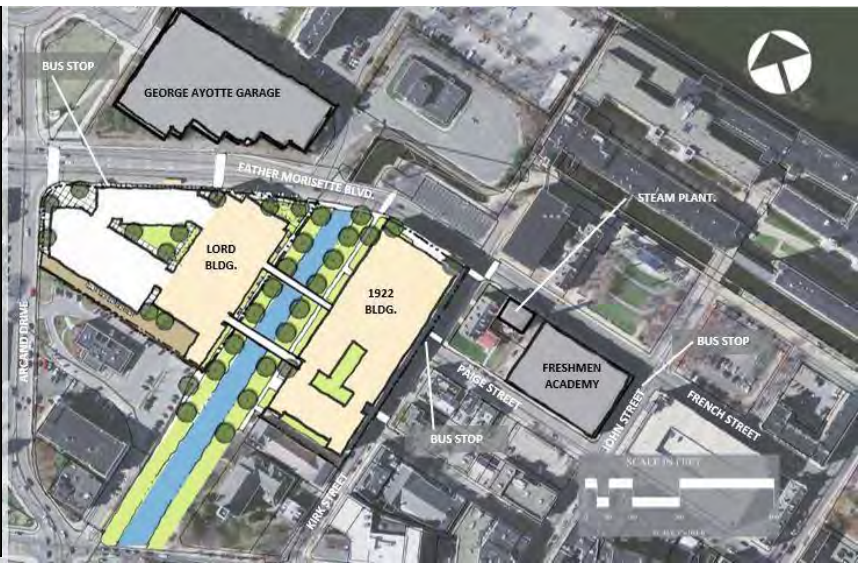
**BUILDABLE ACREAGE = 6.0**
6.6 TOTAL ACRES EXIST
- .6 ACRE STEAM/FA BLDG

**GREEN SPACE** (SEP. LOT)
APPROX .5 ACRE NEARBY

**PARKING** (via GARAGE) =
1,200 TOTAL CAR CAPACITY
APPROX. 624 LHS PASSES

**BUILDING (GSF) = 624.1k**
RENOVATION = 454.1k GSF
NEW/ADDITION =170k GSF
(2 STORY FH, 5 STORY FA
& NEW 2-STORY BRIDGES)

**RELATIVE COSTS**
TOTAL PROJECT = $344.1m
EST CITY SHARE = $135.6m




Same Pro's/Con's as Option 1A, except;
+ New Freshman Academy (ideal layout/adjacencies & solar orientation)
+ New Field House (more efficient/flexible and diverse, multi-purp. spaces)
+ Modest Green Space Created

Construction/Phasing
+/- Anticipated 4yr Duration
+ Few or No Temporary Classrooms (Modulars) Required
- Temporary Gymnasium Spaces and/or Alternatives Required

Relative Costs
+ This Option is also in the Lower 1/3 of Costs to the City

**Addition/Renovation Option 3 on Expanded Existing Site** – This option takes a look at the potential benefits or drawbacks of acquiring additional land adjacent to the Lord Building/Field House. The primary benefits of doing this would be to avoid the need for any modulars, including no temporary gymnasium spaces and to create a large outdoor green space that can be utilized by PE/Athletics, ROTC and other programs.

The resulting plan also takes advantage of having more space for new construction by cutting light-wells into the Lord Building, displacing approximately 6k sf of program into new construction, but eliminating windowless classrooms/labs.

**BUILDABLE ACREAGE = 7.4**
6.6 TOTAL ACRES EXIST
1.4 ADJACENT PARCEL
- .6 ACRE STEAM/FA BLDG

**GREEN SPACE** (SEP. LOT)
.5a ON-SITE +.5a NEARBY

**PARKING** (via GARAGE) =
1,200 TOTAL CAR CAPACITY
APPROX. 624 LHS PASSES

**BUILDING (GSF) = 638.7k**
RENOVATION = 447.5k GSF
NEW/ADDITION =191.2k
(2 STORY FH, 5 STORY FA
& NEW 2-STORY BRIDGES)

**RELATIVE COSTS**
TOTAL PROJECT = $334.3m
EST CITY SHARE = $126.4m


Same Pro's/Con's as Option 2, except;
+ Does Not Require PE/Athletics Alt. or Off-Site During Construction
+ Virtually No Windowless Classrooms (Lights Wells Created in Lord)
+ Large Green Space Created
+ New Kitchen/Mechanical/Loading

Construction/Phasing
+/- Anticipated 4½ yr Duration
+ No Modulars Required; Phasing is Minimally Disruptive

Relative Costs
+ This Option is also in the Lower 1/3 of Costs to the City

**Addition/Renovation Option 4** rebuilds the entire Western portion of the site including the former 3 story Lord Building as a narrower 5 story structure resulting in no windowless space and allowing a driveway or plaza along the canal-side. This option is similar to Option 2, except that the complete reconstruction of Lord significantly complicates phasing and requires extensive modulars. Reconstruction of portions of Lord would need to occur with the new FH and FA or would restrict use of them after.

Despite more new construction than previous options, the taller/narrower Lord Building forces some public use programs onto upper floors and splits the cafeteria on two floors. Spaces can be zoned for community/activity but occurs more vertically.

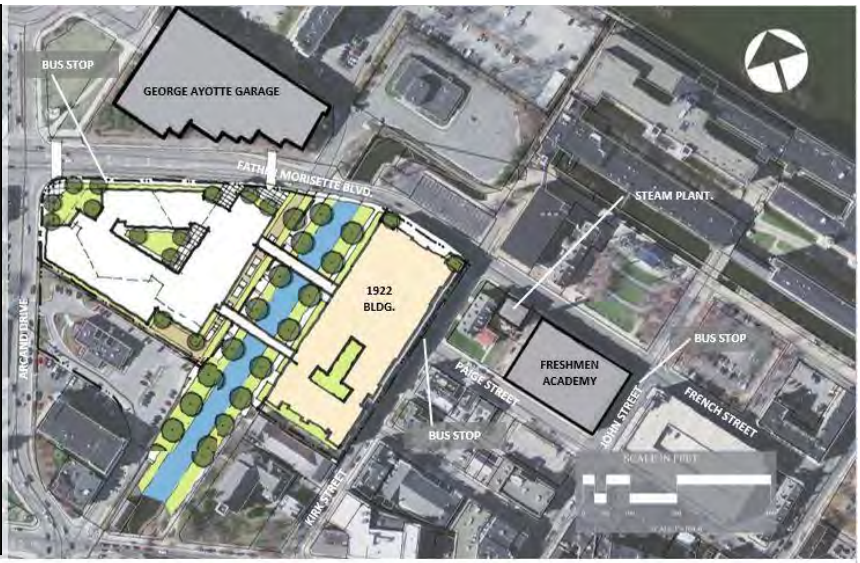
**BUILDABLE ACREAGE = 6.0**
6.6 TOTAL ACRES EXIST
- .6 ACRE STEAM/FA BLDG

**GREEN SPACE** (SEP. LOT)
APPROX .5 ACRE NEARBY

**PARKING** (via GARAGE) =
1,200 TOTAL CAR CAPACITY
APPROX. 624 LHS PASSES

**BUILDING (GSF) = 619.0k**
RENOVATION = 312.8k GSF
NEW/ADDITION =306.2k
(2 STRY FH, 5 STRY OTHER
& NEW 2-STORY BRIDGES)

**RELATIVE COSTS**
TOTAL PROJECT = $376.4m
EST CITY SHARE = $165.8m




Same Pro's/Con's as Option 2, except;

+ New Lord Building Allows Driveway or Canal-Side Plaza
+ Virtually No Windowless Classrooms
+/- Cafeteria is Split on Floors (creating separate freshmen area)
- Not All Programs that Prefer Ground Level Access Fit in that Floor
- Solar Orientation Not Ideal for Majority of Classrooms

Construction/Phasing

- Anticipated 5yr Duration
- Significant Temporary Classrooms (Modulars) Required
- Temporary Gymnasium & Cafeteria Spaces and/or Alternatives Required

Relative Costs

- This Option is in the Higher 1/3 of Costs to the City

**Addition/Renovation Option 5 on Expanded Site** is similar to Opt. 4, except it utilizes the adjacent parcel for larger green space and no temporary gym spaces (like Opt. 3).

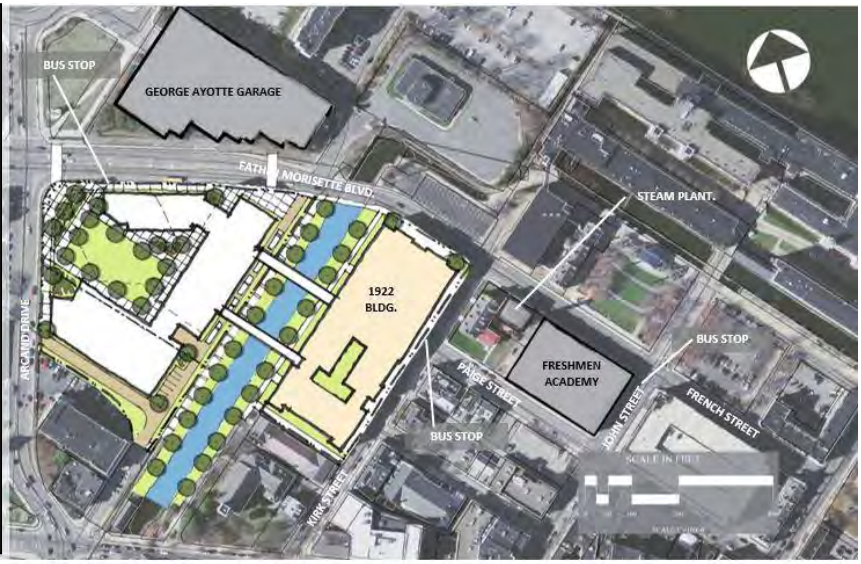
**BUILDABLE ACREAGE = 7.4**
6.6 TOTAL ACRES EXIST
1.4 ADJACENT PARCEL
- .6 ACRE STEAM/FA BLDG

**GREEN SPACE** (SEP. LOT)
.5a ON-SITE +.5a NEARBY

**PARKING** (via GARAGE) =
1,200 TOTAL CAR CAPACITY
APPROX. 624 LHS PASSES

**BUILDING (GSF) = 620.9k**
RENOVATION = 312.8k GSF
NEW/ADDITION =308.1k
(2 STORY FH, 5 STORY FA
& NEW 2-STORY BRIDGES)

**RELATIVE COSTS**
TOTAL PROJECT = $386.4m
EST CITY SHARE = $174.0m



As with Opt. 4, however, the complete reconstruction of Lord significantly complicates phasing and requires extensive modulars. It also forces program onto upper floors and creates a more vertical community/activity zone.

Same Pro's/Con's as Option 3, except;
+ Does Not Require PE/Athletics Alt. or Off-Site During Construction
+ New Lord Building Allows Roadway Passage through the Site
+/- Cafeteria is Split on Floors (creating separate freshmen area)
- Not All Programs that Prefer Ground Level Access Fit in that Floor
- Solar Orientation Not Ideal for Majority of Classrooms

Construction/Phasing
- Anticipated 5½yr Duration
- Significant Temporary Classrooms (Modulars) Required

Relative Costs
- This Option is the Most Costly

## F. New Construction Option(s)

The range of and new construction options included a study on the existing site, the expanded existing site and the 2 most viable alternative sites.

**New Construction on Existing Site** assumes the 1922 Building and Freshman Academy will not be demolished and instead would be returned to the City for reuse. The remaining site at only 3.3 acres creates a dense vertical layout for the new school that is fraught with compromises. In this study, windowless labs, bad solar orientation and major community activity areas on upper floors are forced as a result of the small footprint. Although construction might be accelerated in a condensed new-build, extensive modulars would be required and likely located remotely.

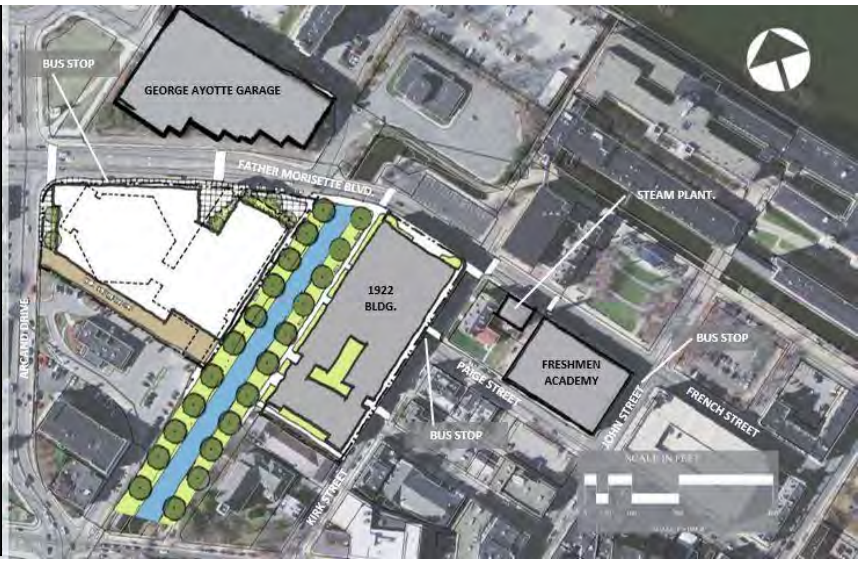
**BUILDABLE ACREAGE = 3.3**
6.6 TOTAL ACRES EXIST
-2.7 ACRE 1922 BLDG
- .6 ACRE STEAM/FA BLDG

**GREEN SPACE** (SEP. LOT)
APPROX .5 ACRE NEARBY

**PARKING** (via GARAGE) =
1,200 TOTAL CAR CAPACITY
APPROX. 624 LHS PASSES

**BUILDING (GSF) = 594.0k**
(NEW 6 STORY, HIGH RISE)

**RELATIVE COSTS**
TOTAL PROJECT = $350.6m
EST CITY SHARE = $156.8m




Pro's/Con's
+ Down Town Location is Ideal for Transportation & Services
+ Adjacent Parking Garage (covered/controlled & no maintenance)

+ General Benefits of All New Construction
  - ✓ Meets All Space Needs (room types/counts/sizes)
  - ✓ Meets Most Educational Objectives (locations/adjacencies)
  - ✓ Freshman Academy Wing (ideal org layout/clusters)
  - ✓ New Field House (more efficient/flexible and diverse spaces)
  - ✓ Efficient Operations (due to size and new building envelope)
+ Former Freshman & 1922 Facilities Available for Reuse
+ No Bridges or Split Buildings
- 6-Story, Vertical Plan (High Rise) Forces Many Programs Up
- Solar Orientation Not Ideal for Majority of Classrooms due to Tight Site
- Windowless Science Labs due to Tight Footprint
- Limited Access to Green Space

Construction/Phasing
+ Anticipated 3½yr Duration
- Extensive Temporary Classrooms (Modulars) Required
- Temporary Gymnasium & Cafeteria Spaces and/or Alternatives Required

Relative Costs
- This Option is in the Mid-Higher 1/3 of Costs to the City

**New Construction on an Expanded, Existing Site** is similar to the New on Existing, but given a bit more space, this option reduces to 5 story construction with better zone for community/activity areas and classroom wings arrayed for good solar orientation.

Although construction might be accelerated in a condensed new-build, extensive modulars would be required and likely located remotely.

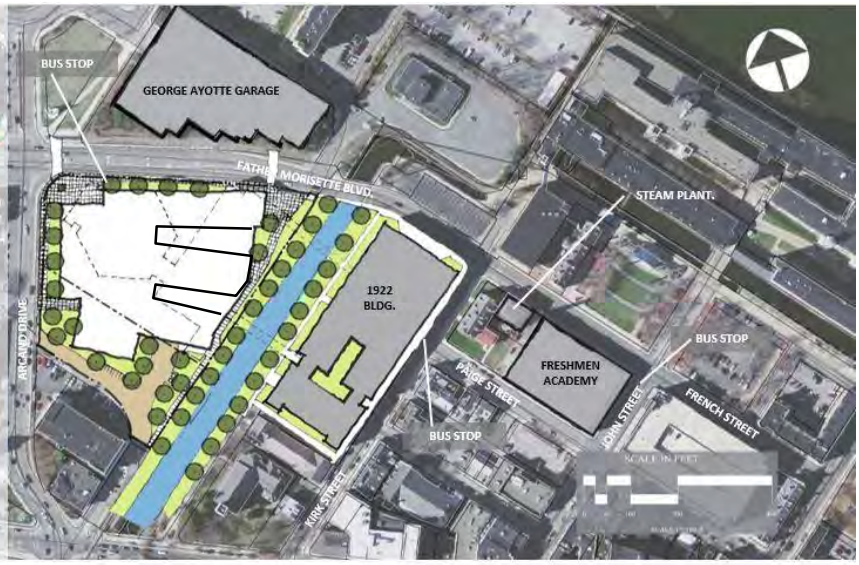
**BUILDABLE ACREAGE = 4.7**
6.6 TOTAL ACRES EXIST
1.4 ADJACENT PARCEL
-2.7 ACRE 1922 BLDG
- .6 ACRE STEAM/FA BLDG

**GREEN SPACE** (SEP. LOT)
APPROX .5 ACRE NEARBY

**PARKING** (via GARAGE) =
1,200 TOTAL CAR CAPACITY
APPROX. 624 LHS PASSES

**BUILDING (GSF) = 576.5k**
(NEW 5 STORY BLDG)

**RELATIVE COSTS**
TOTAL PROJECT = $355.4m
EST CITY SHARE = $166.0m




Same Pro's/Con's as New on Existing, except;
+ 5 Story/Not High Rise Construction
+ Creates Ideal Community Use/Activity Zone
+ Good Solar Orientation for All Classrooms/Labs
+ Virtually No Windowless Classrooms

Construction/Phasing
+ Anticipated 3½yr Duration
- Extensive Temporary Classrooms (Modulars) Required
- Temporary Gymnasium & Cafeteria Spaces and/or Alternatives Required

Relative Costs
- This Option is in the Mid-Higher 1/3 of Costs to the City

**New Construction on Wang Site** – Without an adjacent parking garage, city transit and park land, a new Lowell High School requires an estimated 16 acre minimum to meet the space needs of building, parking, site circulation and playfields. At 14.7 useable acres, the shortfall at the Wang Site is seen in limited green space and insufficient parking at 430 vs the 750 to 800 anticipated.

Aside from the limited site size, there are also concerns with co-locating the High School with the Middle and Elementary Schools already on site. The access roads are an additional concern, being relative narrow and within a thickly residential area.

New construction does allow a more ideal 4 story plan, with proper orientation of the double-wide classroom wing and clear zoning of community use/activity areas. The new plan also allows for very efficient and effective clustering of rooms and labs to better promote interdisciplinary collaboration.

**BUILDABLE ACRES = 14.7**
56 TOTAL ACRES EXIST

**GREEN SPACE** (ON-SITE)
APPROX 2 ACRES

**PARKING** = 430 CARS

**BUILDING (GSF) = 571.5k**
(NEW 5 STORY BLDG)

**RELATIVE COSTS**
TOTAL PROJECT = $325.7m
EST CITY SHARE = $142.3m

Same Pro's/Con's as New on Expanding, except;
+ More Ideal 4 Story Building
+ Ample Access to Green Space
+/- Parking & Busses on Site (requires bussing plan, but less athletic travel)
- Limited Walkability & Public Transit
- Co-Located with Elementary & Middle School
- Close Proximity to Neighborhoods (Building & Traffic Impact)
- Not Close to City Services

Construction/Phasing
+ Not Complex Phasing, No Educational Disruption

- Field Replications Required (1 Soccer + 2 Little League Fields) at alternative site to be determined.

Relative Costs
- This Option is in the Middle 1/3 of Costs to the City

**New Construction on Cawley Site** utilizes a similar (ideal) plan to Wang, but bends to the shape of the site. The building footprint is deliberately kept off the City owned parcel to the East because it falls within the Town of Tewksbury. This portion of the site is used for the majority of parking instead.

Although the parking is listed at 608 (also below the target 750-800 spaces), this site has enough space, but comes down to a balance between count of spaces vs field replication. This site offers the advantage of being co-located with significant athletic fields to create a more traditional school campus. Roadway access is considered more accommodating, although there are concerns for travel through nearby neighborhoods (particularly Douglas and Clark Roads).

**BUILDABLE ACRES = 20.0**
34 TOTAL ACRES EXIST,
NOT INCL. THE STADIUM

**GREEN SPACE** (ON-SITE)
AMPLE ACCESS TO FIELDS

**PARKING** = 608 CARS

**BUILDING (GSF) = 571.5k**
(NEW 5 STORY BLDG)

**RELATIVE COSTS**
TOTAL PROJECT = $332.5m
EST CITY SHARE = $148.3m


Same Pro's/Con's as New on Wang, except;
+ Adjacent to Major Fields, incl. the Football Stadium
+ Not Co-Located with Other Schools

Construction/Phasing
+ Not Complex Phasing, No Educational Disruption
- Field Replications Required (1 Softball, 2 practice Football). Note; This Site Plan Assumes 1 Practice LAX and Softball Infield are Replicated On-Site

Relative Costs
- This Option is in the Middle 1/3 of Costs to the City

*Note: ongoing investigations have identified portions of Cawley site to have potential Article 97 restrictions. Refer to the Conclusion (below) and the Appendix for additional information.*

# G. Summary of Evaluations and Conclusions

The evaluation of options began with the search for potential sites and a preliminary assessment of the most viable. The search for alternative sites began with a broad sweep of properties yielding 7 potential sites, the viability of each was then screened with assessment of buildable area, proximity to parking and transportation, access to utilities and sidewalks, location (including wetlands and floodplains), zoning, land use and historical restrictions and ownership rights vs eminent domain requirement.

*Refer to the Site Assessment Matrix included in the Appendix*

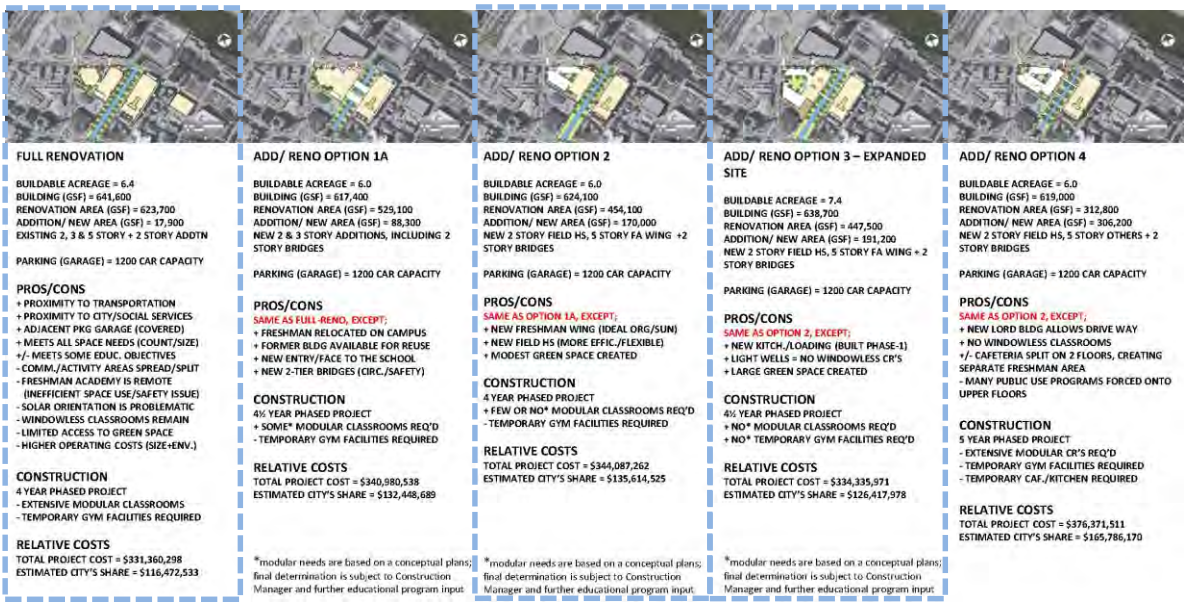
All, but 3 sites were eliminated because they were not nearly large enough to meet the estimated 16 acres required for a new school, circulation, parking and green space. Note: the existing site is only 6.6 acres, but benefits from having an adjacent parking garage, city transit and modest green space nearby. One of the three was not pursued because it is owned by Mass DOT. The most viable sites that were used to study building options included the Existing, Existing/Expanded, Wang and Cawley.

The options were developed using the equivalent Educational Program objectives, estimated space needs and site development requirements so they could be assessed relative to each other, even if the needs and objectives continued to evolve. The ability of each option to meet these objectives was noted in the form of Pro's/Con's.

Key Educational Objectives and Project Goals include;

- Freshman Academy to be Connected, but Distinct (4 teams of 8 incl. Sci)
- Create a Social Hub & Heart to the School
- Zone for Community Use/Activities (incl. Restaurant/Retail & Little Theater)
- Student Support & Administrative Houses to be Easily Accessed by Parents
- Academic Clusters for STEM, Humanities and Cross Collaboration
- Teacher Planning Dispersed with Each Cluster
- ELL & SPED to be Dispersed in Groupings of 2 or more
- Cluster ROTC Program
- Cluster Fine Arts Programs
- Cluster Digital Media Programs
- Controlled & Effective Use of Daylight
- Visible Learning & Ample Display of Student Work
- Ubiquitous Flexibility, Breakout/Small Group and Multi-Use Spaces

An initial round of 6 Options were developed and presented to the City Council, SBC, Business Leaders (Lowell Plan Group) and the Community for feedback and to determine if additional options should be developed. This initial round of input lead to the development of Full Reno, Add/Reno Option 1A (advancement of Opt 1), Add/Reno Options 4 & 5 and the New on Expanded Site Option



**FULL RENOVATION**

BUILDABLE ACREAGE = 6.4
BUILDING (GSF) = 641,600
RENOVATION AREA (GSF) = 623,700
ADDITION/ NEW AREA (GSF) = 17,900
EXISTING 2, 3 & 5 STORY + 2 STORY ADDTN

PARKING (GARAGE) = 1200 CAR CAPACITY

**PROS/CONS**
+ PROXIMITY TO TRANSPORTATION
+ PROXIMITY TO CITY/SOCIAL SERVICES
+ ADJACENT PKG GARAGE (COVERED)
+ MEETS ALL SPACE NEEDS (COUNT/SIZE)
+/- MEETS SOME EDUC. OBJECTIVES
- COMM./ACTIVITY AREAS SPREAD/SPLIT
- FRESHMAN ACADEMY IS REMOTE (INEFFICIENT SPACE USE/SAFETY ISSUE)
- SOLAR ORIENTATION IS PROBLEMATIC
- WINDOWLESS CLASSROOMS REMAIN
- LIMITED ACCESS TO GREEN SPACE
- HIGHER OPERATING COSTS (SIZE+ENV.)

**CONSTRUCTION**
4 YEAR PHASED PROJECT
- EXTENSIVE MODULAR CLASSROOMS
- TEMPORARY GYM FACILITIES REQUIRED

**RELATIVE COSTS**
TOTAL PROJECT COST = $331,360,298
ESTIMATED CITY'S SHARE = $116,472,533

**ADD/ RENO OPTION 1A**

BUILDABLE ACREAGE = 6.0
BUILDING (GSF) = 617,400
RENOVATION AREA (GSF) = 529,100
ADDITION/ NEW AREA (GSF) = 88,300
NEW 2 & 3 STORY ADDITIONS, INCLUDING 2 STORY BRIDGES

PARKING (GARAGE) = 1200 CAR CAPACITY

**PROS/CONS**
SAME AS FULL-RENO, EXCEPT;
+ FRESHMAN RELOCATED ON CAMPUS
+ FORMER BLDG AVAILABLE FOR REUSE
+ NEW ENTRY/FACE TO THE SCHOOL
+ NEW 2-TIER BRIDGES (CIRC./SAFETY)

**CONSTRUCTION**
4½ YEAR PHASED PROJECT
+ SOME* MODULAR CLASSROOMS REQ'D
- TEMPORARY GYM FACILITIES REQUIRED

**RELATIVE COSTS**
TOTAL PROJECT COST = $340,980,538
ESTIMATED CITY'S SHARE = $132,448,689

*modular needs are based on a conceptual plans; final determination is subject to Construction Manager and further educational program input

**ADD/ RENO OPTION 2**

BUILDABLE ACREAGE = 6.0
BUILDING (GSF) = 624,100
RENOVATION AREA (GSF) = 454,100
ADDITION/ NEW AREA (GSF) = 170,000
NEW 2 STORY FIELD HS, 5 STORY FA WING +2 STORY BRIDGES

PARKING (GARAGE) = 1200 CAR CAPACITY

**PROS/CONS**
SAME AS OPTION 1A, EXCEPT;
+ NEW FRESHMAN WING (IDEAL ORG/SUN)
+ NEW FIELD HS (MORE EFFIC./FLEXIBLE)
+ MODEST GREEN SPACE CREATED

**CONSTRUCTION**
4 YEAR PHASED PROJECT
+ FEW OR NO* MODULAR CLASSROOMS REQ'D
- TEMPORARY GYM FACILITIES REQUIRED

**RELATIVE COSTS**
TOTAL PROJECT COST = $344,087,262
ESTIMATED CITY'S SHARE = $135,614,525

*modular needs are based on a conceptual plans; final determination is subject to Construction Manager and further educational program input

**ADD/ RENO OPTION 3 – EXPANDED SITE**

BUILDABLE ACREAGE = 7.4
BUILDING (GSF) = 638,700
RENOVATION AREA (GSF) = 447,500
ADDITION/ NEW AREA (GSF) = 191,200
NEW 2 STORY FIELD HS, 5 STORY FA WING + 2 STORY BRIDGES

PARKING (GARAGE) = 1200 CAR CAPACITY

**PROS/CONS**
SAME AS OPTION 2, EXCEPT;
+ NEW KITCH./LOADING (BUILT PHASE-1)
+ LIGHT WELLS = NO WINDOWLESS CR'S
+ LARGE GREEN SPACE CREATED

**CONSTRUCTION**
4½ YEAR PHASED PROJECT
+ NO* MODULAR CLASSROOMS REQ'D
+ NO* TEMPORARY GYM FACILITIES REQ'D

**RELATIVE COSTS**
TOTAL PROJECT COST = $334,335,971
ESTIMATED CITY'S SHARE = $126,417,978

*modular needs are based on a conceptual plans; final determination is subject to Construction Manager and further educational program input

**ADD/ RENO OPTION 4**

BUILDABLE ACREAGE = 6.0
BUILDING (GSF) = 619,000
RENOVATION AREA (GSF) = 312,800
ADDITION/ NEW AREA (GSF) = 306,200
NEW 2 STORY FIELD HS, 5 STORY OTHERS + 2 STORY BRIDGES

PARKING (GARAGE) = 1200 CAR CAPACITY

**PROS/CONS**
SAME AS OPTION 2, EXCEPT;
+ NEW LORD BLDG ALLOWS DRIVE WAY
+ NO WINDOWLESS CLASSROOMS
+/- CAFETERIA SPLIT ON 2 FLOORS, CREATING SEPARATE FRESHMAN AREA
- MANY PUBLIC USE PROGRAMS FORCED ONTO UPPER FLOORS

**CONSTRUCTION**
5 YEAR PHASED PROJECT
- EXTENSIVE MODULAR CR'S REQ'D
- TEMPORARY GYM FACILITIES REQUIRED
- TEMPORARY CAF./KITCHEN REQUIRED

**RELATIVE COSTS**
TOTAL PROJECT COST = $376,371,511
ESTIMATED CITY'S SHARE = $165,786,170

**ADD/ RENO OPTION 5**

BUILDABLE ACREAGE = 7.4
BUILDING (GSF) = 620,900
RENOVATION AREA (GSF) = 312,800
ADDITION/ NEW AREA (GSF) = 308,100
NEW 2 STORY FIELD HS, 5 STORY OTHERS + 2 STORY BRIDGES

PARKING (GARAGE) = 1200 CAR CAPACITY

**PROS/CONS**
SAME AS OPTION 3, EXCEPT;
+ NEW LORD BLDG ALLOWS THRU-ROAD
+ NO WINDOWLESS CLASSROOMS
+/- CAFETERIA SPLIT ON 2 FLOORS, CREATING SEPARATE FRESHMAN AREA
- MANY PUBLIC USE PROGRAMS FORCED ONTO UPPER FLOORS

**CONSTRUCTION**
5½ YEAR PHASED PROJECT
- EXTENSIVE MODULAR CR'S REQ'D
+ NO TEMPORARY GYM FACILITIES REQ'D
- TEMPORARY CAF./KITCHEN REQUIRED

**RELATIVE COSTS**
TOTAL PROJECT COST = $386,376,693
ESTIMATED CITY'S SHARE = $173,976,178

**NEW BUILDING - EXISTING SITE**

BUILDABLE ACREAGE = 3.3
BUILDING (GSF) = 594,000
NEW 6 STORY BLDG + NO BRIDGES

PARKING (GARAGE) = 1200 CAR CAPACITY

**PROS/CONS**
+ PROXIMITY TO TRANSPORTATION
+ PROXIMITY TO CITY/SOCIAL SERVICES
+ ADJACENT PKG GARAGE (COVERED)
+ BENEFITS OF ALL NEW CONSTRUCTION:
  - ✓ ZONED FOR COMMUNITY/ACTIVITY
  - ✓ MEETS ALL SPACE NEEDS
  - ✓ MEETS MOST ALL EDUC OBJECTIVES
  - ✓ IDEAL FRESHMAN ORG./CLUSTERS
  - ✓ FIELD HS (MORE EFFIC./FLEXIBLE)
  - ✓ MORE EFFICIENT USE/OPERATIONS
+ FORMER FA & 1922 BLDG'S AVAILABLE
- TRIGGERS HIGH RISE CONSTRUCTION
- PUBLIC PROGRAMS ON UPPER FLOORS
- NOT IDEAL NEW ORIENTATION
- WINDOWLESS SCIENCE LABS IN NEW
- LIMITED ACCESS TO GREEN SPACE

**CONSTRUCTION**
3½ YEAR PHASED PROJECT
- EXTENSIVE MODULAR CR'S REQ'D
- NO TEMPORARY GYM FACILITIES REQ'D
- TEMPORARY CAF./KITCHEN REQUIRED

**RELATIVE COSTS**
TOTAL PROJECT COST = $350,611,505
ESTIMATED CITY'S SHARE = $156,843,060

**NEW BUILDING - EXPANDED SITE**

BUILDABLE ACREAGE = 4.7
BUILDING (GSF) = 576,500
NEW 5 STORY BLDG + NO BRIDGES

PARKING (GARAGE) = 1200 CAR CAPACITY

**PROS/CONS**
SAME AS NEW ON EXIST, EXCEPT;
+ DOES NOT TRIGGER HIGH RISE CONSTR.
+ GOOD COMMUNITY/ACTIVITY ZONE
+ GOOD SOLAR ORIENTATION AT ALL CRS
+ NO WINDOWLESS CLASSROOMS
- NO THRU-ROAD

**CONSTRUCTION**
3½ YEAR PHASED PROJECT
- EXTENSIVE MODULAR CR'S REQ'D
- TEMPORARY GYM FACILITIES REQ'D
- TEMPORARY CAF./KITCHEN REQUIRED

**RELATIVE COSTS**
TOTAL PROJECT COST = $355,436,809
ESTIMATED CITY'S SHARE = $165,955,019

**NEW SCHOOL AT WANG SITE**

BUILDABLE ACREAGE = 14.7
TOTAL SITE ACREAGE = 56.0
BUILDING (GSF) = 571,500
4 STORY BLDG

PARKING (ON-SITE) = 430 CAR CAPACITY

**PROS/CONS**
SAME AS NEW ON EXIST, EXCEPT;
+ MORE IDEAL 4 STORY CONSTRUCTION
+ AMPLE ACCESS TO GREEN SPACE
+ GOOD SOLAR ORIENTATION FOR ALL
- CO-LOCATED W/ MIDDLE+ELEM. SCHOOL
- LIMITED WALKABILITY /PUBLIC TRANSIT
- NOT CLOSE TO CITY SERVICES
- IN CLOSE PROXIMITY TO RESIDENTIAL AREAS (TRAFFIC + MASSING CONCERNS)

**CONSTRUCTION**
3 YEAR CONSTRUCTION
+ NO PHASING OR MODULARS REQ'D
+ NOT EDUCATIONALLY DISRUPTIVE
- FIELDS TO BE REPLICATED:
(1 SOCCER + 2 LITTLE LEAGUE FIELDS)

**RELATIVE COSTS**
TOTAL PROJECT COST = $325,679,444
ESTIMATED CITY'S SHARE = $142,245,805

**NEW SCHOOL AT CAWLEY SITE**

BUILDABLE ACREAGE = 20.0
(16.4 FOR NEW SCHOOL + 3.6 NEW FIELDS)
TOTAL ACREAGE = 34.0 (4 IN TEWKSBURY)
BUILDING (GSF) = 571,500
4 STORY BLDG

PARKING (ON-SITE) = 608 CAR CAPACITY

**PROS/CONS**
SAME AS NEW AT WANG, EXCEPT;
+ ADJACENT TO FOOTBALL STADIUM
+ AMPLE ACCESS TO GREEN SPACE
+ NOT CO-LOCATED W/ OTHER SCHOOLS
+/- MORE ACCOMMODATING ACCESS

**CONSTRUCTION**
3 YEAR CONSTRUCTION
+ NO PHASING OR MODULARS REQ'D
+ NOT EDUCATIONALLY DISRUPTIVE

**RELATIVE COSTS**
TOTAL PROJECT COST = $332,458,871
ESTIMATED CITY'S SHARE = $148,341,142

A second round of review lead the SBC to make a recommendation to pursue the 3 or 4 preferred options, narrowing the focus so that each could be developed in a bit more detail. The preferred options were selected to not only to represent the full range of studies (a Full Renovation, Additions/Renovations & all New Construction Option), but also to represent those that best met the educational program, had the least educational impact during construction and were cost effective & efficient.

Full Renovation was selected as one 'book-end' extremes. It is our understanding that the MSBA expects to see a minimum of at least one Full Reno, an Add-Reno and a New Construction Option. This option does not meet several of the educational objectives (most notably locating the Freshman Academy on-site), but the sheer

magnitude of estimated project costs warrants a deeper look at how well it can achieve all but that one educational goal.

It is also the only option in its class and the lowest cost overall. For many in the community who wish to limit their tax burden, this option will help provide perspective on the relative value of meeting the educational goals.

New at Cawley was selected as the opposing extreme and most viable option for new construction. Cawley provides enough space (as currently charted for feasibility level study), to meet all the educational objectives in the most efficient and effective plan. The site will come with a trade-off of lost fields vs. site program, but should be explored further along with the potential of expanding the property bounds.

Late in the selection process, but prior to the City Council vote to adopt the four options recommended by the SBC, new information regarding the Cawley site as Article 97 park lands was discovered. Further investigations into the article 97 logistics and development of the New Option on the Cawley site are expected to continue during the Preferred Schematic Report Phase.

Add/Reno Options 2 & 3 were selected, being the most ideal addition/renovation options in meeting educational objectives and limiting educational disruptions during construction. Both options are among the 1/3 lowest costs overall and between them, explore possibilities within the existing city owned property and with the potential of expanding the site.

Specific features from either option may be explored in the form of sub-options in the next phase in hopes of evolving the concepts toward a singularly appropriate solution for the City of Lowell.

Refer to the Appendix for additional information.

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MSBA Module 3 Feasibility Study

# Preliminary Design Program

Submitted to the Massachusetts School Building Authority:
February 24, 2017

# Lowell High School

City of Lowell, Massachusetts
Lowell Public Schools


Perkins Eastman | DPC

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# 3.1.2 Educational Program

Lowell High School, established in 1831 with a principal and 47 students, was the first public co-educational high school in the United States and one of the first integrated high schools in the nation. In 1896 Coburn Hall was erected and an adjacent building was added in 1922. The school was expanded across the canal in 1980 with the construction of a new building and field house. Expansion and renovation of both buildings occurred in 1997. In 2005, the district repurposed a nearby middle school to serve as additional space for the Lowell High School Freshman Academy.

Throughout its long life, the high school buildings have been repurposed to the extent possible to meet educational needs, but the structure only allows for minimum flexibility and usage. As the school expands in numbers and evolves into a modern educational approach, a new facility is needed to implement technology seamlessly across the building and to offer flexible spaces that support collaboration and 21st century teaching and learning.

LHS successfully completed the Fall 2015 NEASC Accreditation process and received full reaccreditation. However, the school was placed on warning for standard 7: Community Resources for Learning, which deals with budget, facilities, and the physical plant. The accreditation committee listed the following concerns (noted in the 4/22/16 Accreditation letter):

*The school site and plant do not minimally support the delivery of high quality school programs and services, including but not limited to the following:*

- *Leaks in the roof, the tunnel, and from sinks*
- *Temperature fluctuations where one room is considerably warm while another is considerably colder*
- *The presence of pests in the building*
- *Windows in need of repair*
- *The nurse's office which is small and not easily navigated by wheelchair-bound students*
- *The lack of full accessibility to individuals with physical handicaps*
- *The main cafeteria that is at or near capacity*
- *The lack of capacity of the electrical system resulting in the inability to support upgrades in technology*
- *The lack of natural light or adequate ventilation in art rooms*
- *The inability of the science labs in both the 1922 and the 1980 buildings to support modern science curriculum and pedagogy*
- *The lack of equitable facilities to support students in life skills programs*
- *The lack of equitable access to up-to-date technology for all students*

According to the Fall 2015 NEASC Accreditation report,

> *In the 2013-2014 school year, a comprehensive facilities assessment by OMR Architects determined that the building's needs, based on enrollment trends for the next ten years and the fluctuations in enrollment, provide justification for a renovation or for the construction of a new high school. A request has been submitted to the Massachusetts School Building Authority (MSBA) and has been accepted and is being looked upon favorably. The city of Lowell and the Lowell School Department are unified in their support for this petition to the MSBA. The adoption and funding of a comprehensive, long-range plan for programs and services, facility needs, technology, and capital improvement will ensure the ability of Lowell High School students to achieve the school's expectations for learning.*

The Lowell Public Schools are incredibly diverse. The ethnic/racial/cultural composition of the student body in the schools makes it one of the most diverse districts in the Commonwealth: African American students 7.1%, Asian students 29.4%, Hispanic students 30.1%, White students 30.1%, and all other students 3.2%. In the district, 75.1% of the student body qualifies as low-income, 15.1% are classified as Special Education, and the English Language Learner population is 26.6%. The high school reflects the great diversity of the City of Lowell with students representing over 50 countries from all over the world and speaking almost 60 different languages. Given this cultural, racial and socioeconomic diversity, Lowell High School has been successful at consistently maintaining a high graduation rate for an urban district (over 80%) and a high college attendance rate (over 85% of students seek post-secondary education at four-year and 2-year colleges and universities).

*The proposed planning concepts, whether renovation or new construction, will include the scope/costs of creating a weather-tight, code compliant facility (including full accessibility) along with new mechanical (indoor air quality, heating and cooling), electrical, plumbing, fire protection, technology, communications and safety/security systems. All options have been planned to address program deficiencies, including sub-standard Nurse's Office, Cafeteria, Science Labs, Special Education (including Life Skills) and numerous other program deficiencies that do not meet MSBA guidelines or capacity needs.*

*The great diversity represented by the student body is expected to be celebrated in new and different ways, possibly through new means of display and broadcasting within the school, but also by having Special Education and English Language Learner (ELL) to be integrated as 2-room clusters, adjacent to regular academic classrooms (as opposed to a separate zone within the school).*

# A. GRADE AND SCHOOL CONFIGURATION POLICIES

Lowell High School currently educates over 3,125 students in grades 9-12. The school has twelve academic departments each led by an Academic Department Chair, nine Pathway Programs (eight currently and one in development), an academically-accelerated Latin Lyceum program, and four administrative houses that consist of a House Dean, two Guidance Counselors, a Social Worker, and two clerks. The houses in the main building are located in four different areas of the building, two in the 1980s building and two in the 1922 building. Classes are randomly scattered within the buildings, a product of repurposing space as needed, and teachers are assigned to houses based on proximity to the house office for organizational purposes only. Courses and teachers are not scheduled in a single house but rather across the building. There is a Freshman Academy program housed in a building separated from the rest of the high school by a public roadway. The Freshman Academy is its own separate house, with its own two clerks, three Guidance Counselors, and a Social Worker. Students are placed into one of three clusters in the Freshman Academy; two clusters contains two English, History, Math and Science teachers and a third super-cluster contains three English, History, Math, and Science teachers. Ninth grade students need to travel to the main buildings for physical education and other elective courses.

Proposed Change: We would like to keep our current grade and school configuration in regards to departments, pathways and administrative houses. We would like to incorporate the Freshman Academy within the new/renovated high school in its own wing, which would allow the Freshman Academy to keep its distinct program identity but make it more connected to the rest of the school and safer for students who would no longer have to cross a street to get to classes during the school day. In order to make it easier for parents to access house offices and to strengthen collaboration between house teams, one option would be to locate the house offices near the main entrance(s) and in proximity to each other. This also supports the safety and security of the building, eliminating traffic streaming in through open doors and the need to share security officers in multiple buildings. One physical plant would ensure that there is a more cooperative effort to support safety and security throughout the building.

*The proposed planning concepts intend to create a distinct Freshman Academy as a small learning community within the school, but not completely isolated, as students will utilize shared programs, such as World Language Classrooms, Library/Media Center, Gymnasium and Arts/Tech programs. Class scheduling may be used to keep shared programs distinctly separate, but also intentionally mixed to expose new students to the larger high school community in a deliberate manner. The Freshman Academy will be arranged in teams of 4 classrooms (English/social studies/math and science). Freshmen currently utilize 2 teams of 8 classrooms +1 team of 12 for*

*3100 students. The proposed enrollment increase of 13% suggests approximately 4 teams of 8 will be needed for an enrollment of 3,520 students.*

*The proposed administrative program includes space for main administration, main student support as well as the suites for freshman and 4 houses (7 administration suites total). Additional space is earmarked for archived records, teacher workrooms and the career center*

## B. CLASS SIZE POLICIES

Lowell High School takes pride in its extensive course offerings, offering more variety than most public high schools in Massachusetts. This offers students the opportunity to not only meet core graduation requirements, but also explore their interests in a variety of areas including Business/Marketing, Culinary, Engineering, the Fine and Performing Arts, and ROTC, just to name a few. This variety does have an impact on the schedule and class sizes. There is no official class size policy in the district, though we do try to keep our college level courses below 28 at the high school. The average class size in the core academic areas of English, mathematics, science, and social studies is 24. ELL courses average 22 and Foreign Language courses average 22. Physical education average 33 and our special education courses average 7. In the elective area of art, business, culinary, and ROTC, average class sizes range from 2 to 22 with outliers ranging due to unique needs of certain programs, from 2 in the bank program, 10 in the Retail Marketing (School Store) to 60 in the band and chorus classes.

Proposed Change: There is a need for flexible classroom space for a variety of reasons to include the ability to appropriately schedule classes that are not within the average class size.

*Future space needs are calculated based on the current Master Schedule, prorated for the new student enrollment (3,520 students) and an average class size of 24 students/room (same average as exists now, which results in a range between 20 and 28, sometimes a few more). Given the existing range, rooms are planned larger (at 900sf vs existing 825-850 sf average) and will include furniture layouts for 28. Some classes are deliberately smaller at 8-16 students and were tracked and calculated separately to ensure courses were not averaged-up and course offerings were not eliminated.*

*Note:*
*Planning for the future, ELL classes were calculated for a 20 student average and specialty programs, including SPED, Fine Arts, Business and Technology were based on existing sizes. Physical Education needs are based on 26 student class average.*

# C. SCHOOL SCHEDULING METHOD

Lowell High School is on a seven period day. The school day begins at 7:55 am and ends at 2:30 pm. There are four 25 minute lunch periods per day between two cafeteria locations, one in the main campus and one at the Freshman Academy.

| | | | |
|---|---|---|---|
| Warning Bell | 7:50 | | |
| Period 1 | 7:55 | - 8:45 | (50) |
| Period 2 | 8:45 | - 9:35 | (50) |
| *Advisory* | 9:35 | - 9:55 | (20) |
| Period 3 | 9:55 | - 10:45 | (50) |
| Lunch 1 | 10:45 | - 11:10 | (25) |
| Period 4A | 10:45 | - 11:35 | (50) |
| Period 4B | 11:10 | - 12:00 | (50) |
| Lunch 2 | 11:35 | - 12:00 | (25) |
| Period 5A | 11:35 | - 12:25 | (50) |
| Period 5B | 12:00 | - 12:50 | (50) |
| Lunch 3 | 12:25 | - 12:50 | (25) |
| Period 6A | 12:25 | - 1:15 | (50) |
| Period 6B | 12:50 | - 1:40 | (50) |
| Lunch 4 | 1:15 | - 1:40 | (25) |
| Period 7 | 1:40 | - 2:30 | (50) |
| Dismissal | 2:30 | | |

The academic year is divided into two semesters with half year courses worth 2.5 credits, but most core courses run for a full year (with consecutive A/B semester sequencing). The master schedule is completed by the school's scheduler with input from the department chairs.

Graduation Requirements:
Students must earn a total of 90 credits, including the following minimum course requirements:

- Ten (10) credits in U.S. History and Government.
- Twenty (20) credits in English.
- Ten (10) credits in Mathematics. Students must pass Algebra IA, Algebra IB, Geometry A, and Geometry B.
- Ten (10) credits in Science.
- Ten (10) credits of Physical Education
- Five (5) credits of Health

Courses are offered in four levels: College, Honors, High Honors, Advanced Placement/Dual Enrollment.

Proposed Changes: The high school is planning to create an exploratory committee to look at schedules to see if there would be a schedule for the high school that would meet the goals of retaining a robust selection of course offerings (7 courses per semester) but with longer blocked class periods. This would not have a significant impact on room usage, but would allow for sustained blocks of teaching time.

*Programming calculations are also tied to the available periods per cycle each room can be used. No immediate change to the school schedule is anticipated, but a hypothetical model was discussed that might allow longer blocks that also maintains a 35-period cycle. As such, space needs were based on a 35-period cycle.*

## D. TEACHING METHODOLOGY AND STRUCTURE

Lowell High School is a community of educators whose core commitment is to provide students with exceptional instruction. Teachers and administrators regularly review and refine instructional practices through scheduled sessions within academic disciplines, formal and informal observations, a new and comprehensive teacher evaluation process, and a building-based support team that serves to ensure that at-risk students are supported in ways that allow them to access the curriculum. Teachers at Lowell High School utilize instructional strategies that are consistent with the school's core values, beliefs, and learning expectations. Strategies that are implemented personalize instruction, engage students in cross-disciplinary learning, engage students to be active learners and emphasize inquiry and problem-solving skills. Opportunities exist to allow students to engage in authentic application of knowledge and skills and to self-assess their performance in those tasks. Technology is utilized in a variety of ways to assist and further the educational process. Teachers maintain expertise in their respective content areas and utilize effective content-specific practices such as formative assessments, strategic differentiation, group activities, and specific support strategies which aid struggling students. Teachers believe it is essential to have more time to collaborate and plan to share and implement additional instructional strategies that will strengthen student achievement and learning and encourage more student-centered classrooms.

Proposed Change: An area of need for the high school, as identified by the most recent NEASC Accreditation process, is to create more opportunities for collaborative planning opportunities and interdisciplinary connections. While the current facility groups together teachers in a variety of ways - some by departments (Fine & Performing Arts on one floor) and some by grade level or program needs - the administration is interested in looking at different organizational structures that would more fully support the concept of expanding areas organized for STEM classrooms, Humanities classrooms, and CVTE classrooms. Also a focus on more interdisciplinary teaching and learning would require some larger, flexible spaces where departments can bring classes together for interdisciplinary work such as

guest speakers, teach-out opportunities, learning demonstrations, and other types of interactive group learning.

- Administrative and Academic Organization/Structure:
  Currently the administrative and clerical staff are located throughout the buildings, organized into house offices consisting of house deans, guidance counselors, social workers and clerks; office space for the majority department chairs and the director of curriculum, instruction and assessment in the teachers center, student support services includes the coordinator of student support, discipline & operations specialist, parent liaisons, enrollment and student support services clerks, the main office consisting of the head of school and three clerks. The special education suite includes the department chair for special education, clerk, and educational team chairs. The athletic office has the athletic director, clerk and school bursar. Data processing office includes a scheduler, clerk and instructional specialist overseeing testing.

  The high school has 12 academic departments and nine Pathway Programs (eight currently and one in development for next year) that fall within departments. Each department requires flexible learning spaces for students and teachers to engage in both teacher-directed and student-directed learning.

  Proposed change: LHS Administration is considering clustering academic Department Head offices together by subject matter connections (Humanities, STEM, CVT) and integrating the houses into this configuration. One way to do this would be to place two house offices in a combined house and guidance suite in proximity to a department center. This would allow for administrative presence in multiple areas of a large building. Another option would be to place all the house offices into one central space near the main office, such as a house and guidance suite. The Freshman Academy, while housed within the same large building, would have a separate office suite for the Director of the Freshman Academy, Student Support Specialist, clerks, guidance counselors and the FA social worker. The Head of School, the Director of Curriculum, Instruction, and Assessment, and the Discipline and Operations Specialist would all have offices clustered near the main office. It is crucial to have adequate conference room space available for all offices.

  *The proposed program/plans anticipate the equivalent of 5 House Offices Suites (including Freshman Academy), each with (2) Clerks/Waiting, the House Dean, (1) Social Worker (2) Guidance Counselors and a small Conference area. The Freshman Academy will need space for (1) Student Support Specialist and an additional Guidance Counselor (a total of 3).*

*A separate Main Office with Secretary/Waiting, Head of School, Bursar, Director of Curriculum/Instruction, Discipline/Operations, large Conference & kitchenette is planned along with a Main Student Support Center including Student Support Coordinator, Conference, (1) Clerk, (1) Registrar/Clerk, Waiting for 10-12, (3) Testing and (4) Parent Liaison stations/desks. A separate College/Career Center with (3) Guidance Counselors, Conference and main room with 24 computers and soft seating area.*

- Curriculum Delivery Methods and Practices:
  Lowell High School's course offerings are more comprehensive in range and scope than most public high schools in Massachusetts. As such, curriculum at LHS is comprehensive in design and aims to challenge students at all academic levels. Curriculum maps are currently being revisited to have parallel structure across all departments and to use *Understanding by Design* as the philosophy behind the curriculum and instructional mapping. In terms of instruction, teachers are encouraged and guided to use a wide variety of instructional techniques, keeping student engagement and active participation at the forefront of the work. In the past few years, a major focus area has been integrating technology into instruction across all content areas. We have also developed the idea of formative and summative assessments being varied, meaningful, and authentic as we move away from using only traditional assessments and integrate more projects, presentations, demonstrations, and other non-traditional assessments across departments.

  The one area that has been identified as an important need (as indicated by the faculty in our last NEASC process) is more time for teacher collaboration, especially around sharing instructional practices and tools that will grow student learning across all levels and encourage more student-centered classroom practices.

  ***Priority 21st - Century Learning Goals for LHS***
  (created in Fall 2016 Building Visioning Workshops):

  **Empathy, Global Perspective, and Civic Engagement**
  - Cultural Awareness
  - Personal, Social, and Civic Responsibility
  - Awareness of Community and Global Society
  - Multicultural Literacy

  **Critical and Inventive Thinking**
  - Critical Reasoning and Problem Solving
  - Agility, Adaptability, and Risk-Taking
  - Joy, Curiosity, and Imagination
  - Motivation and Creativity

  **Communication and Collaboration**

- Oral and Written Communication
- Teamwork and Interpersonal Skills
- Media Literacy and Digital Competence
- Accuracy of Information

Real World Interconnectivity

- Executive and Organizational Skills
- Competency in Core Skills and Content
- Career Preparation and Life Skills
- Vocational Opportunities and Certifications

Holistic Awareness

- Self-advocacy
- Wellness
- The Natural World

These 21st-century learning goals expand our existing mission statement and goals for student learning, which we are in the process of revising:

*Lowell High School Mission Statement*

Commitment to excellence in <u>everything</u> we do: academics, activities and citizenship.

Lowell High School provides a secure and cooperative environment where the emphasis is on mutual respect, curiosity, the free exchange of ideas, and the appreciation of education both as a process and a means to betterment.

We are a community…

- That values a curriculum incorporating the best practices of both traditional and contemporary instruction.
- That creates and supports an atmosphere promoting high expectations for student achievement.
- That strives to meet the needs of a variety of ethnic and language backgrounds, career interests, and learning capabilities and styles by providing a broad range of programmatic offerings.
- That believes student accomplishment is a shared responsibility of students, parents, staff, administration, school committee, and community.
- That provides all students the curriculum to meet school and state graduation requirements, and assesses learning continuously in a variety of ways including mandatory state testing.

*Expectations for Student Learning*

*Lowell High School expects all students:*

- To attain an understanding of the educational standards, core knowledge, skills, and concepts defined by the Massachusetts Curriculum Frameworks.
- To take increasing responsibility for educational decisions on a daily and long-term basis.
- To complete academic work both independently and cooperatively in a productive manner.
- To think critically and solve problems using inductive and deductive reasoning.
- To read effectively and communicate ideas and information using a variety of formats.
- To develop an ability to use a variety of mediums—including the creative and the technological—in the process of learning, and demonstrate their acquired learning through use of those mediums.
- To demonstrate respect for individual differences and appreciation for the diversity of a multicultural world.
- To understand and demonstrate a sense of community.

*Core Values*

- Responsibility
- Integrity
- Determination
- Engagement
- Respect

○ English Language Arts/Literacy:

The Lowell High School English Department is committed to supporting and encouraging students to become independent, life-long learners. All English courses are designed to build skills in effective reading, writing, speaking and listening. Through a sequential program of core courses, students are supported to read critically from a wide range of literary and informational texts, write effectively for a variety of audiences and purposes, and speak effectively in informal and formal situations. We recognize that mastering these complex communication skills is essential for successfully meeting the challenges of the 21st Century.

The English Language Arts curriculum is comprehensive in design and aims to challenge students at all academic levels. Curriculum maps have been redesigned to parallel structure in other departments and to use Understanding by Design as the philosophy behind the curriculum and instructional mapping. In terms of instruction, teachers are encouraged and guided to use a wide variety of instructional techniques, keeping student engagement and active participation at the forefront of the work. In the past few years, a big focus area has also been on

integrating technology into instruction as a core part of classrooms. We have also developed the idea of formative and summative assessment being varied, meaningful, and authentic as we move away from using only traditional assessments and integrate more projects, presentations, demonstrations, and other non-traditional assessments across departments.

- Mathematics:
  A primary goal of the Mathematics Department is for all students to achieve mathematical literacy. However, mathematical literacy includes more than students being able to do arithmetic and to solve routine mathematical problems. Mathematical literacy requires students to reason and prove, to solve real mathematical problems, to make connections, to use multiple representations of numerical information, and to communicate mathematical information to other people. All of the courses in the Mathematics Department operate with these learning goals in mind. The mathematics curriculum is comprehensive in design and aims to challenge students at all academic levels. Curriculum maps have been redesigned to parallel structure in other departments and to use Understanding by Design as the philosophy behind the curriculum and instructional mapping. In terms of instruction, teachers are encouraged and guided to use a wide variety of instructional techniques, keeping student engagement and active participation at the forefront of the work. Math teachers use various methodologies to differentiate the instruction for all learners including direct instruction, discussion, problem solving, simulation, inquiry-based investigations, and collaborative groupings. In the past few years, a big focus area has also been on integrating technology into instruction as a core part of classrooms. We have also developed the idea of formative and summative assessment being varied, meaningful, and authentic as we move away from using only traditional assessments and integrate more projects, presentations, demonstrations, and other non-traditional assessments across departments.

- Science:
  Science educators use various methodologies to differentiate the instruction for all learners including direct instruction, discussion, problem solving, simulation, inquiry-based investigations, and collaborative groupings. Science labs currently include traditional fixed benches that take up much of the room. This lack of flexibility and fixed furnishings, such as laboratory tables, limit group sizes because of safety concerns. The limited flexibility of our small, outdated science labs also includes limited storage areas. We would like to have laboratory science rooms that meet today's lab safety standards and allow us to deliver a high quality, hands-on, inquiry-based science curriculum. We envision providing appropriate opportunities for the authentic application of knowledge and skills in our science curriculum. It is essential to have the space, flexibility and equipment to provide opportunities for students to gather quality data for these authentic

experiments. Additionally, in collaboration with Middlesex Community College and U-Mass Lowell, we intend to continue to offer Dual Enrollment courses with a focus on biotechnology and medicine, chemistry, computer science, engineering, robotics, and green and renewable energy. It is essential to support interdisciplinary collaboration between science, math and engineering in order to ensure the success of these programs and the practical application of student knowledge. We must offer these opportunities to Lowell High School students as these are STEM-related fields with enormous potential for college and career opportunities

*The program/plans provide large/flexible science labs in accordance with State standards. A total of 28 labs, 20 being full-sized 1,440 sf and 8 being Integrated Science classrooms at 1,000sf are proposed. 2 of the 20 are for Health and Bioscience as previously noted. All 20 large labs will have 200sf of Prep/Storage space, typically grouped in two's as 400sf, and (2) additional Prep/Storage rooms are provided for the Freshman/Maker Space. (1) Chemical Storage and a Growing Room are also provided.*

- Social Studies:
  The Social Studies Department offers a four-year course of study in history and the social sciences. The content, reading materials, instructional activities, and assessments are designed to promote higher-level thinking and communication skills. All of the history and social science courses at Lowell High School adhere to the Massachusetts Social Studies Curriculum Frameworks and the Common Core State Standards. Social Studies at LHS promotes a College, Career, and Citizenship (C3) approach to student learning and engagement in social studies. The Social Studies curriculum is comprehensive in design and aims to challenge students at all academic levels. Curriculum maps are being designed to parallel structure in other departments and to use Understanding by Design as the philosophy behind the curriculum and instructional mapping. In terms of instruction, teachers are encouraged and guided to use a wide variety of instructional techniques, keeping student engagement and active participation at the forefront of the work. In the past few years, a big focus area has also been on integrating technology into instruction as a core part of classrooms. We have also developed the idea of formative and summative assessment being varied, meaningful, and authentic as we move away from using only traditional assessments and integrate more projects, presentations, demonstrations, and other non-traditional assessments across departments.

- World Languages/English Language Learners:
  It is the goal of the Foreign Language Department that every student achieves an ability to understand, speak, read and write in the target language, while at the same time developing global awareness and knowledge of different cultures.

Lowell High School offers English Language Learners (ELLs) in grades nine through twelve a comprehensive academic program to build English language proficiency and academic content knowledge. English Language Learners develop English proficiency while learning the general curriculum. Instruction also recognizes that language modalities (speaking, listening, reading, and writing) develop interdependently and, therefore, should be integrated to promote skill development. English Language Learners at Lowell High School participate in one or more program models that support English language and content knowledge development. Students' English language proficiency is assessed and academic background reviewed in order to recommend an appropriate program placement in English Language Development (ELD) classes, Sheltered English Instruction (SEI) content classes, and/or English Language Development support classes.

Both of these departments need classrooms that can serve as flexible language "lab" classrooms, with technology of our current language lab and areas of the classroom that can be used for individual listening/speaking practice as well as collaborative spaces for using the lab technology in small groups, working with direct teacher instruction, or other areas of a language classroom that would allow students to engage in discourse for language practice.

Proposed Change: To help ensure the best learning opportunities for students, all academic department teaching spaces must include:

- Modern classrooms with interactive LCD projectors, adequate whiteboard space, adequate storage, maximum natural lighting with windows that open, ample outlets for device charging, and a streamlined, moveable teacher desk and podium.
- Classrooms that are clustered into inter-disciplinary configurations to promote cross planning and discourse between academic departments.
- Multiple large, flexible group instruction spaces that can be used for combined classes, presentations, lectures, seminar, faculty meetings, and parent meetings. These could be various-sized spaces that can be split up or combined (with movable walls) to better suit the needs of the various users.
- Adequate book storage for all departments, but especially for the core departments (English, Foreign Language, History, Math and Science) where textbooks and trade books are used extensively in all classes. We would prefer to have a central storage location for many of the books but with smaller distributed book and supply storage for specific departments.

*The program/plans provide large, flexible and fully integrated technology for all classroom spaces, including World Language and ELL programs. ELL rooms are*

*intended to be dispersed with general classrooms, but clustered or paired for inter and intra collaborative opportunities. World Language rooms are to be grouped as a department or potentially semi-dispersed by language for the same collaborative opportunities. The Freshman Academy, as a separate zone within the overall school, should have easy access to all language classrooms and will have one ELL team included within (ELL language, social studies, math and science).*

*Operable walls can be used between select sets of classrooms (1 per cluster) to allow large group gatherings. Likewise, select single classrooms can have sub dividable partitions to allow small group flexibility.*

- Academic Support Programming Spaces:
  Lowell High School has 3 Instructional Specialists: 1 is focused on Instructional Technology Support, one is focused on classroom/instructional support, and the third is focused on academic testing support (MCAS, ACCESS, etc.). We also have number of academic tutors (part-time) who work in classrooms to support student learning; these are specifically language tutors in the Newcomers classroom and a "Read 180" tutor for additional literacy support with grade 9 students.

  *(1) Office for the academic Instructional Specialist is provided with other Dept Offices, a second will use space within the Tech Center and third will use space within the MCAS room.*

- Student Guidance and Support Services:
  School guidance counselors are located in house offices. A social worker is assigned to each house office and the Freshman Academy but not every social worker is physically located in the house due to space constraints.

  Proposed change: Ensure that there is space in each house office to accommodate the assigned social worker for more effective case management.

  Student Support Services suite provides for enrollment, working papers, parent liaison, and support for critical student issues including homelessness. There is a separate college and career center staffed by three guidance counselors with an attached computer lab for use of Naviance and other college/career research activities.

  *As noted under Administrative and Academic Organization/Structure, the House Administration areas include (2) Guidance Counselors and (1) Social Worker. Freshman House will include a third Guidance Counselor and (1) Student Support Specialists. A separate Student Support Services Center is provided for the full school.*

# E. TEACHER PLANNING AND ROOM ASSIGNMENT POLICIES

Lowell High School teachers are assigned to one of 12 departments and for administrative purposes to one of four house offices or the Freshman Academy. There is one Teachers' Center which also houses the majority of the department chairs but no department centers which has hindered collaboration between teachers.

Proposed change: Moving forward the school would benefit from combined academic wings (humanities, STEM, CVT) with teacher workrooms (located near classroom clusters) and multi-media rooms that help to foster cross-curriculum collaboration and support. Teacher workroom space that is designed for both inter and intra departmental collaborative work as well as professional development would greatly enhance the ability of teachers to plan and support robust curriculum. The majority of teachers currently have their own classrooms, teaching 5 periods of a 7 period day with one 50 minute period of prep time, one 50 minute period of duty or collaborative time and a 25 minute lunch period.

*Classrooms are planned at approximately 85% utilization per state requirements vs 71% per current practices. This effectively means non-ownership of classrooms; most teachers would have primary ownership, but would need to share if one period a day or, conversely, all academic teachers might share two rooms (one for 3 periods, another for 2 periods per day). In either case a dedicated work space for each teacher is required and would be provided via planning rooms dispersed throughout the school and located convenient to each teacher's classroom(s).*

*The new plans anticipate having (4) freshman planning rooms; (1) for each team and sized for 10+ staff, anticipating SPED & ELL specialists. (13) Additional planning rooms are to be dispersed with grade 10-12 academic classrooms/labs, including (1) with World Language. The program also provides a large seminar room (little theater) to be used for teacher seminars, professional development and other multi-purpose activities as currently occurs.*

*Note: the proposed number of classrooms/sci-labs are projected at fewer than exist despite a 12.5% planned enrollment increase. This is primarily due to the difference in utilization. For example; 148 core academic classrooms/sci-labs exist for approximately 3,125 students. If enrollment increases 12.5% (to 3,520), you would expect classrooms/labs to increase to approx.166, but if the utilization of those rooms increased 14%, then 166 would become 143 rooms. The program calculates 146 classrooms/sci-labs are required (including 6 scheduled small group classrooms).*

## F. CLASSROOM INSTRUCTION (9-12)

As described in sub-section D and broken down into each academic subject

## G. FOOD SERVICE PROGRAMS

Aramark provides food service for Lowell High School. All lunches are made at the high school. The school has a full service kitchen for grades 10-12 and a warming kitchen at the Freshman Academy. Breakfast is available to all students from 7:00 am to 7:55 am. There are two breakfast carts along with the service in the cafeteria. Lunch is served daily in four 25 minute seatings between 10:45 am and 1:40 pm. in two separate cafeterias (main school and Freshman Academy). All breakfasts and lunches for students are free of charge.

The current space does not adequately accommodate all the students scheduled for lunch in the main school so many students eat in the lobby in front of Student Support Services and in the hallways outside the cafeteria.

Proposed Changes: Ensuring that the designated cafeteria space can accommodate enough students to allow for three lunch periods instead of four will have a positive impact on the scheduling process. It is also important to have a small satellite space off the main cafeteria for students who cannot function in a large space or large groups.

*Kitchen and Cafeteria areas are undersized now. The design/program meets the MSBA guidelines for 3 seatings (1/3 of the student population) and is anticipated to be developed as space that has a variety of zones within to accommodate different predilections and to be more flexible for alternative and multi-purpose uses. The potential of separating the freshmen portion of cafeteria, along with a satellite server will be explored during design.*

*The Cafeteria is to be located for easy and flexible access of students for early and extended hours, as well as for community use. The school would like to include easy and increased access to the breakfast service.*

## H. TECHNOLOGY POLICIES/PROGRAM REQUIREMENTS

Technology at Lowell High School is not equitable and needs significant upgrading within classrooms and throughout the building. There is a need for reliable technology that assists in the deliver 21st century curriculum along with a robust, high-speed wireless network with enough bandwidth to support a digital learning environment.

All teachers and administrators were recently issued MacBook Air computers. The school has invested in LCD projectors and document cameras over recent years to assist in presenting material in a effective manner to students and this is a basic tool that we are striving to ensure is in every classroom.

The district has computer technicians who are assigned through an online work order process to help maintain technology for the district. Currently the high school has ten shared labs (6 PC and 4 Mac) along with 16 restricted-use computer lab classrooms (8 PC classrooms, 5 Mac classrooms, 1 language lab, 2 ROTC, 1 Maker Space). The school has been migrating to mobile technology carts shared on an as needed basis by the community (4 iPad, 3 Macbook, 1 iPad science cart and 1 Chromebook cart). The school has one technology specialist whose primary focus is helping teachers integrate technology into their classrooms. She works one-on-one with teachers, offers group trainings, and has open lab hours for teachers to drop in.

The school is moving forward with online curriculum resources as allowed by the current technology. For example, business courses are completely online. While the current facility includes 33 classrooms equipped with Apple TVs and mobile iPad carts, and ten classrooms recently outfitted with interactive whiteboards, the use of such technology is generally limited to those classrooms and the trained teachers using them. While the current budget does not contain specific earmarks for the expansion of new technology to other classrooms, the library media center, or computer labs, the school purchases digital projectors and document cameras to upgrade classrooms when the budget allows. Twenty of these setups were added to classrooms across all academic departments in 2014-15, and another ten in the 2015-16 school year. A few classrooms have older model PCs dedicated to student use, but LHS does not provide classroom sets of mobile laptop computers or other digital devices for general use by teachers or students except in the Apple TV/iPad equipped rooms or with the “rental” carts. One recent technological improvement in the past few years is the installation of wireless access points in most classrooms, which has improved connection to the Internet throughout the school via personal mobile devices. However there are still too many areas in the school where WiFi connection is weak.

Teachers in all disciplines integrate technology into instructional practices. This means the use of technology in classroom pedagogy (e.g., iPads in some classrooms, computer labs in most instructional areas, a growing number of interactive whiteboards, digital projectors and document cameras) and the inclusion of technology in student assignments and outcomes. Some of the latter technologies include Google Apps for Education such as Google Drive, Google Classroom, YouTube and Blogger, iMovie, and Keynote (on iPads and iMacs). Students use a variety of mediums to demonstrate their learning including audio, video, and cloud-based apps.

Students in graphic design, television production, and engineering classes use technologies including CAD, Photoshop, Adobe, digital cameras, Avid, etc.

Proposed Change: Moving forward the high school anticipates moving away from shared computer labs to technology embedded in all classrooms with the use of mobile computer carts that allow for greater flexibility in the use of space. Eventually the school would like to be in a position to have student 1:1 use and install an interactive projector in every classroom.

*The new school will include robust infrastructure with fiber optics delivery into the building and a fully wireless environment planned for 1:1 capability in the future and designed for access to laptop and/or tablet devices. Specialty labs that require substantial computing, graphics and streaming capabilities will be outfitted as required.*

*All classrooms, special education/small group, arts, music, media center and flexible learning areas and conference rooms will be planned with data-projectors, document camera capability, fully wireless computing and have access to laptop or tablet cart storage/charging areas.*

*The (10) existing unassigned computer labs will not be replicated in the new program, but instead larger rooms and computer carts allow every classroom to become a computer lab.*

*The proposed program includes (12) specialty computer labs, including (5) Business/Mktg, (3) Art/Graph, (2) Engineering/Robotics, (1) Maker Space and (1) Digital Music are included in the program, along with (4) classrooms with computers; (2) ROTC + (1) World Language + (1) Math/Computer Sci. Additional computer lab settings occur within the TV/Media Studio, Library/Media with Technology Center and the Career Center.*

*Space is required for the existing and ongoing computer/technical support staff, equipment, work area and training lab. These spaces will be included as part of the overall Media Center that will more than double in size, per MSBA standards (from approximately 9,000sf to 22,000sf).*

- Media Center/Library:
  The school has a library media center staffed by one Library Media Specialist along with two library aides. The library media center is used broadly by various departments. Teachers schedule time in the library when they need students to research material (3 classes can be scheduled at the same time), work collaboratively in groups, the library also offers instructional sessions on how to use a library or take out books. The center is also open an hour before school five

days per week and an hour after school four days per week with teachers hired to provide tutoring or homework help. The Library Media Specialist focuses on using technology as a viable research tool coordinating google docs and the use of library research databases which is the number one library skill students need for college. The library media center has a dedicated computer lab which is essential for both visiting classes and for students coming in during lunch, before/after school and advisory time that need access to computers and printing capabilities. The library also has banks of computers in the library proper. These computers allow students to access key search engines, databases and allow students to write and edit papers.

The Library Media Center also houses the Lowell High School archive which has material dating back to the 1830s.

Proposed change: The library media center needs an upgrade in technology to include a dedicated laptop cart along with a balance of quiet areas, reading areas, collaboration areas, meeting areas and storage space. The space needs to support multi-media, flexible group space and current research practices along with small alcoves for small group or one-on-one tutoring.

*The current Media Center is approximately half the size of the state's standards and will be increased substantially, while also accommodating the needs of the school's Technology Center and professional training.*

*The new Media Center will serve as the technology hub and will be positioned to offer access to students in the morning and for extended day use. The space will be planned to accommodate 3 or more classes simultaneously with reading/soft seating areas, computer lab(s), instructional/presentation area(s) and a series of quiet/small group spaces. The space will include storage/charging for laptop carts and provide a room for Lowell High School archives.*

# I. ART PROGRAMS

The Mission of the Fine Arts Department of Lowell High School is to provide all students with a wide variety of high quality artistic experiences in Dance, Music, Theater and Visual Arts and to encourage creativity, the development of a unique artistic voice, and the enthusiastic pursuit of excellence in the Arts. The Philosophy of the Fine Arts Department at Lowell High School is to encourage all students to learn in, about, and through the Arts as a process of intellectual growth and self-discovery and as a contribution to the advancement of our collective cultural heritage. We believe that the creative process is essential to learning and we endeavor to provide a diverse, comprehensive, and sequential curriculum that includes creating, performing, presenting, and producing, making aesthetic judgments as well as

responding to the numerous connections between art and life. At the core of this creative work is using one's risk-taking, curiosity and collaborative abilities. We challenge students to become life-long learners who understand and appreciate the potential of the Arts. We strive to build student confidence and resiliency that fundamentally transforms students into creative thinkers with 21st-century skills.

Although Graphic Design, Digital Photography, Digital Audio and Animation are listed in the communications pathway, they are also part of the Fine Arts Pathway. Labs with the appropriate technology, data storage and file sharing systems and flexible furniture (except in Digital Audio lab due to pianos) are needed.

*The program/plans provide dedicated spaces for Visual Arts in the form of separate 2D, 3D & General Art Studio, Graphics Lab, Digital Photography/Animation Lab and TV Production Classroom. Additional Dark Room, Kiln and Storage and space is provided. The size of each lab is proposed slightly larger than State standards due to the class sizes that run higher than standards.*

## J. MUSIC AND PERFORMING ARTS PROGRAMS

In the performing arts, a Dance Studio - large enough for 2 classes simultaneously with ballet bars, mirrored walls, appropriate flooring, sound system and technology. The chorus room should have a flexible foot print. The room does not need built in risers but the floor should be hardwood to allow dancing for show choir. Portable platform and choral risers along with sufficient storage and sound system.
The band room requires very large storage spaces due to the size of many of the instruments including marimbas, tubas, and drums. It also requires practice rooms and an office area. We would like to keep the current size of the auditorium to best meet the needs of the program and school.

*The Performing Arts spaces include separate Chorus, Band, Digital Music/Piano Lab and (2) Dance Classrooms along with associated practice rooms, storage and office area. Similar to Visual Arts, the traditional Band and Chorus Rooms are proposed larger than State standards.*

## K. PHYSICAL EDUCATION PROGRAMS

<u>Gymnasium:</u>
The gymnasium and its supporting spaces would be the primary area for physical education instruction and on-campus athletics. It should include a flat track (ideally 6-lane, 150 or 200m) and three basketball courts (ideally 4 and not overlapping the track) for physical education, athletic team conditioning and track and field and sub-varsity basketball practices, (currently the four sub-varsity basketball teams and one

varsity basketball team practice off campus). The space would also include spectator seating with storage underneath.

An additional gym for special education/adaptive physical education instruction, would be located adjacent to the main gym, allowing for individual and class activities in support of students educational plans. The gym would have a wood floor with set up for three volleyball courts for special education physical education and interscholastic practice and interscholastic volleyball matches. Additionally, a main basketball court with 2 courts lined side by side across the main court for special education physical education and interscholastic practice is included. Spectator stands on one side of the gym with the set up for team benches and scoring table on the other side closest to the locker rooms, trainer's room. Storage needs would include wrestling mat storage for at least two mats.

The supporting spaces in the gymnasium would include:

- A shared space for weights/functional strength with a focus on Olympic-type lifting and dynamic/core training for physical education and athletics.
- Double sized (space for two wrestling mats) and divisible wrestling/multipurpose room for physical education instruction and wrestling practice. The divider would allow for combined or differentiated instructional offerings for physical education and for our large wrestling program to separate practice based on instructional level (currently our beginning/freshman wrestling practice in the Murphy Cafeteria).
- A multipurpose, flexible room with some spectator seating could be used for alternative physical education options during the day such as yoga, pilates, zumba, cheering and gymnastics (moveable equipment)

<u>Natatorium:</u>

The city of Lowell contains two major rivers and multiple canal systems; it is essential for the safety of our citizens that all students have the opportunity to learn to swim. The natatorium would include an 8-lane pool for physical education aquatics instruction, interscholastic swimming, and diving and community swimming. It would include independent access from a lobby area with restrooms for spectators/rental groups and spectator seating inside the natatorium for swim meets and community swimming.

<u>Administrative/Support:</u>

The administrative/support spaces would include an ice and water fill station for team access without entering the trainer's room. Male and female PE/coaches' offices with showers and restrooms Secure Storage for uniforms, clothing and equipment. An administrative office with a conference room. An athletic training room and locker rooms for use by physical education students and student-athletes.

*The MSBA's standards are focused on meeting the needs of Physical Education as opposed to Athletics. As such, the creative/flexible use of PE teaching stations is necessary to best serve the needs of all. A total of (9) stations can be justified based on the schedule of PE courses, each station is considered to be 3000sf (half a basketball court sized gym).*

*The ideal gymnasium/track would require approximately more than 28,000sf (9 stations) and would not afford any other PE/athletic spaces.*

*The program/plans have allocated the 9 station equivalent which allows a 3 court gym with overlapping track, a weights/strength room, a 2-mat wrestling room and separate multi-purpose room (for gymnastics/cheering/yoga) with adjacent storage. The intent is to co-locate the SPED Adaptive PE gym and ROTC Multi-Purpose space within the overall PE/Athletic area for beneficial adjacencies and create an overall space that could include an overlapping 134.1m, 4-lane track (12 laps =1600m)*

*The state does not participate in funding Natatoriums, but the program/plans include an 8-lane, 25 yard pool as part of the project.*

*Separate boys' and girls' locker rooms, team rooms, athletic director's suite, coach's offices, trainer's room and storage rooms are included in the program.*

## L. SPECIAL EDUCATION PROGRAMS

Currently there is limited handicapped access to the 1922 building. Moving forward this needs to be addressed to ensure that all handicapped students can easily access all buildings to include doors that have handicapped access. Currently inside the 1922 classroom doorways have thresholds which limit a student's independence and mobility to freely move in/out of the room. Another obstacle for the students in being able to turn the door knob. Lever style handles in the classroom would again provide students independence in moving in/out of the classrooms.

It is also important for the steps to be color coded on the edges to allow those visually impaired students independence in getting from area to area. At present we have had a number of falls/trips on the steps due to the perceptual depth problems of some students.

*The design plans are to be fully accessible, and seek to accommodate all learners, including those with sight, hearing, cognitive and physical impairments through a universal design approach. This approach focuses on inherent equity and barrier free planning for physical, sensory and cognitive differences. In other words, a fully sloped corridor would be preferred over corridors with a separate stair and ramp, to provide equal access and common experiences for the able and impaired alike. This concept carries into the treatment of wall and floor finishes and colors that should*

*be used to help accentuate changes-of-plane with visual cues. Acoustic considerations include recognition of mechanical system noise, and even quieting the sound of rain on roofs and window sills.*

In addition to the number of classrooms that are required by the department, there are some programs that have specific needs. Each will be addressed below:

Lifeskills Classrooms *(4) - proposed to reach beyond to all Special Ed programs:*
Presently in the 1922 building one of our life skill classrooms houses a cooking area and a laundry area. This room is also the classroom for a group of 18-22 year old students. The facilities provided should be accessible to the entire special education program and not limited to a class. Although the 2 class periods a day that are free can be utilized, it does not afford students the amount of time required to learn the skills needed to successfully transition to adult independent living. The proposal is to have separate space for the kitchens, laundry, mail room and copy center allowing staff to sign up for the rooms.

Intensive Needs Full Size Classrooms *(2):*
The Intensive Needs classrooms house our neediest students in terms of physical, medical and cognitive needs. Each class must be full sized to allow for wheelchairs, standing apparatus, swings, etc. The classrooms also need to have full size sinks with running hot water to clean the tubing and machinery (food processors, blenders, etc) used to prepare food and feed students. Presently there is one small room attached to room 118 that serves as a sensory room for the students. It is small and presents an issue of movement on some days; a larger room, though not full size, would alleviate the jams that can be created. In terms of personal needs, the high school has 3 changing bathrooms for our students. There is one in the 1980 building (near the nurse's office) and 2 in the 1922 (ground and first floor). Staff are required to take students out of the classrooms in order to change students. A changing room/bathroom connected to the classrooms is ideal. These bathrooms need toilet facilities with handicap bars, changing tables, sinks, and hoyer lifts.

Autism Classrooms *(8):*
The classrooms for students with autism also require a full-size classroom to allow for movement space and planning stations for students. Even in high school we continue the process of toilet training some of our students so an attached single bathroom in each classroom is ideal. Presently our 18-22 year old class has an attached bathroom. At times students need to be able to go to a quiet area that gives them room to meltdown and then regroup. Presently in our older classroom we have a separate backroom which has been utilized consistently and effectively while in the younger class we had the school department install partitions to allow for such a space. Again it is optimal to keep these types of separations/rooms to manage the potential volatility of some of the students.

*The program/plans provide (4) Life Skills classrooms grouped in two's (one for ages 14-18, the other for 18-22). The duel labs include dedicated toilets and shared kitchen, laundry and mail room areas. A separate Hygiene (wash/changing) space will be provided in a location that can be shared among the program.*

*The Intensive Needs Classrooms are also intended to be split-up between two age groups*

*The Life Skills program also includes (2) Intensive Classrooms with toilets, (8) Autism Classrooms with toilets, a shared Sensory Room and (2) Adaptive PE stations to be collocated with the main Gym.*

Adjustment Program:

The Adjustment program has a social worker devoted to the program to help manage the behavioral outbursts and emotional breakdowns of students with emotional disabilities. Presently the social worker is housed central to those classrooms and has a 2-room suite to both counsel and give students space as needed. This type of arrangement needs to continue in order to afford the adjustment students the services they require. Additionally, the adjustment classrooms need to be of good size to allow space between the students and for the opportunity to complete project based activities while allowing areas for students to regroup/take space.

*The program/plans provide (8) Adjustment Classrooms (2 to be located with the Freshman Academy) and space for the associated Social Worker, Counseling and Storage.*

*Fundamental Program:*

One of the course offering in the Fundamentals Program is the Instructional Support Class which services well over 100 students. In this class we presently work on transitional skills, self-determination skills, and largely on academics from other classrooms. These subject area classes are using Google Classroom and students are regularly accessing information on Aspen. Presently many teachers teach this course with inadequate materials and space to truly service students fully. To meet the students' required work we require a large classroom (larger than the average) that can house up to 10-12 computers for students to regularly access. Our "Instructional support" classroom - solely dedicated to this class- presently houses as many as 12-16 students with a mere 4 computers. Students are continuously waiting to get on the systems to complete their work or check in on their progress/work that needs to be completed. As a school we are having students send information/work through Google Drive constantly but we cannot meet this need in our classes. In order to meet needs we need a large space with many computers and study carrels for students to use when they come to take a test. Presently students will leave a gen

education class and come to test in the IS class but we have no private/quiet space to offer them and the efforts we and the student put in are compromised. In addition, shelving is critical as the IS center should house a textbook from each classroom as well as space for every student to have an individualized binder to track their work and transitional planning.

*The program/plans provides (9) half-classroom sized spaces (2 to be located with the Freshman Academy) and space for the large Instructional Support suite. The Instructional Support space must support the equivalent of 3 classes of 10-12 students working closely with specialists.*

Deaf and Hard of Hearing *(1):*
The DHOH program is presently housed at the Freshman Academy. It requires a ½ size classroom with the typical classroom needs (i.e. whiteboard, computer, etc.)

*Speech and Language (SPL):*
Presently housed in 2 smaller rooms in the back of a classroom (#305), the SPL class requires office space as well as teaching space. There is an assistant that works with the speech therapist. A ½ size classroom would be sufficient and would also house a little space for the Occupational Therapist and the Physical Therapist to complete some paperwork. The Speech Therapist holds small groups (6-8) students that work as a group at a round table.

Administrative Needs*:*
The Special Education administrative team at LHS consists of the following: 2 Evaluation Team Chairpersons (ETC), 1 Social Worker (in addition to adjustment social worker), 2 Evaluators, 2 Psychologists, 1 Department Chair and 1 Clerk. The staff requires office space, meeting rooms and testing rooms in order to complete their work. The main office for special education must be a locked room as it contains confidential files. This room (presently #144) houses the clerk, Department Head, and ETCs and works well. Optimally, each staff member evaluating (evaluators, psychologists) would have a small office to allow them to test in their room where all the materials are located. Presently evaluations occur in a number of places - wherever there is a free spot. The teams hold over 400 meetings a year and the need for meeting rooms is critical. We presently have 2 rooms: one is located in the Students Support Services office and one is located in room #220. Social workers also need a room that is individual in order to service students. The adjustment program is a little different and is addressed above.

*The program/plans provide a half classroom for the Deaf/Hearing Impaired program, Speech Office for 3 + meeting for 6, (2) Social Workers, (2) Psychologists with (2) Evaluators/Testing, (2) Meeting Rooms, a SPED Dept. Chair, (2) Team Eval. Chairs and SPED Office/Clerk.*

# M. VOCATIONAL EDUCATION PROGRAMS

Non-chapter 74 Programming

- Air Force ROTC

  The Air Force Junior ROTC Pathway is a four-year citizenship program designed to develop citizens of character dedicated to serving their nation and community. The objectives of AFJROTC are to educate and train high school cadets in citizenship, promote community service, instill responsibility, character, and self-discipline, and provide instruction in air and space fundamentals. The program is grounded in the Air Force core values of integrity first, service before self, and excellence in all we do. The curriculum emphasizes the Air Force heritage and traditions, the development of flight, applied flight sciences, military aerospace policies, and global awareness. Rigid academic courses in military science and leadership provide a solid foundation. The curriculum shows students how to reach their full potential while serving society through self-discipline, structure, followership, and leadership. Students are challenged by assuming various leadership positions throughout the Lowell High School Cadet Corps. Senior Cadets are responsible for organizing, planning, and coordinating all cadet operations and activities. In addition to classroom curriculum, learning includes numerous extra-curricular activities including before/after school programs, field trips, and community service activities. These activities emphasize teamwork, discipline, and community engagement.

  This program provides both classroom instruction and physical fitness training that requires multiple classrooms and a dedicated physical training space where cadets can drill and conduct physical training without disturbing other classes in the vicinity.

  *The program/plans provide (5) classrooms (1 more than exists) and a 2,500sf multi-purpose space dedicated for drills, physical training, color guard, etc. per USAF standards. Additional prescriptive storage, cadet office and conference areas are provided. The ideal location for ROTC programs would be near PE/Athletic areas for shared use of spaces and with easy access to outdoors.*

- Communications

  The Colleen Creegan Media Center: The Digital Media Studio requires an adjacent flexible classroom, a Digital Media Production Lab, with state of the art computers, wall monitors and secure storage where students will learn all aspects of media production - pre-production through broadcasting in a flexible, authentic environment. In addition, the Digital Media Studio should have individual editing bays with computers and updated software, a collaborative meeting space for students and digital media studio staff along with sufficient

storage to house all the equipment required to maintain a state of the art digital media production studio.

Within the actual studio, there needs to be a lighting grid with a sufficient number of light fixtures to allow for dedicated lighting cues for sets - newsroom desk, interview set, etc. A teleprompter, digital light and sound boards, the ability to add graphics and transitions, production switchers, duplication and storage, capture and playback deck, broadcast converters, video monitoring, audio monitoring, working communication between studio floor and control room and the ability to shoot/broadcast in HD. An edit/share system allowing for collaboration between digital media classes, graphic design classes, digital photography and digital audio classes.

In addition to the Digital Media Production studio and lab, additional labs for graphic design and digital photography as well as a digital audio lab that included digital pianos are essential. An edit sharing/storage system that would allow students and staff to work collaboratively - graphic design students create images and logos for TV broadcast, digital audio students create soundtracks for news segments, etc. For animation, tablets and computers are needed.

The Colleen Creegan Media Center also houses Lowell Educational Television, the educational access channel for the city of Lowell. Three staff members manage content and programming for channel 22 and let22.org as well as support LHS class activity. The studio contains a full sized media studio, edit rooms, small offices, and storage rooms. A teacher works in a media computer lab classroom where students create content for in school and city of Lowell broadcasts.

Proposed change: Locate the classroom within the media studio suite and provide students with private workspaces that allow them to focus on their media projects. It is essential to have flexible space and classroom adjacencies to allow for additional related programs to enhance the learning experience and allow for collaboration between the studio and journalism, music and digital music production, graphics, live music production, web radio production and drama and acting.

*The Media Studio is replicated in the new program and ideally located with other digital media programs and/or arts programs in the plans, with classroom space nearby.*

*The program/plans provide equivalent square footage to what exists, with a slight increase to address the need for a larger conference/meeting room. The suite will be configured with a full-size Studio, Waiting Room, Control Room, (8) Editing Suites, Media Classroom, Equipment Room, Offices for 3 and a Conference Room*

*for 15. The location would ideally be clustered near other Digital Media spaces and/or with Fine Arts (Digital Photo/Animation, TV Production & Graphics).*

- Culinary

  The Culinary Arts Department is designed for students interested in careers within the Food Service Industry, one of the largest and fastest growing industries in the world. This Pathway is ideally a three year program that can be tailored to one or two years on an individual basis. This Pathway integrates a rigorous academic curriculum, but it also provides "hands-on" training in a student-operated restaurant. Students are exposed to different baking and cooking techniques, a variety of table services, and customer relations. This Pathway provides a professional environment so students will culminate a basic, well-rounded education in Culinary Arts. All students complete the program with a portfolio and enough experience to secure an entry-level position within the Food Service Industry or pursue careers through higher education. Students also have the opportunity to train and test for the Serve-Safe Certification.

  Proposed change: The restaurant with its full service kitchen is not in the best location to serve the general public. It is currently in the basement and anyone being buzzed in the exterior door can go in many different directions within the school. This is a safety concern. The restaurant should be located with easy monitored access from the lobby in the same vicinity as the school store and the bank. This would keep our school businesses accessible to the general public while ensuring safety. The configuration of culinary area should be made up of the restaurant/kitchen with adjacent classroom space and an adjacent culinary lab for feeder culinary program. This would allow for more effective collaboration within the department. The other piece that is crucial is adequate storage space for inventory to include adjacent space for walk in freezers and refrigerators.

  *The program/plans provide (2) Culinary Classrooms along with the Kitchen/Restaurant and associated Freezer/Cooler and Dry Storage spaces. The new spaces are sized slightly larger than the existing and ideally located for easy, but controlled access by the public and for after-hours use. The kitchen will benefit further from shared access to loading/receiving areas.*

- Engineering

  *Maker Space Lab* - The LHS Makerspace will allow for student intrinsic motivation and self-directed learning, while engaging students in significant content by allowing for connections to curriculum. The Makerspace will reinforce or introduce to students the components of all LHS STEM disciplines.

  *An unassigned Maker Space serves as pull-out space for the 9th Grade. The Science Lab sized space will have an adjacent prep room for associated storage*

*of materials, projects and 3D printing. The space will be located within the Freshman Academy areas.*

*Engineering Lab* - Technology/engineering classes will be able to move seamlessly between tool-based work, lecture, group work, and non-tool-based labs. Physics and robotics classes will have direct access to woodworking and metal tools for hands-on applications. All classes in this Pathway will be able to move from paper-based lecture or group work to computer based design to manufacturing

Proposed change: The growth of this program has prompted the need for 2 Engineering labs so that all classes can have full access to this facility and educational/technology tools.

*The program/plans provide (2) Engineering Labs as required to meet prorated scheduling. Each room is sized as a traditional Science Lab, but will be outfitted according to the specific needs for CADD and Robotics.*

- Environmental Sustainability (in development)
  All classes in this Pathway will be able to move from classroom/academic work to hands-on, designing and manufacturing (computer-based, solar panels, etc.)

  Proposed change: With the addition of a lab, students will be able to access design and manufacturing tools in house (rather than using facilities at satellite locations - such as businesses and collaboratives).

  *The program/plans provide a Science Lab sized space that will be developed as a new pathway for clean energy and sustainable design. The enrollment for this program is expected to come from other tech/engineering programs which might reduce in utilization, but provide specialized spaces to support each pathway.*

- Health & Bioscience
  The Health and Bioscience Pathway is designed for students with an interest in the fields of allied health and/or the emerging field of biotechnology. The Health and Bioscience Pathway offers students a unique opportunity to gain essential classroom knowledge and practical experience within the local medical or biotechnological community.

  Proposed change: *Hospital Room Model Classroom* - Students will interact with model patients and learn how to conduct electrocardiograms, draw blood, interpret X-rays, set broken bones, and perform a range of other challenging tasks.

*The program/plans provide a separate Health and Bioscience Lab as part of the overall count of Science Labs, but each is to be outfitted for the specifics of either medical assisting, including associated patient beds, mock toilet/changing room or micro/biotech which includes specialized fume hoods and clean room set-up.*

*The design/plans seek to create a dispersed pattern of interdisciplinary STEM and Humanities clusters, each potentially grouped as (3) science labs with (3) math classrooms vs (3) english with (3) social studies classrooms. Ideally, each cluster would have shared pull-out spaces and good visibility to foster collaboration and small-group and project-based activities. The visibility may allow a bit more independent work by students and also provides passive supervision throughout academic areas. ELL academic classrooms/labs will be woven alongside regular academic clusters in groupings of (2), as will health classrooms and special education spaces. World Language is to be grouped as a department, similar to Fine Arts, Business/Tech, ROTC and Physical Education, and located for ease of access among all grades.*

*Larger classrooms are critical to meet the needs of more active learning and to accommodate more flexible furniture that allows for multi-mode set-ups and better accommodates individual computing.*

<u>Chapter 74 Programming:</u>

- Business Marketing & Finance

Lowell High School offers a Marketing & Finance Pathway for students interested in majoring in Business Administration in college or entering the workforce in the areas of management, finance, accounting, or marketing. The Marketing & Finance Pathway offers students authentic learning opportunities. Our students have the ability to work in the 1826 School Store, with a site in the high school and another in the downtown. Students experience the excitement and challenges of being a small business owner. Our marketing program partners with NFTE (Network for Teaching Entrepreneurship) which provides numerous hands-on learning activities and opportunities. Our partnership with the Jeanne D'Arc Credit Union allows students in the pathway to work in the Lowell High School branch of the Jeanne D'Arc Credit Union. In this branch, students learn the day-to-day operations of the banking industry. Both these valuable business opportunities allow students to earn high school credit and real world experiences while providing valuable services to the school and community.

Proposed change: The school store requires an adjacent flexible classroom (marketing retail lab) with retail and storage space to effectively provide students with real world experience in running a store, which includes customization of t-shirts, inventory control, customer service, accounting, marketing/advertising, and online

sales. Beyond the retail program there is a need for flexible, technologically-equipped classroom space that allows for the use of online business and marketing simulations, software designed specifically for these types of classes, and online research. Positioning the other four business classrooms in the vicinity of the store would be beneficial in allowing more collaboration between the teachers. The bank is currently located within the cafeteria which allows for access by students and staff but does not allow for easy public access. There is a need for a larger space for the bank. The store and the bank should be co-located with the restaurant program in a configuration that allows for access through the main lobby for security purposes.

*The program/plans provide (5) Business Finance/Marketing classroom/labs, (3) of which are recognized under Massachusetts Chapter 74 Program for Marketing and include the School Store. A separate space for the Bank is provided as a pull-out component of this program.*

*All Business programs would ideally be located as a cluster, but the larger priority is positioning the Bank, Store and associated Classrooms near the Cafeteria, Main Entry/Lobby and easily accessible for public and afterhours uses. Separate storage for retail/supplies is provided.*

## N. TRANSPORTATION POLICIES

Transportation is not provided to Lowell High students to get them to and from school. If a student wishes to use the Lowell Regional Transit Authority bus, the cost of a bus pass is $20.00 per month. A survey of students conducted during the 2014-2015 school year indicated that students commute to and from school using the following methods: ride from family/friend (33%), walk (32%), ride city bus (24%), drive (11%). Daily, 11 LRTA buses transport students at drop-off and pick-up times, lining up along French Street and Kirk Street.

Approximately 83 SPED students are transported to and from LHS separately each day with 10 total of the following: specialty equipped wheelchair vans, yellow buses, and smaller vehicles.

Transportation for Athletics is extensive. Daily, about 7 buses line up at the main entrance on Father Morissette Boulevard to transport students to practices at Cawley Stadium, the boat house and other locations. Students provide their own transportation home from practice. On game days, there can be up to 4 additional buses that pick up students (also at the Father Morissette location) for transportation to games.

*Note; the Educational Program does not address parking needs. The site program is articulated in section 3.1.5 Site Development Requirements. The school currently benefits from its location that utilizes city transportation, wide streets and adjacent*

*parking garage. Planning options that create a new school a different site will need to account for parking and transportation as part of the site program.*

## O. FUNCTIONAL AND SPACIAL RELATIONSHIPS

Lowell High is interested in exploring different organizational structures that would more fully support the concept of expanding areas organized for STEM classrooms, Humanities classrooms, and CVTE classrooms. LHS is considering clustering academic Department Head offices together by subject matter connections (Humanities, STEM, CVT) and integrating the houses into this configuration. One way to do this would be to place two house offices in a combined house and guidance suite in proximity to a department center. This would allow for administrative presence in multiple areas of a large building. Another option would be to place all the house offices into one central space near the main office, such as a house and guidance suite. The Freshman Academy, while housed within the same large building, would have a separate office suite for the Director of the Freshman Academy.

*The broad planning goals are to organize a new or renovated school for community use and control by having a zone or zones with major activity areas, such as the PE/Athletics spaces, Auditorium, Cafeteria and Media Center able to be opened or closed in a controlled and naturally supervisable way. The Cafeteria and Media Center seek to serve as the heart of the school, one as the social core and the other as the technology hub. Both located and configured for flexible use and access to views and outdoors. The culinary program would ideally be in proximity to the lobby as well as cafeteria kitchen/loading areas. The culinary restaurant, school store and bank also need to be located near the main lobby/community use areas.*

*The freshman are to be zoned in a separate wing, but well connected to shared programs and major spaces. Freshman academic rooms are to be clustered as teams of 6 classrooms + 2 science labs with nearby special education, health, ELL classrooms and a teacher planning room. Other academic rooms are to be organized in STEM clusters (3 science with 3 math) and Humanities clusters (3 english and 3 social studies), but in an alternating pattern that promotes collaboration within each cluster and convenient cross-discipline connections between STEM and Humanities.*

*Special Education, ELL and Health Classrooms are to be dispersed with general academic areas (grades 9-12), but ideally in groups of two.*

*Fine-Arts, World Language, ROTC and Digital Media programs are to be clustered alike, while seeking proximity to general academics for foster potential inter-disciplinary efforts.*

# P. KEY PROGRAMMATIC ADJACENCIES

As described in section O above

# Q. SECURITY AND VISUAL ACCESS REQUIREMENTS

Of critical importance to the Lowell High community is an environment that is safe and secure. The school currently has 32 entrances. After the start of the school day, all doors are kept locked with the exception of the main lobby door. A security guard monitors the door closest to the Freshman Academy at class changing time to allow student to enter the main school without having to go to the main entrance. The main entrance has no buzzer or electronic monitoring system to manage entrance into the building. There is a security desk in the main lobby where visitors are expected to check in and be given a visitor's pass but visitors can easily bypass the guard who might be busy checking another visitor in. The school uses the Raptor visitor system and during school hours the school has over 10,000 visits each year. The high school has approximately 110 analog cameras throughout the three buildings that are being replaced by digital cameras as the analog cameras wear out. Currently the command and control center in an emergency is the security office that has multiple camera monitors and the ability to use the intercom. This space is not secure having both an interior glass door and large ground level windows to the outside.

At its current site the high school has a neighboring facility that is of adequate size to house students in an emergency/evacuation situation. This is important factor in our safety protocols that allows us to account for both students and staff in a safe alternative environment.

Proposed Change: The plan should include an upgrade to the cameras system. The security vestibule should be configured to better monitor the main entrance to the school to include a camera and buzzer system on the door. If the high school continues to occupy multiple buildings the second building should also have a security entrance to better monitor the flow of students, staff and visitors. The school would also benefit from a secure command and control center preferably in the vicinity of the main office with multiple monitors to display footage from security cameras, an intercom system and space for a conference table. To alleviate bottlenecks and overcrowding during class changing time having multi-level bridges would be very beneficial and would limit the amount of students choosing to go outside to move between buildings. The school also needs a more robust security system that allows for automatic lockdowns of all exterior and interior doors along with a system of communicating with police and rescue. The current intercom system is past its functional life and needs to be upgraded to better meet the needs of the school.

*The proposed planning concepts include a controlled main entry vestibule with security desk, adjacent SRO Office and a conference room that can function as Command/Control Center and also serve as DARE meeting space. A satellite SRO Office will be provided due to the large size of the school.*

*The planning layout for new or renovated facilities will be zoned for the ability to lock-off wings and control after-school use and community access. This includes locating the school store, bank, culinary and administrative houses for access from main lobby and functional areas.*

## R. OTHER PROGRAMS

In-House Suspension(2): The high school has two separate in-house suspension rooms, one for grades 10-12 and one for grade 9. These rooms are used all day and students do self-reflection and coursework with the assistance of the in-house teacher who acts as tutor/counselor.

Student Activities: The high school also has a student activities office that manages 32 after school activities and clubs. This office space is located in the cafeteria for easy access by students.

Nurses' office. This office has four assigned nurses. This space needs to have a reception area, private exam rooms and storage space for equipment and student records.

Outside service providers provide both academic support and health and social services:

- SCORE Mediation: Mediation office that trains students to work as mediators on student issues referred by house deans and other staff members. This space requires and office and a small meeting room.
- MCC/UMass: Programs provide intensive academic support and college/career support for 1st generation college and underserved populations. These programs require office spaces and a classroom (TRIO; Gear-Up / Talent Search / Upward Bound)
- Catie's Closet: A nonprofit that provides clothing and cosmetic items for students in need. Space needed is the size of a small classroom.
- Health Center: Lowell Community Health has a medical suite at the high school to service students with medical and mental health issues.
- Counseling Services: Outside counseling providers come into the school to support students with mental health needs.
- Safe Harbors Homeless Coordinator: Office space needed for program coordinator that assists our homeless student population.

*The program includes (2) classrooms for In School Suspension, a student activities space and full Nurses' Suite per MSBA Guidelines. An office and waiting/secretary is provided for Score Mediation, along with a 3-room suite for MCC/UMass Trio programs, 2 spaces for Catie's Closet (1 with freshmen), a suite of rooms for the Community Health Center and space within the Student Support Center for Safe Harbors.*

*The program also provides a small space for Latino Connection and an office for substitute teachers. Counseling Services occur throughout the school, within available space.*

*See Appendix for further information*

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# 3.1.4 Evaluation of Existing Conditions

## A. Executive Summary

This report examines the existing conditions of the exterior and interior of the Lowell High School which is a campus comprised of multiple buildings: the "1922 Building" (collectively includes the original 1892 Coburn Building, the 1922 Sullivan Addition and the 1997 Kouloheras Addition), the 1980 Lord Building and Field House Building, and the Freshman Academy which consists of the former 1901 Lowell High School Commercial and Manual Training Department (Trade High School) and the former 1939 High School Annex. The Steam Plant was constructed as part of the 1922 High School addition. It includes a review of all the systems and is meant to act as a snapshot of the overall facility condition at the time the reviews were completed. The consultant team has visited the existing buildings, spoken to the facilities and maintenance staff, reviewed the areas of the building applicable and relevant to their respective trades and provided a base existing conditions report as well as a summary of necessary repair scope, as applicable.

These existing conditions analyses included: review of the available construction drawings from the City Engineering Department and the High School, available drawings from the Massachusetts Archive, the Comprehensive Facilities Assessment by OMR Final Draft dated February 28, 2014, and on-site observations by Perkins Eastman|DPC and their consultants during the months of August, September and October 2016.

Perkins Eastman | DPC visited and cataloged every room and surface in the facility, any deficiencies discovered during that effort were recorded in the field and then transcribed in the office onto existing condition drawings and schedules to develop the project base repair scope for the estimator. Design Team consultants also visited the site and recorded their observations in reports. These drawings, schedules and reports are included in the appendix.

The Lowell High School is located at 50 Father Morissette Boulevard in Lowell Massachusetts. The +/- 6.6 acre campus is comprised of 4 parcels, 4 buildings and 2 bridges that span the canal totaling approximately 626,188 s.f. The condition of these buildings vary with the vintage of each and are summarized in this section.

The campus is located in the DMU (Downtown Mixed Use District) within the city. Lowell High School is located along Father Morissette Boulevard, Arcand Drive and French Street. The Freshman Academy is detached and located at the intersection of Paige Street and John Street adjacent to the Steam Plant. The two main high school structures are the 1922 Building and the Lord and Field House Building which span a segment of the National Historic Park's Merrimack Canal and Lucy Larcom Park.

On the east side of the Merrimack Canal the existing Lowell High School is listed on the National and State Registers of Historic Places through its inclusion within both the Lowell National Historical Park & Preservation District, the City Hall Historic District, and the Downtown Lowell Historic District. This applies to the buildings on Kirk Street including Coburn Hall (1892) and an addition built circa 1922; the 1997 addition is also in the National Historical Park by virtue of its attachment to the High School Building. The 1980s sections (Lord and Field House) are within the preservation district, and within the Lowell Downtown Historic District. The 1980's buildings may be deemed less historically sensitive, but all work on those buildings will require Lowell Historic Board and likely also MHC review. Three nearby buildings also associated with the high school, the former Lowell High School Commercial and Manual Training Department (a.k.a. Lowell Trade School) (1901) Located at 68 John Street, the Lowell High School Annex (1939) located at 55 French Street as well as the Steam Plant and associated smokestack on French Street are also listed on the National and State Registers of Historic Places through their inclusion within both the Lowell National Historical Park & Preservation District and the City Hall Historic District. The Lowell Trade School/Lowell High School Annex were subsequently renovated circa 1997 as the Freshman Academy.

As to be expected with facilities that have been renovated over time, the buildings have portions which comply with the ADA (Americans with Disability Act) / MAAB (Massachusetts Architectural Access Board) and other spaces that don't. A substantial renovation project would likely exceed thresholds that would require altering non-compliant areas to comply with these regulations.

In general, the various buildings have more than the minimum number of toilet facilities to address the projected enrollment of 3,520 students and approximately 500 staff. Some of the toilet room layouts are not compliant and toilet fixtures can be eliminated to allow for reconfiguration of compliant toilet rooms.

## Recommendations for Future Investigations for All Buildings:

In general, the available existing information is incomplete and does not reflect the current configuration of the campus. Should the existing buildings be part of a renovation or expansion project, it is recommended that a full laser survey of the buildings be done to confirm layout and dimensions, as well as invasive testing to determine the existing structure of the older vintage buildings.

# 3.1.4 Evaluation of Existing Conditions

# B. Developable Property

See appendix for additional information regarding Titles and Deeds.

The Lowell High School campus is bordered by Father Morissette Boulevard, the Tsongas Center and George A. Ayotte Parking Garage to the north, an office building and the Lowell Masonic Association to the south, Kirk Street and The National Park Headquarters and the Steam Plant and Freshman Academy Buildings to the east, and Arcand Drive and apartment buildings to the west. The main campus is bisected by the Merrimack Canal which has an active trolley track on the east side of the canal, and Lucy Larcom Park on the east.

### Water:

Lowell Regional Water Utility (LRWU) water mains provide domestic and fire protection service to all high school buildings. A 20 inch main runs east - west in Father Morissette Boulevard which splits to a 12 in main continuing on Father Morissette and a 16 inch main running southerly in Arcand Drive. A 6 inch main runs north – south between the Merrimack Canal and the 1922 building in Lucy Larcom Park. A 20 inch main runs easterly and westerly in French Street which supplies a 6 inch main that runs northerly – southerly in Kirk Street. A 6 inch main tees into the Kirk Street main which runs easterly – westerly in Paige and Lee Streets. A 6 inch main runs northerly – southerly in Dutton Street.
See appendix for further information.

### Sanitary Sewer:

Lowell Regional Wastewaste Utility (LRWWU) provides sewer service to all high school buildings. A 15 inch sewer main runs in a northerly direction in Arcand Drive which connects to a 24 inch sewer main at the intersection of Father Morissette Boulevard and then turns westerly and connects to a 48 inch sewer main in Father. Morissette Boulevard. A 15 inch sewer main beginning west of the Merrimack Canal located in Father Morissette Boulevard running westerly increasing in size to 18 and then to 24 inches. A 12 inch combined sewer runs northerly in Lucy Larcom Park connecting to a combined 12 inch sewer main in French Street. A 16 x 18 inch combined sewer main runs northerly in Kirk Street to a 24 inch combined sewer main in French Street.
See appendix for further information.

### Storm Drainage:

The storm drainage service is provided through a combination of the Lowell Regional Wastewater Utility (LRWWU) by way of a combined sanitary and stormwater system, which does not meet DEP Stormwater Regulations 2008 and a separate stormwater drainage system. There is a 24 inch drain line in Arcand Drive running northerly and connecting to a combined 24 inch sewer main in Father Morissette Boulevard. There

is a 15 inch increasing to 36 inch drain line running westerly in Father Morissette Boulevard. A 15 inch increasing to 24 inch sewer main also is running westerly in Father Morissette Boulevard. A 12 inch combined sewer runs northerly in Lucy Larcom Park connects to a combined sewer in French Street that turns easterly. A 16 x 18 inch combined sewer main runs northerly in Kirk Street.
See appendix for further information.

### Gas:
The city's gas service is provided through National Grid. A 6 inch gas main is located in Father Morissette Boulevard. A 4 inch gas main tee's off the 6 inch main at the intersection for Father Morissette and Arcand Drive and continues southerly in Arcand Drive. The 6 inch gas main splits at the eastern end of Father Morissette and continues southerly parallel to the Lord Building and into Merrimack Street. A 6 inch gas line runs in northerly in Dutton Street. A 4 inch gas line runs in a northerly direction in Kirk Street and tees into a 6 inch gas main running on the northern edge of French Street.
See appendix for further information.

### Electrical:
The city's electricity service is provided through National Grid.
See appendix for further information.

### Telecommunication/CATV:
The city's telecommunication and cable television services are provided through Comcast and Verizon.
See appendix for further information.

### Soils:
Pending geotechnical investigations which will be performed when site selection is finalized.

### Public Sidewalk and Private Driveway Improvements:
The paving at the main entrance to the high school between the Lord Building and Field House is in poor condition and needs replacement. HC accessible curb ramps are in poor condition and need improvements to meet MAAB requirements. Most of internal site sidewalks and all of the driveways are in poor condition requiring replacement. HC parking spaces along Father Morissette Boulevard do not meet MAAB requirements and need replacement and relocation.

### Phase 1 Geo-environmental:
A Phase I Environmental Site Assessment (ESA) has been performed per ASTM E1527-13 and MGL Part I, Title II, Chapter 21: Massachusetts Oil and Hazardous Material Release Prevention and Response Act. This report also includes 75 Arcand Drive which is included as part of the "expanded" existing site options. Based on the findings Nobis Engineering recommends that a Phase II subsurface investigation be conducted including collection and analysis of soil samples and a surface geophysical survey (electromagnetic and ground penetrating radar) in the vicinity of the steam plant to determine the presence or absence of a historical underground storage tank.

See appendix for additional information.

## Permitting:

### Wetland Protection Act (310 CNR 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), dated April 2009 indicates a wetland resource area located along the Merrimack Canal, (and more specifically located between the 1922 Building and Lord/Field House Buildings).

Work performed within resource areas or buffer zones will require a filing of a Notice of Intent (NOI) with the Lowell Conservation Commission and the Massachusetts Department of Environmental Protection.

It appears that any proposed work within the vicinity of the Merrimack Canal may require the filing of a Notice of Intent filing with the DEP and the Lowell Conservation Commission.

### Flood Plain:

Based on the Flood Insurance Rate Map (FIRM), the Community Panel Numbers 25017C0139F and 25017C0143F and both dated July 7, 2014, the Merrimack Canal is in Zone A (No base flood elevations determined). The remainder of the school building sites are located in Zone X (Areas determined to be outside the 0.2% annual chance floodplain).

### Surface Water Supply Protection (310 CMR 22.20):

The Massachusetts Department of Environmental Protection (DEP) ensures the protection of surface waters used as sources of drinking water supply from contamination by regulating land use and activities within critical areas of surface water sources and tributaries and associated surface water bodies to these surface water bodies to these surface water surfaces.

The only water supply for the Lowell Regional Water Utility (LRWU) is the surface water from the Merrimack River, which has its source in the White Mountains of New Hampshire. The Intake Station is situated on the riverbank north of the city and water is pumped one half mile to the treatment plant. A review of the Massachusetts DEP resource layers available on the MassGIS indicates the High School is not located within a water Supply Protection Zone, and appears to not require permitting under 310 CMR 22.20.

### Natural Heritage & Endangered Species Program:

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 High School site is NOT located within a Priority Habitat of Rare Species or an Estimated Habitat of Rare Wildlife and that there are no vernal pools on or adjacent to the site. It does not appear that the project will require NHESP review.

### Area of Critical Environmental Concern (ACEC):

A review of the Massachusetts Geographic Information System (MassGIS) dated April 2009, indicates that the site is NOT located within any Area of Critical Environmental Concern.

### US EPA 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 are required to develop and implement stormwater pollution prevention plans in order to obtain permit coverage. The permitting requirement will need to be determined based upon future design options. Update for options under consideration.

### Sewer Connection Permit (314 CMR 7.00):

New connections to sanitary sewers, increases in flow to existing sanitary sewers, and discharges from businesses that are not considered to be "industrial wastewater" are subject to state requirements based on their expected discharge volume:

- Discharges ≤ 15,000 gallons per day (gpd) will need only local approvals (no approvals by MassDEP)
- Discharges ≥ 15,000 gpd but ≤ 50,000 gpd must file a one-time certification statement with MassDEP within 60 days after the connection starts to be used
- Discharges > 50,000 gpd must obtain a MassDEP permit before construction

Due to the existing sewer flows from the buildings to be maintained or to increase slightly, no permitting is expected to occur. Any new sewer services may require permitting (street opening, sewer connection fee) from the City of Lowell.

### Permitting Table Timeline:

| Permit | Permitting Authority | Anticipated Filing Date | Anticipated Approval Date |
|---|---|---|---|
| Notice of Intent (Order of Conditions) | MassDEP & City of Lowell Conservation Commission | After 100% DD | Approval in 3 to 6 months |
| Planning Board Site Plan Review | City of Lowell Planning Board | From SD to DD | Up to 6 months+ |

| | | | |
|---|---|---|---|
| (If Required) | | | |
| National Pollutant Discharge Elimination System (NPDES) with EPA Notice of Intent (NOI) | Environmental Protection Agency (EPA) | After 100% CD | Once Submitted: Close NOI at end of Construction |

**Zoning:**

The Lowell High School is located in the DMU Downtown Mixed Use District. The site has few limitations other than a Max F.A.R. of 4 and a Minimum Frontage of 25 which the parcels well exceed. See Section 3.1.5 for additional information.

See appendix for further information.

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# 3.1.4 Evaluation of Existing Conditions

# C. Architectural, Building Code and Accessibility

### Architecture:

Prior to the construction of the existing High School buildings, the site has been developed since the early 1800's, when the Merrimack Canal and associated textile mills were constructed. The Merrimack Manufacturing Company and Boot Cotton Mills were both located to the north of the Site, and rail line was constructed to the west of the canal to serve these mills. Today this rail line still exists and is used for streetcar traffic associated with the Lowell National Historical Park. Former railroad activities likely transported and handled raw materials that were associated with the operation of the mills that surrounded and were located on parts of the site which suggests that although there is no documented release of contamination to the environment from historical site operations, the nature of historical site operations suggests that there is potential for a release to have occurred which warrants further investigations should the existing high school site be selected for a renovation or expansion project . The various campus buildings were constructed at various times as described below.

### "1922 Building":

The 1922 Building is located at 38 Kirk Street. The site consists of approximately 2.7 acres situated on the east side of the Merrimack Canal and is bounded by Father Morissette Boulevard/the George Ayotte Parking Garage to north west, Kirk Street/National Park Headquarters to the east, an alley and St. Anne's Episcopal Church to the south, and Lucy Larcom Park and the Merrimack Canal to the west.

The building consists of approximately 312,052 sf and is comprised of three main sections: the original Coburn Hall Building at the south constructed in 1892, the Sullivan addition constructed in 1922, and the Kouloheras addition at the north that was constructed in 1997. The building is comprised of 3 stories, with a partial mezzanine in the original Coburn building (that was constructed at the time of the 1997 addition), plus a full basement. The 1922 Building is connected to the Lord Building via 2 pedestrian bridges consisting of approximately 4,400 sf; one at the southern end of the site which was constructed in 1980 and another at the northern end which was constructed in 1997.

The building appears to be constructed of various structural systems for each vintage. The 1892 Coburn Building is a combination of wood framing supported by steel and wood trusses at the roof, and tongue and groove wood plank on wood joists spanning to brick masonry bearing walls at the floors. The1922 Sullivan Building construction is largely unknown due to lack of existing drawings and the fact that hard finishes obscure the structure; observations and limited original drawings

suggest at least some sections of the building are reinforced concrete slab construction (concrete slabs with masonry block or tile forms, supported on masonry bearing walls). The 1997 addition is structurally separated from the 1922 building by an expansion joint, and is steel framed with metal deck spanning to steel joists and beams/girders supported by steel columns. The lowest level of the building is slab on grade with a mixture of fieldstone and concrete foundations. The bridges are long span structures comprised of concrete slab on metal deck spanning to steel joists and beam/girders supported by steel columns.

Pending confirmation of the existing construction via invasive testing, the building is likely Type IIIA, the bridge is Type IIB construction under the Massachusetts State Building Code 780 CMR 8th Addition.

The building is comprised of spaces which include: classrooms, the Cyrus Wendell Irish Auditorium, the Daniel P. Kane Courtyard Restaurant, the Lowell Community Health Center, Catie's Closet, a Teacher's Center, ROTC, various mechanical and electrical rooms. The 1922 building also includes and historic artifacts such as the Carney Medal Winner and the Distinguished Alumni wall plaques located the public spaces adjacent to the Auditorium. Due to the width of the building, academic classrooms are organized along the perimeter walls (including courtyards) to maximize natural light. There are also light wells that provide additional light into corridors. The multi-level Auditorium is located in the central northern core of the 1922 portion of the building and is accessed via a ramp and stairs off of Father Morissette Boulevard. The vertical circulation is provided by 8 egress stairs and 2 elevators. The building is accessed through 9 separate entries distributed around the building perimeter,

As noted above, it is expected that per many facilities of this era renovated over time the building has portions which comply with ADA/AAB and other spaces that don't. Areas of non-compliance include but are not limited to: exterior entries which contain stairs and no ramps, the existing HC lift at the north entry foyer adjacent to the Auditorium is technically not compliant and needs to reconsidered, Auditorium floor slopes exceeds the maximum allowable of 1:12, Auditorium Balcony and Control Room are not accessible, classroom door clearances on the push and pull sides, classroom thresholds that exceed the ½" maximum, toilet room clearances, Band and Choral rooms have tiered floors. The Teacher Work Room located in the mezzanine is not accessed by an elevator, Science rooms / labs do not have required clearances, the majority of hardware is not accessible, and signage does not reflect current room usage and does not meet accessibility requirements. In general, the buildings has more than the minimum number of plumbing fixtures to serve the potential design population and therefore reducing the number of restroom fixtures to provide accessibility will not be a problem.

The envelope components range in condition from good to poor. In general the masonry and structure do not show severe signs of distress and appear to be in good condition. The slate and copper roofs and downspouts on the original 1892 building have been recently replaced and are in excellent condition, but the existing membrane are past their useful life and experiencing water infiltration that suggests full replacement. The brick walls are in good condition with few exceptions. The

limestone and terra cotta features require some replacement; several pieces have been salvaged and could possibly be reused. The exterior walls of the 1892 and 1992 portion of the building are comprised of multiple wythes of masonry, and the 1997 addition is brick veneer with steel back-up 1997. Only the 1997 portion of the building has confirmed insulation in the exterior walls. The majority of the windows are in fair to poor condition and are difficult to operate (some will not close or open), and several seals and insulated glass units are broken. The poor condition combined with the fact that preliminary Historic discussions suggest that a window with a more historic profile would be required should a major renovation occur, suggests that all windows be replaced. The building sealants have deteriorated requiring full replacement. The exterior doors appear to have been replaced as part of the 1997 work but may need to be replaced as part of making the entrances accessible. The stairs are in poor condition and replacement is recommended. Interior doors and frames are in good to poor condition. The elevator in the 1892 building was recently replaced and is good condition with the exception of the ceiling and lights which are damaged and should be replaced. The elevator in the 1922 building is in poor condition and replacement is recommended. Some of the interior partitions are the demountable type which do not extend to the deck, and are an acoustic breach which will not meet the LEED prerequisite, and should be replaced. The majority of the interior finishes and casework are in fair to poor condition with few exceptions and replacement is recommended. The bridges are generally in fair to poor condition: the barrel vaulted aluminum and polycarbonate roof/wall system should be replaced, window systems are tired and failing and should be replaced, as should interior finishes. The HVAC, Mechanical, Electrical, Plumbing and Fire Protection Systems are in poor condition and are at the end of their useful life cycle and require replacement as further explained in Section C of this report.

### 1980 Buildings: Lord (Academic Building) / Field House (w/ Natatorium)

The Lord/Field House Building is located at 50 Father Morrissette Boulevard. The site consists of approximately 3.3 acres situated on the west side of the Merrimack Canal and is bounded by Father Morissette Boulevard to the north, Arcand Drive along the west, the trolley tracks/Merrimack Canal to the east and a parcel of property at 75 Arcand Drive along the South of the site, which is an office building.

Constructed in 1980 with a minor renovation and addition in 1997, the facility is comprised of two buildings totaling approximately 216,172 sf. The Lord Building is a 3 story academic building which is approximately 141,122 sf. The Field House is a 2 story athletic facility with a partial basement totaling approximately 75,050 sf. The two buildings are connected via a 2 story glazed lobby space. As noted above, the Lord Building is connected to the 1922 building via 2 pedestrian bridges; one at the southern end of the site which was constructed in 1980 and another at the northern end which was constructed in 1997. The two bridges total approximately an additional 4,400 sf. The construction type for both buildings and the bridge is Type IIB unprotected, non-combustible construction.

The Lord Building is a 3 story academic building is comprised of classrooms, science

laboratories, Murphy Cafeteria, kitchen, conference space, the Colleen Creegan Library (Ext. Building Sign, "George D. Kouloheras Library Media Center), a television studio, student support offices, administration and nurse's offices, Police Department, 1826 School Store, the Jeanne D'Arc Credit Union, the Little Theatre, and a maintenance and receiving area. The structure is a concrete slab on grade of varying thickness with building columns supported on pile foundations. The second and third floor construction consists of concrete slab on metal deck spanning to steel joists and beams/ girders supported by steel columns. The roof construction of the Lord Building is steel framed, with metal deck spanning to steel joists and beams/ girders supported by steel columns. The vertical circulation is provided by 7 egress stairs and 1 elevator. The first floor has 11 perimeter entrance areas with doors serving the facility.

The Field House is a 2 story hexagonal building with a multi-sport gymnasium, pool, wrestling room, weight rooms, locker rooms, and mechanical room located in a partial basement. The basement also contains a pool pump area. The structure is a concrete slab on grade of varying thickness and reinforcing around the pool area. The second floor construction consists of concrete slab on metal deck supported by steel framing with the exception of the structure located over the pool which is reinforced concrete slab spanning to concrete encased wide flange steel beams supported by steel columns. The roof construction consists of metal deck spanning to steel trusses, supported by steel bents which clear span the hexagonal space. The vertical circulation is provided by 2 egress stairs and there is no separate elevator in this building. The first floor has 6 perimeter entrance areas with doors serving the facility.

The configuration of the Lord building is such that the majority of the academic classrooms are located on the 2nd and 3rd floors along the perimeter; however, various lab classrooms are located in the center with no exterior light or views. Many of the administrative rooms are also without exterior light or views.

The Lord and Field House buildings have portions which comply with ADA/AAB and other spaces that don't. Areas of non-compliance include but are not limited to: Locker Room layouts and clearances, lab clearances, toilet room layout and clearances, and the Little Theatre contains tiered floors without ramps or elevators serving all levels, door clearances, some non-compliant hardware, and signage does not reflect current room usage and does not meet accessible requirements.

The overall condition of the buildings' exteriors are in fair condition with the exception of specific components, such as the cement asbestos panel which is in poor condition and should be replaced with a material that does not contain asbestos. Generally speaking, floor and roof structure appear to be in satisfactory condition; there is no evidence of structural distress that would indicate significantly overstressed, deteriorated or failed structural members. The Lord Building roof is a EPDM type which is in poor condition with evidence of extensive water infiltration and should be replaced. The roof of the Field House is corrugated metal that slopes to a perimeter gutter which appears to be failing causing water to enter the wall cavity below. The exterior walls are showing signs of water infiltration from the failing roof, gutter and downspout system. The brick veneer is failing in numerous areas and

should be removed and replaced. The window and curtain wall systems are in fair to poor condition and replacement is recommended. The exterior doors and entrance systems are in fair to poor condition and replacement is recommended. The building sealants have deteriorated and replacement is recommended. The stairs are in fair condition but need finish upgrades and modifications for accessibility are required to the hand/guardrail configuration to meet MAAB/ABB requirements. The elevator controls and finishes need to be replaced. Interior doors and frames are in good to fair condition requiring selective replacement. Many of the interior partitions are the demountable type which do not extend to the deck, and are an acoustic breach which will not meet the LEED prerequisite, nor best educational best practices and should be replaced. The majority of the interior finishes and casework are in fair to good condition requiring selective replacement. The science labs are in fair to poor condition requiring reconfiguration and casework replacement.

The bridges are generally in fair to poor condition: the aluminum and polycarbonate barrel vault roof/wall system should be replaced. The aluminum panel sidewall and soffit systems are tired and failing and should be replaced, as should interior finishes. The HVAC, Electrical, Plumbing and Fire Protection Systems are in poor condition and are at the end of their useful life cycle and require replacement.

### Freshman Academy-:

The Freshman Academy Building is located at 55 French Street. The site consists of approximately .4 acres on a site which is remote from the main campus and is bounded by French Street / Boarding House Park to the north, John Street / the Joseph M. Downes Garage to the east, Paige St. / Lowell Five Bank to the South, and the Steam Plant/ Lowell National Historic Park Building to the west.

The building consists of approximately 90,326 sf and is comprised of two joined buildings connected by a courtyard; the original southern building constructed in 1901 and the northern building constructed in 1939. The Building, originally the Lowell High School Commercial and Manual Training Department (a.k.a. Lowell Trade School), was subsequently renovated to become the Arts School and City Magnets middle schools circa 1985, and then renovated to become the Freshman Academy circa 1997.The 1901 building is 3 stories with a full basement and is primarily wood framed with fieldstone foundations. The 1939 building is 2 stories with a full basement and is concrete and steel frame w/ concrete foundations. The classrooms are located on the perimeter walls (and surrounding a courtyard) to provide ample exterior light (the exception being classrooms located in the lower level which utilizes smaller windows with high sills). Skylights at the lowest level provide additional light into the corridor outside of the Theatre. Pending confirmation of the existing construction via invasive testing, the building is likely Type IIIB, construction under the Massachusetts State Building Code 780 CMR 8th Addition.

The Freshman Academy building is comprised of: classrooms, administrative offices, a Cafeteria/Multi-Use Room, the J.J. Burgoyne Theatre, Catie's Closet, a Maker Space, and Nurse's Office. The current configuration is largely residual to the

previous layouts and contains numerous level changes that make for difficult circulation, and spaces that are sized for elementary students which are not appropriate for high school students. The vertical circulation is provided by 6 full egress stairs, additional partial stairs, ramps and (1) 2-sided elevator. The first floor has 6 perimeter entrances with sets of double doors serving the facility.

As noted above, it is expected that per many facilities of this era renovated over time the building has portions which comply with ADA/AAB and other spaces that don't. Areas of non-compliance include but are not limited to: 5 exterior entrances which contain stairs and no ramps (there is one accessible entrance on the west side of the building), the Theatre floor slope appears to exceed the 1: 12 maximum allowable, the stage is accessed via a ramp which exceeds 1:12 , the dressing rooms are accessed via stairs, some toilet room dimensional clearances do not meet code, a corridor ramp in the north building appears to exceed the 1:12 max. slope, and some classroom door clearances and hardware also do not comply.

The envelope components range in condition from fair to poor. The EDPM roof is in poor condition which is contributing to leaks throughout the building and full replacement is recommended. In general the structure and the masonry appear to be in satisfactory condition; there is no evidence that would indicate significantly overstressed, deteriorated or failed structural members. The windows systems are in fair to poor condition and many units do not open or close, and finishes are badly faded, and full replacement is suggested. The exterior doors are in fair to poor condition and should be replaced. All exterior sealants are deteriorated and should be replaced. The stairs are in poor condition and full replacement is suggested. The 2-sided elevator is very small and in poor condition and replacement is recommended. The interior doors and frames are in fair to good condition. The Interior Partitions are in fair to good condition. The finishes and caseworks are in fair to poor condition with few exceptions and replacement is recommended. The HVAC, Electrical, Plumbing and Fire Protection Systems are in poor condition and are at the end of their useful life cycle and require replacement.

### Steam Plant:

The Steam Plant is located at 35 French Street. The site consists of approximately .2 acres and is bounded by French Street / Boarding House Park to the North, the Freshman Academy to the east, and the National Historic Park Building to the south and west.

The building is comprised of approximately 3,328 sf, and is a one story rectangle with a substantial brick chimney on the SW of the lot, and a partial basement and tunnel that connects utilities to the 1922 Building Via a tunnel and to the Freshman Academy via overhead lines. The structure is steel and concrete w/ brick bearing walls. The building is likely Type IIB, construction under the Massachusetts State Building Code 780 CMR 8th Addition.

The Steam Plant layout is an open plan which contains boilers in an open plan, with an enclosed generator. There is one stair that leads to the partial basement / tunnels.

The building is a mechanical use and technically does not need to comply with the MAAB's current requirements. The existing tunnels are accessed via stairs. No elevator is required or provided.

The envelope components range in condition from good to poor. The EPDM roof is in good condition and full replacement is not recommended. In general the structure and the masonry appear to be in satisfactory condition; there is no evidence that would indicate significantly overstressed, deteriorated or failed structural members. The windows were replaced circa 1996 and are in good condition. The overhead exterior door at the east was damaged in a fire and should be replaced. The swinging wood doors at the north are in poor condition and should be replaced. All exterior sealants are deteriorated and should be replaced. The stairs are in poor condition and full replacement is suggested. The interior doors and frames are in good condition. The Interior Partitions are good condition. The interior finishes are utilitarian brick, cmu & concrete and in fair condition except the concrete floor which appears to experience flooding at the north and may require repair. The HVAC, Electrical, Plumbing and Fire Protection Systems are in poor condition and are at the end of their useful life cycle and require replacement in the Base Repair condition. Other renovation options will likely pursue new mechanical systems within the buildings and the Steam Plant Building would not be utilized for the MEP systems and the building would be turned over to the City.

See appendix for further information.

### Code:

Following is a list of applicable codes:

| Code Type | Applicable Code (Model Code Basis) |
|---|---|
| **Building** | 780 CMR: Massachusetts State Building Code, 8th Edition[1] (2009 International Building Code) (2009 International Existing Building Code) |
| **Fire Prevention** | 527 CMR: Massachusetts Fire Prevention Regulations (2012 NFPA 1) |
| **Accessibility** | 521 CMR: Massachusetts Architectural Access Board Regulations |
| **Electrical** | 527 CMR 12.00: Massachusetts Electrical Code (2014 National Electrical Code)[2] |
| **Elevators** | 524 CMR: Massachusetts Elevator Code (2004 ASME A17.1) |
| **Mechanical** | 2009 International Mechanical Code (IMC) |

| | |
|---|---|
| Plumbing | 248 CMR: Massachusetts Plumbing Code |
| Energy Conservation | 2015 International Energy Conservation Code[3] |
| Seating | ICC 300-2012 Standard for Bleachers, folding and telescopic seating & Grandstands |

1 The 9th edition of 780 CMR based on the 2015 International Codes is expected to go into effect in mid-2017.
2 The 2017 NEC is in effect as January 2017 and is based on the date the electrical permit is issued, not the building permit.
3 The 2015 IECC has been adopted and will be required to be met January 1, 2017.

International Existing Building Code

The 2009 International Existing Building Code with Massachusetts amendments allows for 3 separate compliance methods:

- Prescriptive Method (in general, altered areas must comply with the code for new construction)
- Work Area Method (level of compliance is based on the classification of work)
- Performance Compliance Method (numerical method that allows tradeoffs for deficiencies). This report is based on the Work Area Method.

Work Area and Classification of Work:

Work will likely include renovations throughout the entire interior of the buildings, installation of new MEP systems throughout, as well as the potential for an addition to the building(s). For the purposes of this report it has been assumed that the scope of work is likely to be classified as Level 3 (the highest level of renovation). This level includes the reconfiguration of spaces, the addition or elimination of doors and windows, the reconfiguration or extension of systems, and/or the installation of additional equipment in more than 50% of the aggregate area of the building. The work must comply with the following IEBC Chapters based on the level of work in each building:

Level 2 Alteration: IEBC Chapters 6 & 7

Level 3 Alternation: IEBC Chapters 6, 7 & 8

Addition: IEBC Chapter 10

Occupancy Classification:

Field House: Non-Separated Mixed Uses:

- A-3 (Exercise Areas and Locker Rooms)
- A-4 (Gymnasium and Pool with Spectator Seating)

Lord Building: Non-Separated Mixed Uses:

- E (Secondary Education)
- A-2 (Cafeteria)
- A-3 (Library and Assembly Areas)

1922 Building: Non-Separated Mixed Uses:

- E (Secondary Education)
- A-1 (Auditorium)

Freshman Academy Building: Non-Separated Mixed Uses:

- E (Secondary Education)
- A-3 (Multipurpose Spaces)

Steam Plant Building:

- U (Utility Building)

## Construction Type:

Field House:

Based on conditions observed during our site visit, the Field House building appears to be constructed with CMU walls and unprotected structural steel members resulting in Type IIB construction (noncombustible, no fire- resistance rating).

Lord Building:

Based on conditions observed during our site visit, the Lord building appears to be constructed with CMU walls and unprotected structural steel members resulting in Type IIB construction (noncombustible, no fire- resistance rating).

1922 Building:

Based on conditions observed during our site visit, the 1922 building appears to be constructed with various construction materials including concrete, wood and steel structure and masonry exterior wall resulting in a minimum of Type IIIB construction (combustible interior- no fire-resistance rating; 2-hour noncombustible exterior wall). The addition at the front of the building had spray-on fireproofing on the structure, therefore the construction type could potentially be Type IIIA (combustible interior- 1- hour fire-resistance rating; 2-hour noncombustible exterior wall).

Freshman Academy Building:

Based on conditions observed during our site visit, the Freshman Academy building appears to be constructed with various construction materials including concrete, wood and steel structure

and masonry exterior wall resulting in a minimum of Type IIIB construction (combustible interior- no fire-resistance rating; 2-hour noncombustible exterior wall).

Steam Plant Building:

Based on conditions observed during our site visit, the Steam Plant building appears to be constructed with CMU walls and unprotected structural steel members resulting in Type IIB construction (noncombustible, no fire- resistance rating).

Building Separation:

The Field House and Lord Building are connected but appear to have a rated wall separating them and could be considered separate buildings. The 1922 Building and Lord Buildings are connected via a pedestrian walkway and could be considered as separate building if needed (if addition is built to one building) but would require additional smoke rated doors at the end of the walkway. The Freshman Academy and Steam Plant buildings are standalone buildings.

## Fire Resistance Ratings:

The following table summarizes the required fire resistance ratings for the building elements of Type IIIB & IIB construction, based on 780 CMR Table 601 and other applicable code provisions:

| Building Element | Fire Resistance Rating (Hrs) Type IIIB | Fire Resistance Rating (Hrs) Type IIB |
|---|---|---|
| Primary Structural Frame[A] | 0 | 0 |
| Exterior Bearing Walls including columns along the exterior wall | 2 | 0 |
| Exterior Non-Bearing Walls | Based on FSD | |
| Interior Bearing Walls | 0 | 0 |
| Floor Construction | 0 | 0 |
| Roof Construction | 0 | 0 |

A. Includes beams, trusses, floor members, etc. having a direct connection to the columns (780 CMR 202).

| Building Element | Fire Resistance Rating (Hrs) | Opening Protectives (Hrs) |
|---|---|---|
| Exit Access Corridors (780 CMR | 0 | 0 |
| Existing 3 stories or less Stair, Mechanical, and Elevator Shafts | Maintain Existing | Maintain Existing |
| Existing 4 story Stair, Mechanical, and Elevator Shafts (IEBC 703.2.1) | 1 | 1 |
| New shafts: (780 CMR 708.4) 3 stories or less:<br>4 stories: | 1[A]<br>2 | ¾ 1½ |
| Building Separation (780 CMR Table 706.4) (Between Field House and | 2 | 1½ |
| Emergency Electrical Room (527 CMR 12.00 700-9(D)(1)) | 2 | 1½ |

A. In lieu of rated shaft enclosure, if the duct connects not more than two stories, the annular space around the penetrating duct may be protected by approved noncombustible material that resists the passage of flames and smoke. If the duct connects not more than three stories, the duct also needs to have fire dampers installed at each floor line (780 CMR 716.6.1).

## Interior Finishes:

The existing interior finish of walls and ceilings in the work area and in all exits and corridors serving the work area must comply with the code requirements for new construction (IEBC 703.4, 803.3). All newly installed wall and ceiling finishes, and interior trim materials must also comply with 780 CMR Table

803.9 (IEBC 602.1, 602.2, 602.3). The requirements are summarized below:

Walls & Ceilings (IBC Table 803.9) – Fully Sprinklered

| Use Group: | E | A |
|---|---|---|
| Exit Enclosures | Class B | Class B |
| Exit Access Corridors | Class C | Class B |
| Rooms & Enclosed | Class C | Class C |

Walls & Ceilings (IBC Table 803.9) – Not Sprinklered (Field House)

| Use Group: | A |
|---|---|
| Exit Enclosures | Class A |
| Exit Access Corridors | Class A |
| Rooms & Enclosed | Class C |

*Note that where exit stairs and exit access corridors serve more than one use group, the most restrictive interior finish is required. Based on our site visit, the existing interior finishes appeared to comply for all buildings*

## Means of Egress:

The means of egress including the number of exits and egress capacity must be sufficient for the number of occupants on all floors (780 CMR 102.6.4). All means of egress are required to be maintained.

*The means of egress for the existing buildings appears sufficient for the current occupant load of the buildings. However, once renovation plans have been developed, the means of egress within the building can be further evaluated based on the calculated occupant load.*

*Based on observations during our site visit, there were areas of the means of egress that were not properly maintained including the following conditions that occurred throughout the buildings:*

- *Storage within stairwells*
- *Broken/ missing door closing devices*
- *Fire hose used to prop door open*

## Required Fire Protection Systems:

The following fire protection systems are required to maintained and provided:

- Automatic sprinkler system (IEBC 704.2.2 & MGL c. 148 s. 26G):
  - The Lord, 1922 Building and Freshman Academy buildings appear to be fully sprinklered. (The mezzanine (teacher center) in the 1922 Building was built above the third floor is not provided with sprinklers. The sprinkler system is required to be altered as the configuration of the building changes.)
  - The Field House is not provided with sprinklers. (A sprinkler system must be installed throughout the Field House if the work area exceeds 50% of the floor area. Full sprinkler protection could also be required by MGL c. 148s. 26G)
  - The presence of sprinklers could not be confirmed in the Steam Plant building however a sprinkler system would not be required even for new construction due to the use of the building.
- Fire Alarm (IEBC 704.4.1 & 804.2) – the IEBC allows existing previously approved fire alarm systems to remain regardless of the level of renovation. However full compliance with the MA Architectural Access Board's Regulations will require a compliant fire alarm system.
  - *The existing buildings currently contain a fire alarm system with*

*deficient notification device coverage (no strobes in classrooms). Note that the fire alarm system must also be altered as necessary in the new construction areas to reflect the new configuration and comply with NFPA 72.*

## Energy Code Provisions for Existing Buildings:

The buildings are subject to the International Energy Conservation Code (IECC) including the amendments contained in 780 CMR Chapter 13. Level 2 and 3 alterations to existing buildings are permitted without requiring the entire building to comply with the energy requirements of the International Energy Conservation Code (IECC). The alterations (new elements) shall conform to the energy requirements of the IECC as they relate to new construction only (IEBC 711.1 & 808.1).

## Accessibility for Persons with Disabilities:

Massachusetts Architectural Access Board Regulations:
Alterations to the building must comply with the requirements of the Massachusetts Architectural Access Board Regulations (521 CMR). For existing building alterations the requirements of 521 CMR are based on the cost of the proposed work:

Americans with Disabilities Act Guidelines:

The ADA Guidelines are not enforced by the Commonwealth of Massachusetts, they can only be enforced through a civil lawsuit or complaint filed with the U.S. Department of Justice. Compliance with the ADA Guidelines is triggered by renovations to an existing building. All renovations to the building must be made to ensure that, to the maximum extent feasible, the altered portions of the facility are readily accessible to and usable by individuals with disabilities (28 CFR Part 36 Section 36.402(a)). Alterations made to provide an accessible path of travel to altered areas and accessible facilities (i.e. provide accessible toilet facilities) are not required if the cost exceeds 20% of the total cost of the alteration (28 CFR Part 36 Section 36.403(f)). However, if the cost to meet these accessibility requirements does exceed 20%, alterations are still required to the maximum extent that the area can be made accessible without exceeding the 20% criteria (28 CFR Part 36 Section 36.403(g)). The ADA also contains less stringent dimensional requirements for some building elements in an existing building where it is infeasible to meet the requirements for new construction (ADA Section 4.1.6).

## Plumbing Code:

248 CMR: The Massachusetts State Plumbing Code

The Massachusetts Plumbing Code (248 CMR) regulates the number of plumbing fixtures required throughout buildings. The minimum number of plumbing fixtures is established by 248 CMR 10.10(18) Table 1 based on the building use and the expected population as determined by the local Plumbing Inspector per 248 CMR 10.10 (18)(2).

The Plumbing Inspector must approve the building population, however, the building population can generally be based on the designer's determination of the actual number of people expected within the building. The Plumbing Code expects that the building population will be divided evenly between male and female for the purpose of determining fixture counts. Any distribution other than 50/50 must be justified to the Plumbing Inspector.

If the existing number of toilet room fixtures are altered (i.e. to make existing toilet rooms accessible) the number provided is subject to the minimum requirements of 248 CMR.

See Appendix for further information.

# Evaluation of Existing Conditions

## 1922 Building: – Exterior


Front Elevation along Father Morisette Blvd.


West Elevation along Canal


West Elevation along Canal


West Elevation along Canal


Interior View at one of Of the Connector Bridges

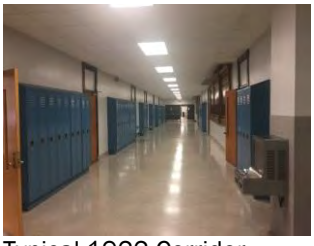

West Elevation of the 1892 Portion of Building

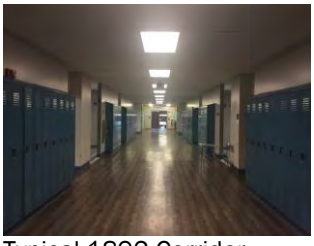

South Elevation


East Elevation along Kirk St.


Elevation of Interior Courtyard

## 1922 Building: – Interior

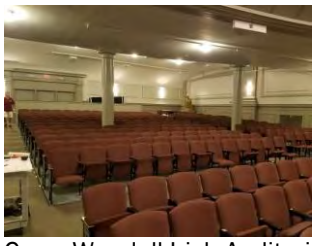

Typical 1922 Corridor

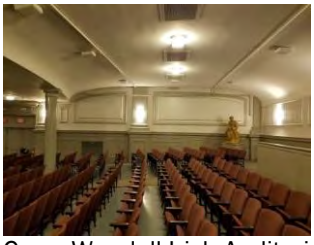

Typical 1892 Corridor

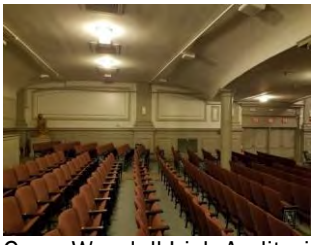

Typical 1997 Corridor/ Lobby

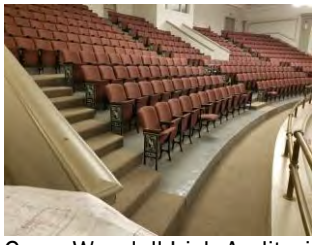

Cyrus Wendell Irish Auditorium

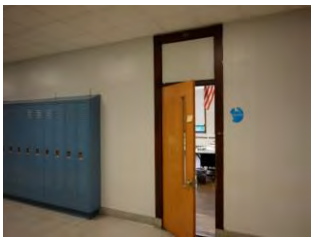

Cyrus Wendell Irish Auditorium


Cyrus Wendell Irish Auditorium


Cyrus Wendell Irish Auditorium


Cyrus Wendell Irish Auditorium


Cyrus Wendell Irish Auditorium


Typical 1922 Classroom


Typical 1922 Classroom


Typical 1922 Classroom


Typical 1922 Classroom


Typical 1922 Classroom

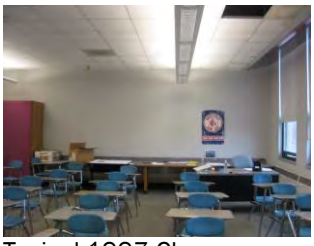

Typical 1922 Science Lab


Typical 1922 Science Lab

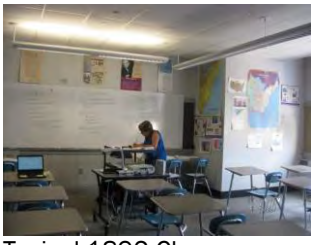

Typical 1922 Classroom

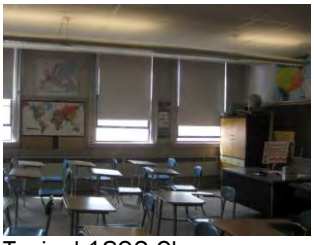

Typical 1922 Science Lab

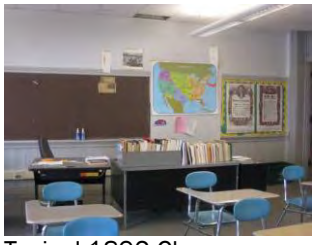

Typical 1997 Classroom

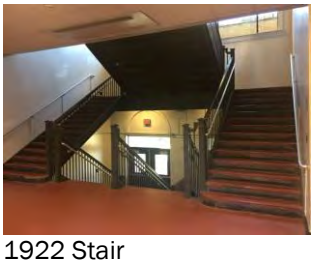

Typical 1997 Classroom

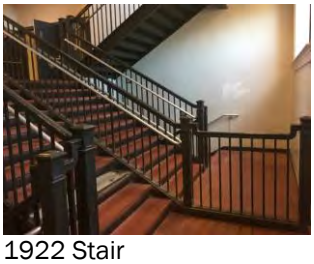

Typical 1997 Classroom

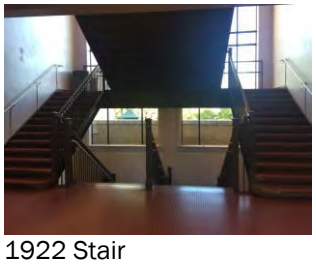

Typical 1892 Classroom

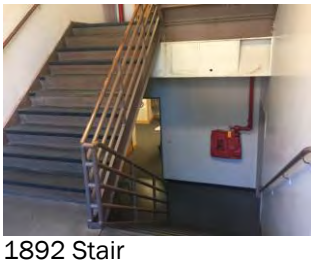

Typical 1892 Classroom

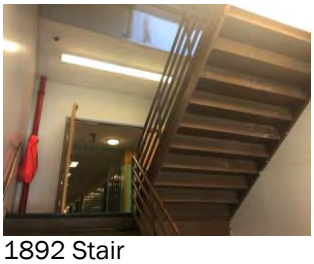

Typical 1892 Classroom

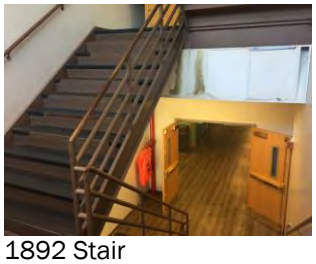

1922 Stair


1922 Stair


1922 Stair


1892 Stair


1892 Stair


1892 Stair

# 1980 Buildings: Lord (Academic Building) – Exterior


Main Entrance of Lord and Field House


West Elevation of Lord


West Elevation looking towards Father Morissette Blvd.

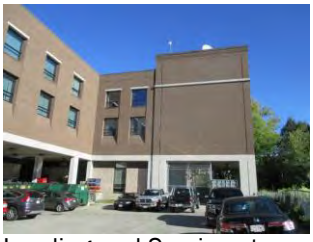
North Elevation of Lord


North bridge at NE corner


North Bridge


East Elevation along canal


South bridge at SE corner

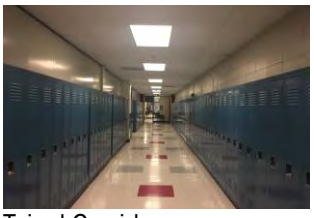

Loading and Service at South Elevation of Lord

# 1980 Buildings: Lord (Academic Building) – Interior

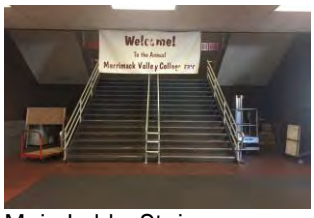

Front Lobby


Main Corridor


Main Corridor


Tyical Corridor

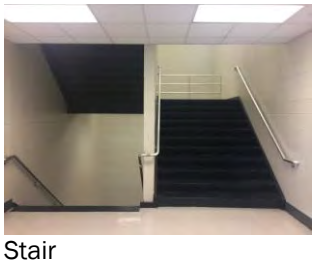

Typical Corridor

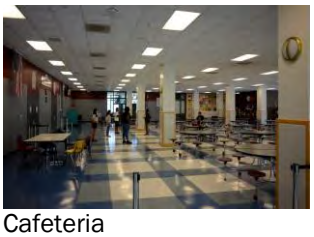


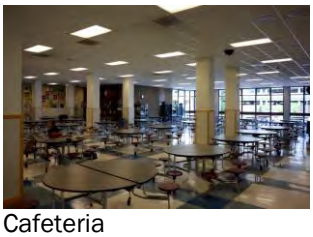
Main Lobby Stair


Stair


Stair

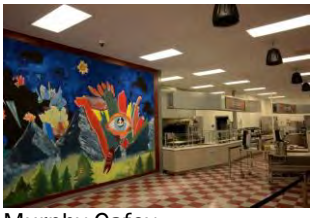

Stair


Cafeteria


Cafeteria


Cafeteria

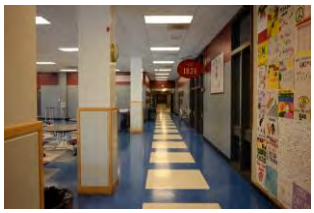
Murphy Cafe


Murphy Cafey


Murphy Cafe


Credit Union


Credit Union


Corridor Looking Towards 1826 School Store


1826 School Store


1826 School Store

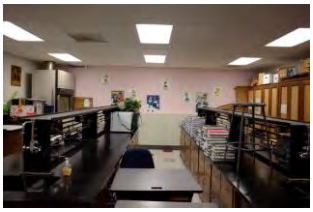

1826 School Store

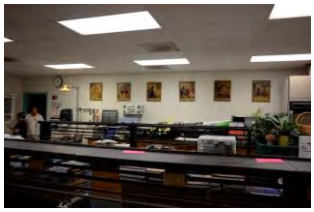

Typical Classroom

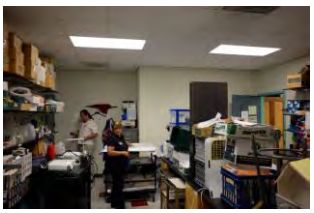

Typical Classroom


Typical Classroom

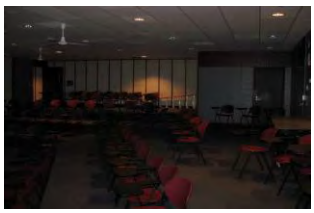

Typical Science Lab


Typical Science Lab

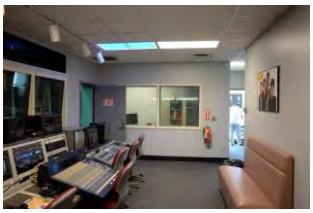

Typical Science Lab


Typical Chemical Prep Room


Little Theatre


Little Theatre


TV Studio

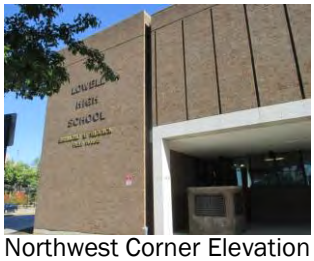

TV Studio Control Room


Colleen Creegan Media Studio

## 1980 Buildings: Field House (w/ Natatorium) – Exterior


Entrance along South Elevation Between Lord and Field House


Exterior Egress Door Along South Elevation



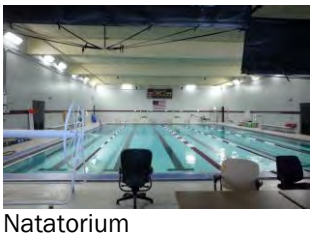
Northwest Corner Elevation

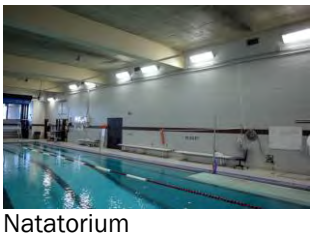

North Elevation along Father Morisette Blvd.


Water Damage is Noticable on all Elevations


Partial East Elevation at Curtain Wall connector

## 1980 Buildings: Field House (w/ Natatorium) – Interior


Natatorium


Natatorium


Natatorium


Women's Locker room


Woman's Locker Room


Women's Locker Room


Men's Locker Room

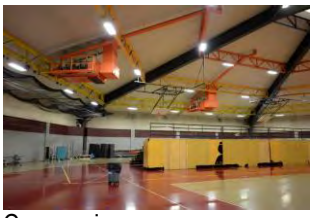

Men's Locker Room

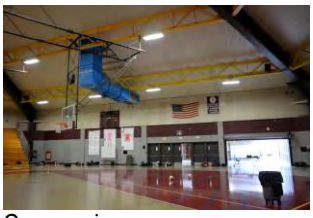

Men's Locker Room

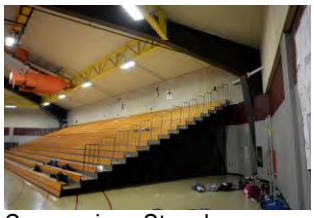

Gymnasium Foyer

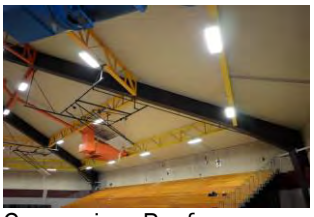

Gymnasium Foyer


Gymnasium


Gymnasium

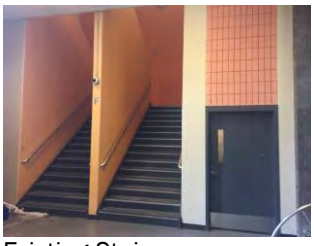

Gymnasium

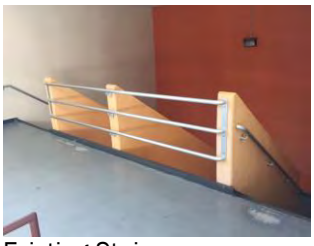

Gymnasium Stands

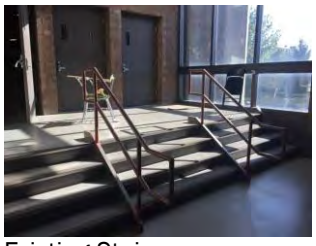

Gymnasium Roof


Gymnasium Roof


Gymnasium Roof


Existing Stair


Existing Stair


Existing Stair

## Freshman Academy: – Exterior

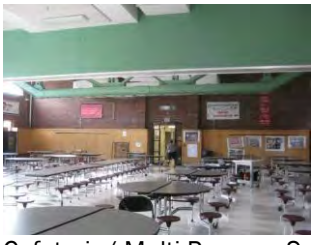

French St Elevation of 1939 Building


South Elevation of 1901 Building at corner of Paige and John Sts.


Main Entry on Paige Street

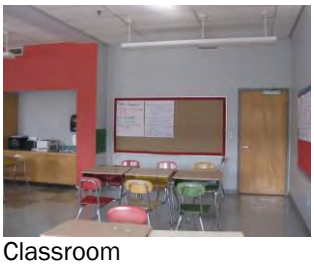

Utilities from Steam Plant to West Elevation of Freshman Academy

## Freshman Academy: – Interior


Cafeteria/ Multi Purpose Space

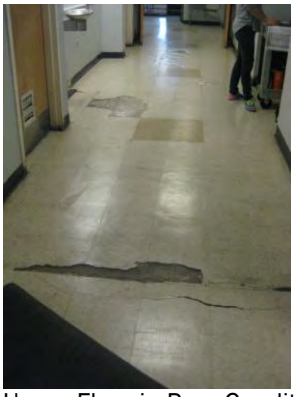

Computer Lab

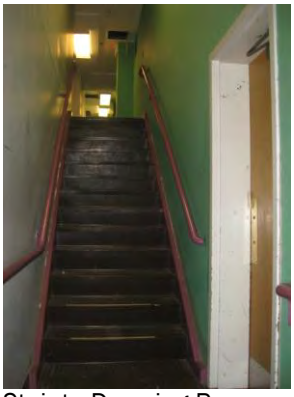

JJ Burgoyne Theatre

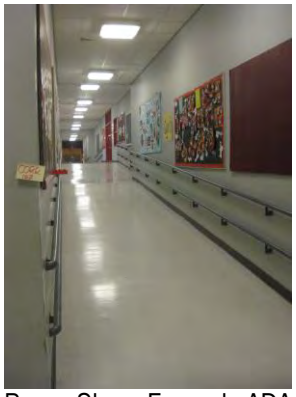

Classroom


Maker Space


Typical Stair Condition


Upper Floor in Poor Condition

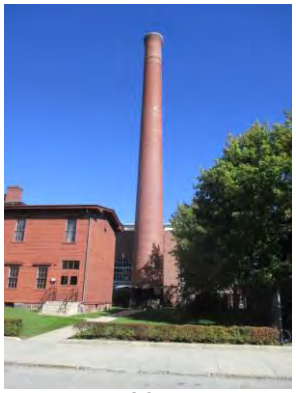

Stair to Dressing Rooms


Ramp Slope Exceeds ADA

## Steam Plant:


Elevation along French St.


Utilities from Steam Plant to Freshmen Academy


Elevation of Stack


Front Doors


Interior of Steam Plant


Interior of Steam Plant


Fire Damage at Overhead Door


Interior of Steam Plant

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# 3.1.4 Evaluation of Existing Conditions

# C. Structural

### Overview:

The Lowell High School is comprised of the following buildings;"1922 Building", Lord/Field House, the Freshman Academy and the Steam Plant which are located along Father Morissette Boulevard/French Street in Lowell. The Lord/Field House building is the only building on the campus located on the west side of the Merrimack Canal. It is connected to the 1922 building by two enclosed pedestrian bridges, spanning over the canal between the buildings at their Second Floor levels. The Freshman Academy (originally the Lowell Trade School) and Steam Plant buildings are located on the east side of the High School's campus, one block over from the 1922 building.

### Purpose:

The purpose of this report is to describe in broad terms: the structure of the existing buildings: to comment on the condition of the existing buildings: to comment on the feasibility of renovations to the buildings: and to identify future structural investigations should the existing buildings be renovated or expanded.

### BUILDING SUMMARIES

### 1922 Building:

### Structural Description:

The "1922 Building" consists of the three main parts: the original Coburn Hall Building, constructed in 1892, a significant classroom/Auditorium addition, constructed on the north side of Coburn Hall in 1922 (Sullivan Building), and the smaller, 1997 addition to the north end of the 1922 building (Kouloheras Addition). The 1997 addition is separated from the 1922 portion of building at each level by an expansion joint. The three-story "1922 Building" has a full basement and is located on the east side of the Merrimack Canal, which separates it from the Lord Building.

Pitched roof construction of the original 1892 section of the building is wood framed, supported by steel and wood trusses. First, Second and Third Floor construction of the 1892 portion of the building consists of tongue and groove wood plank on wood joists spanning to brick masonry bearing walls.

Due to a lack of original drawings and the presence of hard finishes which obscure the structure, the flat roof construction of the 1922 portion of the building is largely unknown. However, our observations and limited original drawings suggest that at least some sections of the building are reinforced concrete slab construction (concrete slabs with masonry block or tile forms, supported on masonry bearing walls).

Flat roof construction of the 1997 addition is steel framed, with metal deck spanning to steel joists and beams/girders supported by steel columns. The First, Second and Third Floor construction of the 1997 addition consists of concrete slab on metal deck spanning to steel beams supported by steel girders and columns.

Lowest level construction is a concrete slab on grade with a mixture of fieldstone and concrete foundations.

### Structural Conditions/Recommended Repairs:

Generally speaking, floor and roof construction appear to be in satisfactory condition; there is no evidence of structural distress that would indicate significantly overstressed, deteriorated or failed structural members. Foundations appear to be performing adequately; there are no signs of significant, total or differential settlements. Structural/structurally related conditions observed on site that need to be addressed include exterior masonry repairs, steel lintel repair/replacement, roofing/roof drainage issues, anchorage of masonry walls and partitions and railing code compliance.

## Lord/Fieldhouse Building:

### Structural Description:

The Lord/Field House Building is a steel and concrete framed building comprised of a three-story Academic Building and a two-story Field House/Natatorium that are connected by a glazed lobby. The Lord Building, located on the eastern bank of the Merrimack Canal, was constructed in 1980 and underwent minor renovations and an addition in 1997. Two enclosed pedestrian bridges, spanning over the canal, connect the Second Floors of the Lord and "1922 Building".

Roof construction of the Academic Building is steel framed, with metal deck spanning to steel joists and beams/girders supported by steel columns. Field House roof construction consists of metal deck spanning to steel trusses, supported by steel bents which clear span the hexagonal space. Second and Third Floor construction of the Academic Building consists of a concrete slab on metal deck spanning to steel joists and beams/girders supported by steel columns. Second Floor construction of the Field House is similar, with the exception of the structure located over the Pool. Floor construction in this area consists of a reinforced concrete slab spanning to concrete encased wide flange steel beams, supported by steel columns. First Floor construction for both buildings consists of a concrete slab on grade, varying in thickness and reinforcing. Building columns are typically supported on pile foundations, as is the small, steel framed addition on the south end of the Academic Building constructed in 1997.

### Structural Conditions/Recommended Repairs:

Generally speaking, floor and roof construction appear to be in satisfactory condition; there is no evidence of structural distress that would indicate significantly overstressed, deteriorated or failed structural members. Foundations appear to be performing adequately; there are no signs of significant, total or differential

settlements. Structural/structurally related conditions observed on site that need to be addressed include exterior masonry repairs, steel relieving angle repairs, soffit repair/replacement, cement board panel replacement, concrete pool deck repairs, anchorage of masonry walls and partitions and roofing/roof drainage issues.

## Freshman Academy:

### Structural Description:

The Freshman Academy is comprised of an original, three-story wood and steel framed structure, with a full basement, constructed in 1900 (one block east of the 1922 Building), fronting Paige Street. An attached, two-story steel and concrete framed addition (of similar size), with a partial basement was constructed in 1939 on the north side of the original building. The facility underwent significant renovations 1985.

The original (1900) building is primarily wood framed. Third and Second Floor construction consists of wood flooring over wood joists. First Floor construction is similar, with wood floor joists spanning to large steel trusses which clear span the Cafeteria and Theater spaces below. The 1939 (addition) portion of the building is concrete and steel framed, with roof construction consisting of metal deck spanning to steel joists and beams/girders. Second Floor construction consists of concrete slab on metal deck spanning to steel joists and beams/girders. First Floor construction consists mainly of concrete slab on grade construction. Floor construction over the middle third of the addition (where a basement is present below) is concrete slab on metal deck, spanning to steel joists. The central Courtyard, located at the First Floor between the 1900 and 1939 buildings, is constructed with metal deck spanning to wide flange steel beams. Three steel framed skylight openings allow natural light to pass into the basement corridor below. The lowest level construction is concrete slab on grade.

### Structural Conditions/Recommended Repairs:

Generally speaking, floor and roof construction appear to be in satisfactory condition; there is no evidence of structural distress that would indicate significantly overstressed, deteriorated or failed structural members. Foundations appear to be performing adequately; there are no signs of significant, total or differential settlements. Structural/structurally related conditions observed on site that need to be addressed include exterior masonry repairs, steel lintel repair/replacement, anchorage of masonry walls and partitions, subfloor deterioration, drifting snow loads and roofing/roof drainage issues.

## Steam Plant:

### Structural Description:

The Steam Plant is steel and concrete framed with brick bearing walls. Roof construction consists of concrete slab over steel trusses which clear span the space to brick bearing walls on building's north and south sides. First Floor construction consists of concrete slab on grade with concrete pads below the larger pieces of equipment.

### Structural Conditions/Recommended Repairs:

Generally speaking, floor and roof construction appear to be in satisfactory condition; there is no evidence of structural distress that would indicate significantly overstressed, deteriorated or failed structural members. Foundations appear to be performing adequately; there are no signs of significant, total or differential settlements. Structural/structurally related conditions observed on site that need to be addressed include exterior masonry repairs (particularly the chimney), and the anchorage of masonry walls and partitions to the roof structure.

## FUTURE STRUCTURAL INVESTIGATIONS:

With the exception of the Lord Building (including the Field House/Natatorium) and the 1997 addition to the "1922 Building", limited structural documentation was available. In particular, there were no structural documents for the 1922 addition to the "1922 Building" and the Freshman Academy (both the original building and the 1939 addition). Accordingly, if major renovations to these buildings are ultimately proposed, FBRA recommends that finishes be removed in selected locations, so the general details of the floor and roof construction in these buildings can be determined. This information will be crucial in determining the structural feasibility of reinforcing, modifying, adding to, or removing portions of the existing floor and roof construction, as well as the approximate costs involved in doing so.

See appendix for further information.

# 3.1.4 C. HVAC, Electrical, Plumbing & Fire Protection

### Purpose:

The purpose of this report is to describe in broad terms: the mechanical and electrical systems of the existing buildings: to comment on the condition of the existing systems: and to comment on recommended upgrades to these systems.

### HVAC:

### General:

Due to the overall age and relatively poor condition and performance of the existing HVAC and automatic temperature control systems, we recommend that all HVAC and ATC Control systems should be replaced. The existing HVAC system should also be upgraded to meet current code requirements for ventilation and energy efficiency, and energy conservation measures (such as energy recovery, variable speed drives for fans and pumps, low pressure ductwork and piping distribution system design, and state of the art direct digital controls and building energy management system) should be designed as part of a new replacement HVAC system. In general, replacing the current High School Buildings including the "1922 Building" (Coburn Hall/Sullivan Addition/ Kouloheras Addition); Lord/Field House; Freshman Academy and Steam Plant, HVAC system with a high performance HVAC system would consist of the following:

### 1922 Building:

These buildings are primarily heated by a shell and tube steam to hot water heat exchanger that is located in the basement mechanical room. Steam and condensate piping is routed from the mechanical room to the Steam Plant via an underground tunnel. Steam condensate is returned to the Steam Plant by a condensate pump. Hot water is circulated throughout the building with the use of (2) end suction base mounted Bell & Gossett pumps (model 1510 pumps, equipped with 25 HP motors). VFD drives have been installed in recent years for the pumps. The pumps, heat exchanger, condensate pump, and associated piping and valving appears to be in poor condition and beyond their useful expected service life.

A 106 ton Carrier indoor chiller, which is associated with a refrigerant outdoor condenser, is installed in a basement mechanical room. Chilled water is delivered to several rooftop units through the use of (2) end suction base mounted Bell & Gossett pumps. The indoor chiller and associated outdoor condensing unit appear to be nearing the end of their useful service life. Gas fired Roof Top Units provide ventilation air throughout the majority of the building. Some of the units are provided with chilled water coils, which are served by the chiller, for dehumidification purposes and provide constant volume to the rooms for ventilation.

Typical classrooms throughout this building are provided with overhead ducted distribution systems with ceiling mounted diffusers and a combination of sidewall or ceiling supply and exhaust registers for ventilation purposes. Many of the ceiling mounted diffusers and grilles appear dirty which could be a sign of dirty filter and ductwork. Wall mounted fin tube radiation at the exterior walls are utilized as the main heat source for the spaces. The majority of classrooms have operable windows for natural ventilation. The majority of rooms are provided with pneumatic (typically Barber Coleman) heating system thermostats while some rooms are equipped with new DDC temperature sensors for monitoring through the building management workstation. Currently, several classrooms (often up to 3 classrooms) are controlled by one control valve. Most of the basement classrooms are heated and ventilated by classroom ceiling suspended horizontal unit ventilators. The units appear to be in poor condition and in need of replacement.

The Auditorium and Stage is served by a rooftop unit that provides heating and cooling through a ducted distribution system that terminates at the ceiling level with decorative grilles which are integrated into the ceiling design. Return air is captured below the stage through vertical grilles on the face of the stage and on the sidewall of the Auditorium. This space has a new DDC sensor for temperature monitoring and control.

The majority of corridors located with this building do not appear to have code required ventilation air. In addition, the heating equipment directly installed for the corridor areas appears to be minimal and in poor condition.

We recommend the following HVAC system repairs and replacements. These buildings should be served by the Steam Plant Building's new hot water heating boiler plant. All existing steam and hot water heating equipment shall be replaced with new hot water heating equipment. All existing steam heating and condensate distribution piping systems, existing steam to hot water heat exchangers, and condensate return pumps shall be removed. All existing terminal heating units and associated steam/hot water piping should be replaced. All existing rooftop and indoor air handling units, and exhaust fans, should be replaced with new units, and upgraded where possible to include energy recovery ventilation and variable air volume control to provide increased energy efficiency. Ventilation systems shall be provided for areas of the existing buildings that are not currently provided with code required ventilation. All existing ductwork distribution systems should be replaced. The existing chiller and associated chilled water piping system should be replaced, potentially with a larger chiller and distribution system in order to provide air conditioning to areas that are currently provided with air conditioning by inefficient split system and window type AC units. Lastly, a new direct digital (DDC) control automatic temperature control and building energy management system should be installed to control all new HVAC systems and equipment.

### Lord/Field House (1980) Building:

The majority of the Lord Building is heated, ventilated and air conditioned by rooftop air handling units. One large gas-fired heating, DX cooling VAV Multi-Zone unit that serves the Library and Media Studio was installed in 1997, while the majority of

remaining rooftop units were installed in 2005. The rooftop units that were installed in 2005 are equipped with direct expansion cooling components, supply and exhaust fans, filter sections, and hot water coils. Hot water for each rooftop is generated through the use of instantaneous gas fired water heater boilers. This current heating system associated with these rooftop units has been failing on a constant basis and high number of water heaters have been replaced and continue to fail.

The majority of building areas are served by overhead ducted distribution system with ceiling mounted diffusers and a combination of low, high sidewall return and ceiling supply registers for heating, ventilation and cooling purposes. Many of the ceiling mounted diffusers and grilles appear dirty which could be a sign of dirty filter and ductwork. In general, much of the terminal heating equipment that is installed is in poor condition and in need of replacement. Several areas have exterior wall areas that do not have fin tube radiation heating, which can cause higher energy use and reduced thermal comfort control. Many corridors throughout the building are not provided with code required ventilation air.

The Pool area is served by one indoor gas/oil fired air-handling unit located in a mechanical room in the basement. The Field House is provided with (4) gas fired indoor air handling units with a single discharge and inlet grille. The Pool and Field House air handling unit systems are generally in poor physical condition and past their expected useful service life.

Many areas have been reported to have inadequate thermostat control, and experiences times when the room/areas are too hot and/or too cold.

We recommend the following HVAC system repairs and replacements. A new high efficiency gas fired hot water plant should be installed to serve the Lord/Field House Building, and to replace the individual rooftop unit boilers. New high efficiency boilers, insulated hot water piping distribution, accessories, pumps equipped with VFDs, and new boiler plant direct digital controls shall be installed to serve the buildings' hot water heating systems. All existing terminal heating units should be replaced with new hot water heating units. All existing rooftop and indoor air handling units, and exhaust fans, should be replaced with new units, and upgraded where possible to include energy recovery ventilation and variable air volume control to provide increased energy efficiency. Ventilation systems shall be provided for areas of the existing buildings that are not currently provided with code required ventilation. All existing ductwork distribution systems should be replaced. Existing split system and window type AC units should be replaced with new high efficiency AC systems. A new direct digital (DDC) control automatic temperature control and building energy management system should be installed to control all new HVAC systems and equipment.

### Freshman Academy:

The Freshman Academy is primarily heated by the central Steam Plant via a shell and tube steam to hot water heat exchanger that utilizes steam from the Steam Plant to provide hot water to the building. Hot water is circulated throughout the building with the use of (2) constant flow end suction base mounted Bell & Gossett pumps. Condensate is returned to the Steam Plant via a condensate receiver and duplex pump

set. The shell and tube heat exchanger, condensate pump and hot water pumps appear to have corrosion on the surfaces and appear to be in poor condition and in need of replacement. Many sections of piping insulation appears to be missing or damaged.

One gas fired constant volume rooftop unit is provided for ventilation purposes for the Cafeteria, Theatre and internal areas of the building. The majority of the classroom and administration areas of the building is ventilated by a constant volume central indoor hot water heating and ventilation unit located in the mechanical room. The H&V (heating and ventilation) unit has a supply air fan, filter section and hot water heating coils. The rooftop and indoor H&V units are generally in poor condition and in need of replacement. These units are functioning poorly and are beyond their expected useful service life.

The cafeteria and auditorium have exposed ducted distribution systems that provide tempered air to the spaces. Wall mounted fin tube is also utilized in these spaces for supplemental heat. The fintube radiation and enclosure are in poor condition and in need of replacement.

Typical classrooms throughout this building are provided with overhead ducted distribution systems with ceiling mounted diffusers and a combination of low, high or ceiling returns for ventilation purposes. In many classrooms the supply and return grilles are located too close to one another. Wall mounted fin tube radiation at the exterior walls are utilized as the main heat source for the spaces. Temperature control for individual spaces utilize thermostatic control valves located on the supply side of the fin tube radiation. These valves provide a dial type control where increasing or decreasing the dial will lower or increase the space temperature. These are ineffective when trying to maintain a constant comfort level within the space. Many of the ceiling mounted diffusers and grilles appear dirty which could be a sign of dirty filter and ductwork.

The Maker Space was recently renovated and is air conditioned by three (3) ductless AC units that are piped to exterior wall mounted air cooled condensing units. The AC system appears in very good condition. The Maker Space is heated by hot water fin tube radiation heating and is ventilated by the central H&V air handling system. The fintube radiation and associated enclosure are in poor condition and in need of replacement.

We recommend that the Freshman Academy building be served by the Steam Plant Building's new high efficiency hot water heating boiler plant. All existing steam and hot water heating equipment shall be replaced with new hot water heating equipment. All existing steam heating and condensate distribution piping systems, existing steam to hot water heat exchangers, and condensate return pumps shall be removed. All existing terminal heating units and associated steam/hot water piping should be replaced. All existing rooftop and indoor air handling units, and exhaust fans, should be replaced with new units, and upgraded where possible to include energy recovery ventilation and variable air volume control to provide increased energy efficiency. Ventilation systems shall be provided for areas of the existing buildings that are not currently provided with code required ventilation. All existing ductwork distribution systems should be replaced. Existing split system and window type AC units should be

replaced with high efficiency VRF type AC systems. Lastly, a new direct digital (DDC) control automatic temperature control and building energy management system should be installed to control all new HVAC systems and equipment.

### Steam Plant:

The main campus heating plant consists of (2) gas-fired steam Cleaver Brooks tube style boilers, each having a capacity of 24,493 MBH natural gas input. The Boilers are Cleaver Brooks Model CBI700.600.015ST boilers, which were installed in 1996. The boilers appear to be in fair physical condition on the exterior, however the boiler internal shell and tubes surfaces show signs of wear and corrosion. The boilers are nearing the end of their expected useful service life of 25 years. The Steam Plant feeds steam to the Coburn (1892) /Sullivan (1997 Addition)/ 1922 Building and Freshman Academy Building. Condensate return travels back to the boilers through the use of a triplex pump condensate receiver and deaerator boiler feed unit, which was manufactured by Shipco. Breeching associated with each boiler consists of a double wall positive pressure system that combines into a common header and exits the building into a masonry stack located adjacent to the Steam Plant. Combustion air for boilers is provided through high wall mounted louvers, which are equipped with dampers which are interlocked to the boilers. Gas fired vertical unit heaters are utilized for spatial heating requirements. The Steam Plant is tied into the school's direct digital control building management system that is manufactured by Siemens.

## ELECTRICAL/TELECOMMUNICATIONS/SECURITY:

### General:

In general, the majority of the Electrical systems have reached their life expectancy with some equipment at approximately 50% of its expected life. The equipment that has reached the end of its useful life is in poor condition. Due to the condition of these systems and the fact that some systems do not comply with current codes, or do not meet current standards of expected efficiency and performance, it is recommended that new Electrical systems be provided with some exceptions that will be further detailed below.

### 1922 Building:

Portions of the existing electrical distribution system was installed in the 1990s and some are original vintage. Panelboards in general are located in corridors and are not separated by load type. Branch circuits are in poor condition and the apparent use of extension cords and plug strips indicates a lack of receptacles. The electrical distribution system should be replaced as described below in any renovation/repair program.

The interior lighting in the building in general is T8 fluorescent however, in most cases light levels quality is not what would be considered acceptable in current lighting design practice. The lighting and lighting controls should be upgraded to meet current

energy codes as well.

The emergency power system does not separate optional standby and life safety loads therefore it is not in compliance with current code. The emergency system is served by the generator in the power plant. Any renovation or base repair will require a generator/emergency systems upgrade as described below.

The fire alarm system notification coverage and type is not in compliance with current code. The fire alarm system should be replaced with a new addressable voice evacuation system as required by the building code in "E" use groups.

A new 4,000 ampere service will be provided with new distribution panels to accommodate power, lighting, and mechanical loads. New energy efficient LED lighting controlled with a new addressable networked lighting control system will be provided. The control system will be interfaced with the BMS system via BacNet over IP protocol. A 250 KW diesel generator will provide emergency power to a new code compliant emergency distribution system. The fire alarm system will be upgraded to a new addressable voice evacuation system to comply with current code. New systems that are required by code that were not previously required will be provided, such as a two-way communications systems and a BDA system for Public Safety communications.

The existing classroom intercom system and clock system is beyond its serviceable life, in same locations it is failing and should be replaced in a renovation or base repair program.

The data cabling has been updated over the years to keep up with the emergency educational technology devices. Telephone and data cabling infrastructure should be upgraded in order for the school to be prepared for 21st Century learning.

The data system will consists of 10 gig fiber optic backbone cabling, horizontal wiring will consist of CAT 6 UTP for both telephone and data. Wireless access locations will be provided with multiple CAT 6A UTP cables to ensure wireless density as well as one hundred percent coverage.

A new central paging system will be provided and integrated with the telephone system which will be synched with wireless clocks that act as transceivers and tie back to a master clock head end.

The buildings are equipped with an access control system, video management system, and intrusion detection system. There is extensive camera coverage however, the cameras are a mix of analog and IP type. All cameras will be upgraded to megapixel IP type cameras with new CAT 6 cabling to replace analog cabling for non-IP cameras. The VMS software should be upgraded and standardized on throughout the facility, cameras should be added in areas that lack coverage.

The access control system will be upgraded and standardized on throughout the facility. Additional doors should be provided with access control to meet the operational needs of the school from partitioning the building to lock down situation.

The intrusion system will be integrated with the video management system and the

access control system.

## Lord/Field House (1980) Building:

The existing electrical distribution system is in poor condition. Panelboards in general are located in corridors and are not separated by load type. Branch circuits are in poor condition and the apparent use of extension cords and plug strips indicates a lack of receptacles. The electrical distribution system should be replaced as described below in any renovation/repair program.

The interior lighting in the building in general is T8 fluorescent however, in most cases light levels quality is not what would be considered acceptable in current lighting design practice. The lighting and lighting controls should be upgraded to meet current energy codes as well.

The emergency power system does not separate optional standby and life safety loads therefore it is not in compliance with current code. The emergency system is served by the generator in the power plant. Any renovation or base repair will require a generator/emergency systems upgrade as described below.

The fire alarm system notification coverage and type is not in compliance with current code. The fire alarm system should be replaced with a new addressable voice evacuation system as required by the building code in "E" use groups.

A new 4,000 ampere service will be provided with new distribution panels to accommodate power, lighting, and mechanical loads. New energy efficient LED lighting controlled with a new addressable networked lighting control system will be provided. The control system will be interfaced with the BMS system via BacNet over IP protocol. A 250 KW diesel generator will provide emergency power to a new code compliant emergency distribution system. The fire alarm system will be upgraded to a new addressable voice evacuation system to comply with current code. New systems that are required by code that were not previously required will be provided, such as a two-way communications systems and a BDA system for Public Safety communications.

The existing classroom intercom system and clock system is beyond its serviceable life, in same locations it is failing and should be replaced in a renovation or base repair program.

The data cabling has been updated over the years to keep up with the emergency educational technology devices. Telephone and data cabling infrastructure should be upgraded in order for the school to be prepared for 21st Century learning.

The data system will consists of 10 gig fiber optic backbone cabling, horizontal wiring will consist of CAT 6 UTP for both telephone and data. Wireless access locations will be provided with multiple CAT 6A UTP cables to ensure wireless density as well as one hundred percent coverage.

A new central paging system will be provided and integrated with the telephone system which will be synched with wireless clocks that act as transceivers and tie back to a

master clock head end.

### Freshman Academy:

The existing electrical distribution systems are in poor condition. Branch circuits are in poor condition. The electrical distribution system should be replaced as described below in any renovation/repair program.

The interior lighting in the building in general is T8 fluorescent however, in most cases light levels/quality is not what would be considered acceptable in current lighting design practice. The lighting and lighting controls should be upgraded to meet current energy codes as well.

The Freshman Academy does not have an emergency generator; all emergency lighting is done through Bodine ballasts. This is a burden on maintenance to properly test the emergency ballasts. An emergency generator and distribution system as described below should be provided.

The building contains a conventional obsolete fire alarm control system with non-compliant notification appliances. The fire alarm system should be replaced with a new addressable voice evacuation system as required by the building code for "E" use groups.

A new 1,600 ampere service will be provided with new distribution panels to accommodate power, lighting, and mechanical loads. New energy efficient LED lighting controlled with a new addressable networked lighting control system will be provided. The control system will be interfaced with the BMS system via BacNet over IP protocol. A 250 KW diesel generator will provide emergency power to a new code compliant emergency distribution system. The fire alarm system will be upgraded to a new addressable voice evacuation system to comply with current code. New systems that are required by code that were not previously required will be provided, such as a two-way communications systems and a BDA system for Public Safety communications. The communications systems will be upgraded to meet 21st Century learning requirements.

### Steam Plant:

The Steam Plant Building will reuse the existing 1,000 ampere and 2,500 ampere services. New branch circuit distribution systems will be provided which consists of a system of sub-panels and feeders to accommodate the lighting upgrades and mechanical upgrades. The existing 105 KW generator will be utilized and the emergency distribution will be modified to accommodate the mechanical upgrades to ensure critical mechanical systems are on emergency power.

The buildings are equipped with an access control system, video management system, and intrusion detection system. There is extensive camera coverage however, the cameras are a mix of analog and IP type. All cameras will be upgraded to megapixel IP type cameras with new CAT 6 cabling to replace analog cabling for non-IP cameras. The VMS software should be upgraded and standardized on throughout the facility,

cameras should be added in areas that lack coverage.

The access control system will be upgraded and standardized on throughout the facility. Additional doors should be provided with access control to meet the operational needs of the school from partitioning the building to lock down situation.

The intrusion system will be integrated with the video management system and the access control system.

## PLUMBING & FIRE PROTECTION:

### General:

The campus is comprised of five buildings. The Field House shares domestic cold water, and gas services with the Lord Building and 1922 Building. It also shares its fire protection services with the Lord Building. The 1922 Building has its own fire protection service. The Freshman Academy has its own domestic cold water service, fire protection service, and fire pump. The Steam Plant also has its own domestic cold water service, and shares its gas service with the Freshman Academy. The only building not provided with sprinklers is the Field House.

In general, for all five buildings, the piping is past its useful life. Hot water is supplied by a combination of electric water heaters and old gas-fired hot water storage tanks, decreasing efficiency. The following existing conditions report provides more information on each of the buildings along with a summary of recommendations

### 1922 Building:

### Fire Protection:

The 1922 Building sprinkler system is served by a 4" water line, entering the east side of the building. The service is located in the basement, underneath Stair C. The building has sprinklers throughout, with FDV connections in the hallways. One exception is the Teacher's Work Room on the third floor, which is not provided with sprinklers. Protection will need to be provided in this area. The auditorium stage also has FDV's at each end, as required by code.

### Plumbing:

The waste and water piping in the 1922 building is past its useful life, and it is recommended to replace it. The building contains bathroom cores as well as art rooms, janitor's closes, lab rooms and a teaching kitchen. The fixtures in the bathrooms are not low-flow and it is recommended to replace them. The sinks in these lab rooms do not appear to be connected to an acid neutralization tank. A central neutralization system for each sink should be added. The emergency eyewashes do not appear to be served by tempered water, which is required to meet code. The hot water comes from the two domestic storage heaters in the basement

of the Field House. The building has different types of drinking fountains throughout, and include some handicapped accessible units. Some were out of service.

There are multiple art rooms in the basement. They each have an art sink. Only one of the art sinks had a solid's interceptor. A solids interceptor should be added per plumbing code.

The teaching, Culinary Kitchen, is located in the basement. It contains equipment that is served by the building's gas line. The kitchen did not have visible floor drains, and the grease interceptor that serves the 3-bay sink is in poor condition.

### Lord/Field House:

The Lord and Field House are served by a 6" domestic cold water service that enters through the basement of the Field House. Two gas-fired domestic hot water storage heaters are also located in the basement, and account for the hot water for the Lord Building, Field House, and 1922 Building. It is recommended that the gas-fired storage tanks be replaced with new High Efficiency gas-fired hot water heaters. The 6" waste for the Field House exists on the west side, and the 6" RWL exists on the north.

The two buildings together contain locker rooms, bathroom cores, and labs. The fixtures in the bathroom cores, like with all other buildings, are outdated, and it is recommended to replace them.

The Field House contains a swimming pool, as well as large women and men's locker rooms. The lockers rooms have communal showers, as well as individual shower stalls. Per 248 CMR 10.10, "In shower rooms or in an area that multiple shower heads are installed and the individual shower space, ara, stall, the floor is designed and pitched so that waste water from one shower head area does not flow over the floor area serving another shower head area". The communal showers and the locker room showers and the "Type 2" showers may not meet these requirements.

The Lord Building houses lab rooms. The sinks in these lab rooms do not appear to be connected to an acid neutralization tank. A central neutralization system or local 5 gallon acid neutralization for each sink should be added. The lab also has gas connections, and an emergency gas shutoff located a few inches from the floor, in the back of the classrooms. They should be located at the exit door of the rooms, per code. The emergency eyewashes do not appear to be served by tempered water, which is required to meet code.

### Freshman Academy:

The entire Freshman Academy is sprinklered and appears to meet NFPA 13 requirements. Standpipe and FDVs are located on each floor, in the stairwell. The sprinkler service and a 50P fire pump assembly is located in a closet, next to the domestic cold water service.

The domestic cold water service for the building enters at the fire sprinkler room. The electric water heater in that same room provides the building's hot water. It is recommended that the heater be replaced with a new energy efficient gas-fired hot

water heater. The building has bathroom cores, as well as Life Skills rooms which contain sinks and gas-fired stoves.

There is a serving kitchen on the Ground Floor. The purpose of it is mostly for heating and serving food. No actual cooking is done. It is served by its own hot water heater, located in the kitchen itself.

### Steam Plant:

The Steam Plant is protected with upright heads. It shares the fire protection services with the Freshman Academy. The building contains a domestic cold water service as well as a domestic hot water heat exchanger. The hot water and hot water recirc. Run between the heat exchanger and the Freshman Academy. On the side of the building is the gas service and meter which serves both the Steam Plant and Freshman Academy. There is flooding in the Steam Plant and the drainage system may need to be modified.

## RECOMMENDATIONS:

### Fire Protection:

- All existing sprinkler piping and heads in the 1922 Building, Lord and Freshman Academy should be removed and replaced with a new fire suppression system throughout in accordance with NFPA 13. Existing services to building may be able to be reused pending confirmation of condition.
- A major renovation would require sprinkler heads be installed throughout the Field House in accordance with NFPA 13.

### Plumbing:

- Per ASHRAE and ASPE, water piping and insulation have a life expectancy of 225-30 years. Piping is past its use life. Consider replacing all water, waste and vent piping in all buildings.
- Replace all bathroom fixtures with new low-flow, sensor operated faucets and flush valves.
- Provide new roof drains on all flat roofs being replaced.
- Replace all existing electric water heaters with high efficiency gas fired water heaters.
- Grease traps in the kitchens are past their useful life and should be replaced.
- Complaints regarding lack of floor drains in the teacher kitchen; floor drains should be added.
- Emergency gas shut offs should be located by the exit door all lab rooms.
- Emergency eyewashes did not appear to be served with tempered water. Tempered water loop needs to be added per plumbing code.

- Lab sinks did not appear to have an acid neutralization system. A central neutralization system or local 5 gallon acide neutralization for each sink should be added per plumbing code.
- Replace gas fired domestic hot water storage tanks in Field House with high efficiency gas heaters.
- Add floor drains or modify floor slop of showers in locker rooms to meet 248 CMR 10.10 requirements.
- Add solid interceptors to all art sinks.
- Modify drainage system in the Steam Plant to prevent future flooring.
- Add regular and handicapped fountains to all buildings to meet code requirement of 1 drinking fountain per 75 people.

See appendix for further information.

# 3.1.4 Evaluation of Existing Conditions

# C. Foodservice

### School Foodservice:

The Lowell High School's cafeteria kitchen serves the typical school lunch program offering a wide variety of food options at multiple service points. The student participation is steady but service is slow due to many factors with the obvious one being that the serving area is not maximized for ultimate flow and throughput. Additionally, it is remotely located from the kitchen forcing the misplacement of labor assets so that management can deal with food transport.

The production kitchen is antiquated and poorly equipped in some cases. It serves two remote serving areas located in the Lord Building and one in the Freshman Academy. Over the years as menu offering and production standards have changed so has the equipment. Unfortunately, the existing infrastructure did not offer any flexibility. Equipment was placed where it could be accommodated and not where it needed to be placed. As a result much of the kitchen flow is in conflict. Lastly, as the program has grown the storage capacities have not. In one example the kitchen staff added walk-in freezer but that additions had come at the expense of displacing some other function.

A complete reorganization is warranted. The future kitchen and servery design must be focused on adequate facilities, flexible future growth, and direct adjacency of the serving area. Additionally, this facility will also need to be positioned so that it can adequately ship product to other schools and programs throughout the campus and district.

### Culinary:

The Culinary Arts program located in the 1922 building is well attended. However, the facility in which the program operates is in dire need of a complete reorganization. The program, in order to meet demand is trying to do too much in an undersized facility that is not properly equipped. There are cooking pieces not located beneath exhaust hoods. There is not enough adequate space for students to set up learning stations. For example a row of tables where students can set up and safely learn knife skills such as chopping and dicing. The culinary program also supports a retail restaurant that is equipped with a bakery display case and salad bar and seating for small groups. The restaurant dining area is open to serve community groups, teaching staff, and is available for special functions and catering.

The future culinary teaching kitchen must be organized to accommodate two main programs, baking and hot food production. These two programs must be organized so that are separate but also share common functions such as pot washing, storage, and use of a common food preparation area used to teach basic culinary skills. The

restaurant component must be placed so that it is convenient to street access while also maintaining a secure point of entry to the school.

See appendix for further information.

# 3.1.4 Evaluation of Existing Conditions

# C. Hazardous Materials

### 1922 Building:

### 1.0 INTRODUCTION:
UEC was contracted by Perkins Eastman to conduct a determination survey for hazardous materials at Lowell High School,1922 Building.

### 2.0 FINDINGS:
### Asbestos Containing Materials (ACM)
Various types of asbestos containing materials were found during the survey. The following suspect materials were either found or assumed to contain asbestos.

1. Lab table was found to contain asbestos.
2. Soft black glazing caulking for borrowed lite was found to contain asbestos.
3. Hard grey glazing caulking for borrowed lite was found to contain asbestos.
4. Light grey/white vinyl floor tile was found to contain asbestos.
5. Mastic for vinyl floor tile under plywood/carpet was found to contain asbestos.
6. Glue daub for ceiling plaster was found to contain asbestos.
7. Hard grey glazing caulking for vision lite in metal door was found to contain asbestos.
8. Exterior door framing caulking was found to contain asbestos.
9. Exterior residue door framing caulking on brick was found to contain asbestos.
10. Glue holding blackboard was assumed to contain asbestos.
11. Pipe insulation was assumed to contain asbestos.
12. Stage fire curtain was assumed to contain asbestos.
13. Underground sewer pipes were assumed to contain asbestos.
14. Damproofing on exterior and foundation walls was assumed to contain asbestos.

### Polychlorinated Biphenyls (PCB's)-Electrical Equipment and Light Fixtures
Visual inspection of various equipment such as light fixtures, thermostats, exit signs and switches was performed or 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.

### PCB's in Caulking:

Building materials and caulking were assumed to contain PCB's.

### Lead Based Paint (LBP):

LBP was assumed to exist on painted surfaces in all areas constructed prior to 1978. A school is not considered a regulated facility.

### Airborne Mold:
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 high.

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

## 3.0 RECOMMENDATIONS/REQUIRED TESTING:
Destructive testing of the exterior walls and excavation around foundation walls will be required to be performed to expose any suspect ACM (damproofing/flashing) and would need to be performed during the design development phase of the project.

Testing for PCB's is not required to be performed by the EPA and is not recommended.

## Lord/Field House:

## 1.0 INTRODUCTION:
UEC was contracted by Perkins Eastman to conduct a determination survey for hazardous materials at Lowell High School, Lord Building/Field House.

## 3.0 FINDINGS:
### Asbestos Containing Materials (ACM)
Various types of asbestos containing materials were found during the survey. The following suspect materials were either found or assumed to contain asbestos.

15. Soft black glazing caulking for borrowed lite was found to contain asbestos.
16. Vertical white caulking in CMU wall was found to contain asbestos.
17. Mastic for white with black/grey vinyl floor tile was found to contain asbestos.
18. Mastic for older caramel vinyl floor tile was found to contain asbestos.
19. Exterior window soft brown glazing caulking was found to contain asbestos.
20. Exterior transite panel was found to contain asbestos.
21. Exterior transite panel covering vertical steel column was found to contain asbestos.
22. Exterior window glazing caulking for transite panel was found to contain asbestos.
23. Glue holding tectum deck at the pool building was assumed to contain asbestos.
24. Exterior black damproofing behind brick at foundation was found to contain asbestos.
25. Exterior flashing protruding from brick was found to contain asbestos.
26. Exterior hidden caulking for transite panel encasing vertical steel column was found to contain asbestos.
27. Glue holding blackboard was assumed to contain asbestos.
28. Underground sewer pipes were assumed to contain asbestos.

### Polychlorinated Biphenyls (PCB's)-Electrical Equipment and Light Fixtures
Visual inspection of various equipments such as light fixtures, thermostats, exit signs and switches was performed or 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.

### Mercury in Rubber Flooring:
Samples results of the rubber flooring indicated the presence of high level of mercury. Mercury was assumed to have leached into the concrete slab. Sampling would be required to determine extent of contamination/leaching.

### PCB's in Caulking:

Building materials and caulking were assumed to contain PCB's.

### Lead Based Paint (LBP):

LBP was assumed to exist on painted surfaces in all areas constructed prior to 1978. A school is not considered a regulated facility.

### Airborne Mold:
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 high.

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

### 3.0 RECOMMENDATIONS/REQUIRED TESTING:
Destructive testing of the exterior walls and excavation around foundation walls will be required to be performed to expose any suspect ACM (damproofing/flashing) and would need to be performed during the design development phase of the project.

Testing for PCB's is not required to be performed by the EPA and is not recommended.

## Freshman Academy:

### 1.0 INTRODUCTION:
UEC was contracted by Perkins Eastman to conduct a determination survey for hazardous materials at Lowell High School, Freshmen Academy.

### 4.0 FINDINGS:
### Asbestos Containing Materials (ACM)
Various types of asbestos containing materials were found during the survey. The following suspect materials were either found or assumed to contain asbestos.

1. Soft black glazing caulking for vision lite in metal door was found to contain asbestos.
2. Soft black glazing caulking for borrowed lite was found to contain asbestos.
3. Purple sink damproofing was found to contain asbestos.
4. Tan sealant around sink drain was found to contain asbestos.
5. Black mastic in speaker box was found to contain asbestos.
6. Underground sewer pipes were assumed to contain asbestos.
7. Damproofing on exterior and foundation walls was assumed to contain asbestos.

### Polychlorinated Biphenyls (PCB's)-Electrical Equipment and Light Fixtures

Visual inspection of various equipments such as light fixtures, thermostats, exit signs and switches was performed or 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.

### PCB's in Caulking:

Building materials and caulking were assumed to contain PCB's.

### Lead Based Paint (LBP):

LBP was assumed to exist on painted surfaces in all areas constructed prior to 1978. A school is not considered a regulated facility.

### Airborne Mold:

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 high.

### Radon:

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

## 3.0 RECOMMENDATIONS/REQUIRED TESTING:

Destructive testing of the exterior walls and excavation around foundation walls will be required to be performed to expose any suspect ACM (damproofing/flashing) and would need to be performed during the design development phase of the project.

Testing for PCB's is not required to be performed by the EPA and is not recommended.

### Steam Plant:

## 1.0 INTRODUCTION:

UEC was contracted by Perkins Eastman to conduct a determination survey for hazardous materials at Lowell High School, Steam Plant.

## 5.0 FINDINGS:

### Asbestos Containing Materials (ACM)

Various types of asbestos containing materials were found during the survey. The following suspect materials were either found or assumed to contain asbestos.

1. Pipe insulation was assumed to contain asbestos. The insulation was found in metal elevated enclosure leaving the plant to Freshmen Academy.
2. Exterior flashing protruding from foundation was found to contain asbestos.
3. Underground sewer pipes were assumed to contain asbestos.
4. Damproofing on exterior and foundation walls was assumed to contain asbestos.

### Polychlorinated Biphenyls (PCB's)-Electrical Equipment and Light Fixtures

Visual inspection of various equipments such as light fixtures, thermostats, exit signs and switches was performed or 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.

### PCB's in Caulking:

Building materials and caulking were assumed to contain PCB's.

### Lead Based Paint (LBP):

LBP was assumed to exist on painted surfaces in all areas constructed prior to 1978. A school is not considered a regulated facility.

### Airborne Mold:

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 high.

### Radon:

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

## 3.0 RECOMMENDATIONS/REQUIRED TESTING:

Destructive testing of the exterior walls and excavation around foundation walls will be required to be performed to expose any suspect ACM (damproofing/flashing) and would need to be performed during the design development phase of the project.

Testing for PCB's is not required to be performed by the EPA and is not recommended.

See appendix for further information.

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# 3.1.4 Evaluation of Existing Conditions

# D. Site - Site Survey & Infrastructure

Lowell High school is located at 50 Father Morissette Boulevard in Lowell, Massachusetts. Lowell High School consisted of five (5) buildings:

- 1922 Building
- Lord Building
- Field House Building
- Freshman Academy
- Steam Plant

The following is a summary of infrastructure utilities available. The summary is based on record plans, on site survey by Consultant Engineers and Lowell Regional Wastewater Utility. See appendices for further detailed information.

### Water Service:

All five buildings of the Lowell High School are connected to the Lowell Regional Water Utility (LRWU) water system.

- 1922 Building:
  - Two (2) existing 4-inch water services under the sidewalk on the easterly side of the building and connected to an existing 6-inch water main located in Kirk Street near Paige Street.
  - One (1) existing 6-inch fire service with a post indicator valve (PIV) that connects to the southerly side of the building. The fire service connects to an existing 6-inch water main located between the 1922 Building and the Merrimack Canal.
  - Two (2) fire hydrants appear to be within 500 feet of the westerly side of the 1922 Building and Merrimack Canal. One (1) hydrant is located at the corner of Kirk and Lee Streets.
- Lord/ Field House Buildings:
  - One (1) single 8-inch cement-lined ductile iron water service that provides both domestic and fire service to both buildings which is located under the sidewalk and connected to an existing 20-inch water main in French Street near Arnand Street.
  - The post indicator valve (PIV) on the existing 8- inch water service
  - The 8-inch water service splits into a 6-inch fire service ad a separate 6-inch domestic water service prior to entering the building.
  - Fire department siamese connection located at the northwest corner of the Field House Building
  - One (1) fire hydrant approximately 150 feet from the water services on French Street between the Lord/ Field House Buildings.

- Freshman Academy:
  - One (1) existing 4-inch domestic water service under the sidewalk and connected to an existing 6-inch water main located in Paige Street.
  - One (1) existing 8-inch fire service under the sidewalk and connected to an existing 6-inch water main located in Page Street.
  - One (1) fire department siamese connection on fate face of the southerly side along Paige Street.
  - One (1) fire hydrant approximately more than 300 feet on John Street located between Paige Street and French Street
- Steam Plant:
  - One (1) existing 2-inch domestic water service located on the westerly side of the building connected to the existing 6-inch water main via a tunnel to the 1922 Building
  - One (1) existing 4-inch fire service that is connected to the existing 6-inch water main via a tunnel to the 1922 Building with a double check back flow preventer in Kirk Street.
  - The existing water service is a 6-inch diameter (type unknown) pipe installed under the entry drive and sidewalk to a 10-inch main in South Franklin.
  - One (1) fire department siamese connection the northwest corner of the building on French Street.
  - One (1) fire hydrant approximately 100 feet of the building near the intersection of French Street and Kirk Street.

### Sewer Service:

All five buildings of the Lowell High School are connected to the Lowell Regional Wastewater Utility (LRWWU) sewer system.

- 1922 Building:
  - One (1) 8-inch sewer service lateral and two (2) 6-inch sewer service laterals serve the building.
  - The 8-inch sewer service lateral near the northwest corner of the building and one (1) 6-inch sewer service lateral near the southwest building corner exists on the westerly side of the building and connects to the existing 12-inch combined sewer main near the Merrimack Canal.
  - The other 6-inch sewer service lateral exits on the easterly side of the building and connects to an existing 12-inch combined sewer main near Lee Street.
- Lord/ Field House Buildings:
  - Four (4) sewer service laterals that serve the buildings
    - The first sewer service is a 6-inch vitrified clay (VC) pipe that exits the westerly side of the Field House Building and connects to a sewer manhole located in the intersection of Arnand Street and French Street.

        - The second sewer service is a 6-inch VC pipe that exits on the northeasterly side of the Field House Building and connects to a 15-inch sewer main at an existing sewer manhole located in French Street.
        - The third sewer service is an 8-inch VC that exits on the northeasterly side of the Lord Building
        - The fourth sewer service is a 4-inch VC pipe that exits the Lord Building approximately 10 feet from the third service. The 4-inch sewer service connects to an acid neutralization manhole that then connects to the 8-inch sewer service and connects to a 15-inch sewer main at a sewer manhole located in French Street.
- Freshman Academy:
    - One (1) 6-inch sewer service lateral serves the school. The sewer service exits the school near at the middle of the northerly side of the building and connects to an existing 18-inch combined sewer (storm drainage and sanitary sewer flows) main at a manhole located in French Street.
- Steam Plant –
    - One (1) 8-inch sewer lateral serves the building. The sewer service exits the school and connects to the existing 18-inch combined sewer (storm drainage and sanitary sewer flows) main in French Street.

Storm Drainage:

- 1922 Building:
    - Several catch basins on the westerly side of the building that connect to the existing 12-inch combined sewer line near the Merrimack Canal.
    - One (1) 6-inch storm drain line that discharges from the approximate southerly center of the building at the alley that then discharges to an existing catch basin and then drains via an 8-inch storm drain line to the existing combined sewer system at a sewer manhole located in the sidewalk of Kirk Street.
    - One (1) 8-inch storm drain line discharges from the northwest corner of the building and connects to an existing storm drain line located on the westerly side of the building near the Merrimack Canal.
    - One (1) 4-inch foundation drain – connects to the 12-inch combined sewer line. It appears that the current drainage system is not in compliance with the current DEP Stormwater Regulations (2008)
    - Four (4) downspouts on the southerly side and two (2) on the westerly side which discharge to grade.
- Lord/ Field House:
    - Lord building's roof drainage is routed internally and into the storm water system on Father Morissette Blvd.
    - One (1) 6-inch vitrified clay (VC) drain pipe for roof drainage of the Field House to combined sewer manhole on Father Morissette Blvd. It appears that the current drainage system is not in compliance with the current DEP Stormwater Regulations (2008).
    - A third closed drainage system composed of catch basins, drain manholes and reinforced concrete pipe (RCP) collects surface

stormwater from the driveway to the loading dock discharging to a manhole and then into a 12-inch storm drain line that discharges to a combined sewer system in Arnand Drive. It appears that the current drainage system is not in compliance with the current Department of Environmental Protection (DEP) Stormwater Regulations (2008).

- Freshman Academy:
  - Freshman Academy's roof drainage is routed internally and into a single 12 inch storm drain service lateral and connects to an existing 18-inch combined sewer (storm drainage and sanitary sewer flows) main at a manhole located in French Street.
- Steam Plant –
  - Steam Plant's roof drainage is routed internally into the building and appears to discharge via two (2) 4-inch roof drain pipes into an 18-inch combined sewer line located in French Street.

## Flood Plain

Based on the Flood Insurance Rate Map (FIRM), Community Panel Numbers 25017C0139F and 25017C0143F and both dated July 7, 2014, the Merrimack Canal is in Zone A (No base flood elevations determined). The remainder of the school building sites are located in Zone X (Areas determined to be outside the 0.2% annual chance floodplain).

## Electrical

- 1922 Building:
  - Main Service provided via a switchboard prior to the 1990s, is back-fed through a 500 kVA dry type transformer.
  - The second switchboard is manufactured by FPE and is rated at 1,600 amps, 120/208 volt, 3 phase.
  - Emergency power is provided via a generator at the power plant. There is an Olympian transfer switch present in the emergency electric room. The transfer switch feeds emergency and optional standby loads.
- Lord/ Field House:
  - Main service provided via a 3,000 amp, 277/480 volt, 3 phase Switchboard located in the receiving area main electric room.
  - Emergency power is provided via a 100 kW generator located adjacent to 750 KVA transformer. The generator serves emergency lighting throughout and walking kitchen refrigeration transformers.
- Freshman Academy:
  - Main service provided via a rated 1,200 amp, 277/480 volt, 3 phase which feeds a 300 kVA dry type transformer with a 1,000 amp, 120/208 volt, 3 phase distribution panel.
  - Emergency power is provided via an emergency generator which supplies lighting and exit signs.

- Steam Plant:

- Main service provided consists of two switches and meters. The services are rated at 1,000 amp, 277/480 volt, 3 phase and 2,500 amp, 277/480 volt, 3 phase.
- Emergency power is provided via a 105 kW natural gas emergency generator. There are emergency battery units throughout as well.

## Survey:

A land survey of the parcel which contain the Field House, Lord Building, 1922 Building, and the 75 Arcand Drive Property which is being considered for some expanded existing site options was performed by Nitsch Engineering. The Freshman Academy was not surveyed because of the Owner's requirement to consolidate the Freshman on a single campus. A survey will need to be performed if the renovation or expansion of this building is further considered.

See appendix for further information.

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# 3.1.4 Evaluation of Existing Conditions

# D. Site - Environmental Assessment (Phase 1)

Nobis Engineering, Inc. (Nobis) completed a Phase I Environmental Site Assessment (ESA) of six parcels of land located in the downtown area of Lowell, Massachusetts (the site). Five of these parcels are owned by the City of Lowell and are used as facilities and infrastructure for Lowell High School. The sixth parcel is currently privately owned and occupied by a pediatric dentistry office.

The Site is located within an area of mixed residential, commercial, and recreational use, including multiple parking garages, historical sites, a park, apartment buildings, and commercial space. The Site is made up of six buildings, all within a two city-block radius. The Lord Building, Field House, 1922 Building, the Freshman Academy, and the steam plant building are currently owned by the City of Lowell and are part of the Lowell High School complex. The 75 Arcand Street property is not owned by the City and is currently operated as a pediatric dentist's office. The Lord Building and Field House (50 Father Morissette Boulevard) are located on the western portion of the Site, with the 75 Arcand Street property abutting them to the south. A narrow park, the Lucy Larcom Park, and the Merrimack Canal are located to the east of the Lord Building and Field House, separating them from the 1922 Building. The 1922 Building connects to the Lord Building via two enclosed, glazed bridges which span across the canal and park below. The Freshman Academy and the steam plant are approximately one city block to the east of the 1922 building, with the steam plant building abutting the Freshman Academy to the west.

The Phase I ESA identifies several Recognized Environmental Conditions (RECs) associated with the historical use of the subject properties.

### Recognized Environmental Conditions:

The RECs identified in the Phase I ESA can be used to evaluate potential subsurface environmental issues that might be encountered should a construction or renovation project be undertaken on one or more of the six parcels included in the assessment. The following are conclusions with respect to the potential impacts of subsurface environmental conditions on future redevelopment efforts for Lowell High School:

- The Site has been developed since the early 1800s, when the Merrimack Canal and associated textile mills were constructed. The Merrimack Manufacturing Company and Boott Cotton Mills were both located to the north of the Site, and a rail line was constructed to the west of the canal to serve these mills. Today this rail line still exists and is used for streetcar traffic

associated with the Lowell National Historical Park.

- Former railroad activities likely transported and handled raw materials, chemicals, and hazardous materials associated with the operation of the mills. Also, railroad operations and maintenance activities themselves typically utilize OHM such as creosote or arsenic-laced railroad ties, herbicides, lubricating oils, diesel fuel, and diesel exhaust, which commonly result in releases of heavy metals, pesticides/herbicides, and petroleum-related contamination along railroad corridors. Any disturbance of soil within the former railroad corridor should consider the possibility that residual contamination is present due to historical use.

- The mills operated until the mid-1900s before closing down and falling victim to urban renewal efforts in the 1960s, which completely changed the configuration of streets in the portion of the Site that is currently occupied by the Lord Building and the Field House. For over 100 years, the portion of the Site located to the west of the Merrimack Canal was occupied by tenement homes associated with the mill, but also a small portion of the mill complex itself. The extreme northwest corner of the Site, the current location of the Field House, was formerly occupied by a "Finishing Mill" that was part of the Merrimack mill complex. The finishing process in a textile mill could have included application of dyes, bleaches, or other chemicals to prepare the textile for its end use. Any disturbance of soil in this portion of the Site should consider the possibility that residual contamination is present due to historical use.

- In 1920, the Steam Plant was constructed at the corner of Kirk and French Streets. Based on the review of historical maps, it appears that the Steam Plant was initially fired by coal, and a "coal bin" was present between the Steam Plant and the Freshman Academy. Residual coal and/or coal ash contains high levels of semi-volatile organic compounds (SVOCs) and polycyclic aromatic hydrocarbons (PAHs). Any disturbance of soil in this portion of the Site should consider the possibility that residual contamination is present due to historical use.

- Review of Lowell Fire Department records revealed that the High School facility has/had a 12,600-gallon "below grade" "Faber Burner" tank located on French Street. The tank's contents were not listed, nor was the installation date, removal date, or any sort of inspection date. Fire Department records do not provide any additional details regarding the tank. This tank may have been a storage vessel for oil that was used to fuel the boilers in the Steam Plant before it was converted to natural gas, or used to heat one of the school buildings. The exact location of this tank is unknown, but is likely to be near the Steam Plant along French Street. According to City representatives, this tank is no longer in service. However, any subsurface exploration performed in the vicinity of the Steam Plant should consider the possibility that this tank is still in place, and that petroleum products may have been released to the environment.

In summary, if construction or renovation activities (or pre-design activities) are expected to disturb soils, or if excess soils are expected to be generated during construction, considerations should be made for the management of environmental media. For example, if soils are expected to be displaced in order to construct a foundation for a new building, these soils should first be evaluated to determine if they have been impacted by OHM. Typically, pre-characterization of soils consists of the collection of soil samples from the area to be disturbed, and analysis of soil samples for a wide range of potential contaminants to determine the presence or absence of contamination, and to meet the requirements of an off-site reuse/disposal location, should these soils be surplus material unable to be reused within the project site.

The typical suite of laboratory analyses for pre-characterization soil samples includes volatile organic compounds (VOCs) by EPA Method 8260, semi-volatile organic compounds (SVOCs) by EPA Method 8270, polychlorinated biphenyls (PCBs) by EPA Method 8082, total petroleum hydrocarbons (TPH) by EPA Method 8100, and heavy metals by EPA Methods 6010/6020. Other analyses may be added based on site-specific knowledge of former operations. There are several nuances, including exemptions and variances that can be applied if specific observations of urban fill materials are made, that might be applicable to the Site as subsurface information is collected and evaluated. A Licensed Site Professional (LSP) should be involved with any soil management evaluations that are made during pre-design or construction, to ensure compliance with all applicable environmental laws and regulations.

### Subsurface Investigation:

Given the identification of RECs on the Site, a Phase II investigation may be warranted during the pre-design phase of the project to determine the presence or absence of OHM in soils at the Site. At a minimum, Phase II investigations should include the following:

- Surface geophysical survey (electromagnetic and ground penetrating radar) in the vicinity of the Steam Plant to identify subsurface anomalies that might indicate the presence of an abandoned underground storage tank. This survey might be followed up with test pitting to identify the source of any anomalies.

- Collection of soil samples from Site areas where disturbance of soils is anticipated. The objective of this investigation would be to determine whether OHM is present in soils. This information would be used to determine the appropriate health and safety precautions that should be taken by construction workers, as well as to identify potential reuse or disposal options for excess soils generated during the project. Shallow soil samples (0 to 2 feet below ground surface) can be collected using hand augers. A small drilling rig (Geoprobe® or equivalent) would be required to obtain deeper soil samples.

Further information can be found in the full Phase I Environmental Site Assessment report found in the appendix.

See appendix for further information.

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# 3.1.4 Evaluation of Existing Conditions

# D. Site - Geotechnical

This section of the study to follow in a subsequent submission pending final site selection.

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# 3.1.5 Site Development Requirements

## A. Overview of Site Programming

As part of the feasibility study the city requested that the design team examine alternative sites throughout the city to be considered for a location of a new high school. Seventy-five sites were identified from the Lowell 2013 Open Space Plan. Many of the sites were quickly eliminated due to size, ownership or known site restrictions resulting in 7 sites identified as being worth studying further.

The 7 sites include; the Existing HS Location, Cawley Stadium, Wang MS/LeBlanc Park, South Common Park, Regatta Field, Rollie's Farm and Carlisle Street. All sites were evaluated based on: environmental constraints, usable acreage, location, suitability and access to public transportation.

Please refer to the appendix for the Site Selection Analysis for the full breakdown and evaluation of each site.

Existing Site: Lowell High School is located along Father Morissette Boulevard and Arcand Drive. The Freshman Academy is detached and located at the intersection of Paige Street and John Street adjacent to which is the Steam Plant. The two main high school structures are the Lord building and the 1922 Building which span a segment of the National Historic Park's Merrimack Canal and Lucy Larcom Park.

Existing Site Expanded: The expanded site includes an adjacent 1.4 acre parcel located south of the existing Lord and Field House building at 75 Arcand Drive. The site borders the trolley tracks to the east the Masonic building to the south, Arcand Drive to the west and Lowell High School to the north.

Cawley Site: The Cawley Site is located between Rogers Street, Douglas Road, Village Street and Clark Road. The site is approximately 45 to 47 acres depending upon which maps are used, and includes approximately 6.5 Acres located within the town of Tewksbury. The actual acreage is pending a final site survey. Assessor's Map and GIS vary slightly, (GIS area +/- 45 acres, Assessor's Map indicates +/- 47.1 acres). The site is split between zones SSF and RR in Lowell and R40 in Tewksbury. The site is currently home to the Martin Athletic Complex which includes the Cawley Memorial Stadium, Martin Softball Field, Carvalho Field, Stoklosa Field, Desmond Field, Machado Field and a practice softball field and multi-use field.

## B. Site Access and Circulation

The majority of students walk, bike or use public transportation (buses) to get to school. The breakdown is as follows: approximately 1/3 walk, 1/3 are dropped off by car and 1/3 drive or take public transportation. There is not a dedicated drop off and

according to staff, cars back up on Father Morissette Boulevard and surrounding streets in the mornings and afternoons. Student arrivals begin at 6:15 am with the majority of arrivals being between 7:30 and 7:55. Dismissal for all is at 2:30.For the student population in wheelchairs 10 vans drop off at 7:15 am and pick up at 2:05 pm. There are 7 contracted buses that take students after school to different sports facilities throughout the city.

Pedestrian circulation includes walking to and from the parking garage across Father Morissette Boulevard at the beginning and end of the day. Circulation during the school day includes walking along the public sidewalks between the buildings, along the Canal Park and through the skywalks across the canal. There is a lot of activity of students coming and going on and off campus throughout the day.

**Program Existing Site:** It is assumed that the overall access and circulation patterns to the school would generally not change with the exception of freshmen being on campus. Students would continue to use the public bus system, walk, bike or drive to school. Site program should include improvements to all entrance plazas (specifically along Father Morissette Boulevard where after school buses line up) to ensure that they are well lit, ADA compliant and have adequate amounts of bike racks, benches for seating and trees for shade. Though not on the school property, all major street crossing connecting into the site should be improved, this includes the connection from the George Ayotte Parking Garage. Pedestrian connections should be provided around all new and existing buildings.

**Program Expanded Existing Site:** Same as the Existing Site Program above except that by adding the adjacent property site circulation can be improved and it will also provide direct access to Dutton Street which will improve public safety access around the building.

**Program Cawley Site:** Cawley site is located outside the city center and may need additional dedicated bus services to access the school. The program for site access will be to separate parent and bus drop-off areas as much as possible internally in order to separate student/parent/ bus vehicle conflicts. Sidewalks and bicycle friendly circulation should be provided around the school and accessing the adjacent athletic complex. Bus services for this site are under discussion with the City and the bus service company.

## C. Parking and Paving

Current Program: The majority of staff, visitors and students use the George Ayotte parking garage located at 1 Post Office Square Lowell (garage capacity of 1,200). Additional parking is found at the Joe Downes Garage located at 75 John Street or street parking. All parking garages are owned and managed by the City of Lowell. Parking in the George Ayotte garage is free for school employees. Student parking passes cost $17 a month. Currently, it is estimated there are accommodations available for 624 vehicles for the Lowell High School needs as also accommodates UMASS Lowell.

Future school parking needs estimates include 700 (for staff and students) 35 handicap spaces and 40 visitor spaces for a total of 775 spaces. Required Parking spaces are approximate and will be further verified by Lowell High School.

**Program Existing Site:** All parking aside from a select amount of handicapped parking spaces will be offsite. The George Ayotte Parking Garage has a capacity of 1,200 spaces and additional parking spaces are available on street or in the Joe Downes Garage. A new site program should include creating as many handicapped parking spaces on site as possible and at a minimum replicating the 3 spaces currently there. The existing HC spaces are currently located to the south of the Field House.

**Program Expanded Existing Site:** Same as the Existing Site Program above except that by adding the adjacent property site circulation can be improved allowing a direct connection to Dutton Street and allowing additional onsite parking spaces .

**Program Cawley Site:** The program for the site development should include new, well lit, clearly defined staff, student and visitor parking. Parking should be approximately 775 spaces including handicapped spaces. This number will be further vetted by the school and city. Parking should be located as close to the school as possible but there can be overlap with other parking lots on site that service the field areas. In the current site plan, the proposed parking spaces have been reduced to only 608 on the Cawley site plan to accommodate the possibility of two new fields that replicate (2) of the fields displaced by the new school. Final field and parking layout is pending further discussions with the City and Lowell High School.

## D. Emergency Access, Safety and Security

Currently there is fire and emergency access around the existing school except for fire truck access along the canal.

**Program both sites:** Design will comply with all public safety and building codes.

## E. Trash Removal, Deliveries and Maintenance

Current Program: A loading dock and trash/recycling area is located on the south side of the Field House. Deliveries to the school involve the following:
1. Food 3 times /week
2. Paper products 1 time/month
3. Miscellaneous deliveries all go to the loading dock

Trash Removal includes the following:
1. (1) 40 yard recycling dumpster located by the dock- removed as needed
2. (2) 10 yard dumpsters located by loading dock –removed every day
3. Food waste is not recycled

**Existing and Expanded Existing Site**: Access for deliveries and trash removal for the proposed Full Renovation, Addition/Renovation Option 1A, Addition/Renovation Option 2, Addition/Renovation Option 4, and New School on Existing Site will be from Arcand Drive along the southwest side of the site. Loading, custodial, and food service facilities are located at the rear of Lord building. Similarly, access for deliveries and trash removal for Addition/ Renovation Option 3, Addition Renovation Option 5, and New School on Expanded Existing Site will also be accessed from Arcand Drive with the service drive connecting through the expanded site to Dutton Street which is parallel to the Merrimack Canal. Loading, custodial, and food service facilities are located at the rear of the Lord building and on the east side of the new Fieldhouse.

**Cawley Site:** For the proposed Cawley site scheme, access for delivers and trash removal will be primarily from Clark Road along the Northern edge for the property. Loading, custodial, and food service facilities are located along the first floor of the northwest corner of the new building extending for a portion along the northern edge.

# F. Utilities and Services

## EXISTING HS SITE

### Water:

There are existing Lowell Regional Water Utility (LRWU) water mains in the surrounding streets. There is an existing LRWU 20-inch water main located in Father Morissette Boulevard and French Street with two (2) fire hydrants; a 6-inch LRWU water main in Kirk Street with one (1) hydrant; a 6-inch water main in LRWU Paige Street with one (1) hydrant; and a 6-inch LRWU water main in the former Anne Street with three (3) hydrant

### Sanitary Sewer:

There are existing Lowell Regional Wastewater Utility (LRWWU) sanitary sewer and combined sewer mains in the surrounding streets. In Father Morissette Boulevard, there is an existing LRWWU 15-inch sanitary sewer main that flows westerly in Father Morissette Boulevard that flows into an 18-inch sanitary sewer main and then into a 24-inch sanitary sewer main near Arcand Drive. In the former Anne Street, there is an existing LRWWU 12-inch combined sewer line that flows in a northeasterly direction and connects to a 24-inch combined sewer main in French Street, then flows in an easterly direction in French Street. In Kirk Street, there is an existing 16”x18” inch combined sewer line that flows in a northeasterly direction and connects to the existing 24-inch combined sewer main in French Street. In Arcand Drive, there is an existing 15-inch sewer main that runs in a northerly direction and connects to the existing 24-inch sewer main in Father Morissette Boulevard.

### Storm Drainage:

There are existing Lowell Regional Wastewater Utility (LRWWU) combined sewer mains and storm drain mains in the surrounding streets. In Arcand Drive, there is an existing LRWWU 18-inch storm drain that flows in a northerly direction and connects to the existing LRWWU 36-inch storm drain in Father Morissette Boulevard. In Father Morissette Boulevard, there is an existing LRWWU 15-inch storm drain that flows westerly and connects to the 36-inch storm drain at the intersection of Arcand Drive and Father Morissette Boulevard. In Anne Street there is an existing 12-inch combined sewer line that flows in a northeasterly direction and connects to a 24-inch combined sewer main in French Street. In Kirk Street there is an existing 16"x18" inch combined sewer line that flows in a northeasterly direction and connects to the existing 24-inch combined sewer main in French Street.

## CAWLEY SITE

### Water:

There are existing Lowell Regional Water Utility (LRWU) water mains in the surrounding streets. There is an existing LRWU 8-inch water main located in Douglas Road and an existing LRWU 8-inch water main in Village Street.

### Sanitary Sewer:

There is an existing Lowell Regional Wastewater Utility (LRWWU) sanitary sewer main located in Douglas Street. There is a 36-inch LRWWU sanitary sewer main that flows in a northerly direction in Douglas Street that flows into a 42-inch LRWWU sanitary sewer main near Wedgemere Drive and then into a 48-inch LRWWU sanitary sewer main at the intersection of Douglas Street, Glenmere Street and Windward Road.

### Storm Drainage:

There is an existing Lowell Regional Wastewater Utility (LRWWU) 36-inch storm drain main located off Douglas Street and within the Cawley Site that runs in a northerly direction that appears to discharge to the existing wetlands located to the north of the site.

Due to the site's proximity to wetland resource areas, the proposed stormwater management system will be designed according to Mass DEP stormwater standards, which require (AC 2/17: Bill this was in a previous iteration and is now missing – confirm inclusion.)

See appendix for further information.

# G. Code Requirements

## EXISTING HS SITE

### Water:

Based on Record Documents, the buildings have existing 4-inch to 6-inch domestic water connections and fire protection connections to the existing LRWU water mains in the surrounding streets. The plumbing report indicates the desire to replace all existing building water services. The existing domestic and/or fire protection service connections to the surrounding streets shall be cut and capped at the main with the tees and gate valves removed.

New domestic and fire service connections to the main shall be made. Connections to the LRWU main will be reviewed and approved by the LRWU as part of their review process and will be constructed with cement lined ductile iron pipe and either tapping sleeves and valves or tees and gate valves. A flow test will be required to determine if the existing water main in the surrounding streets will have enough water pressure for the building's proposed domestic and fire protection needs. Final sizing, number, and location of building water services will be determined by the Plumbing and Fire Protection Engineers.

Inside the building, the LRWU will require installation of new domestic meter with a Meter Transmitter Unit ("MTU") as part of the BWSC's Automatic Meter Reading ("AMR") system and will require backflow prevention installed on both the domestic and fire protection service connections to meet LRWU standards.

Fire protection services will be coordinated with and approved by the Lowell Fire Department. Proposed building Fire Department Connections will be located within 100 feet of a fire hydrant and will be coordinated with the plumbing engineer and the Lowell Fire Department. Additional fire hydrants will be provided as required by the Lowell Fire Department and/or Fire Protection Engineer.

### Sanitary Sewer:

New building sanitary sewer services will be designed to connect to the existing Lowell Regional Wastewater Utility (LRWWU) sanitary sewer mains in the streets with tee connections and in compliance with LRWWU regulations. Acidic wastes from chemistry labs or other uses such as MEP systems will require neutralization prior to discharge into the main, and any interior floor drains will be directed to this system. It is not anticipated that an exterior sewer pump system will be required for the building, new or renovated. Final sizing, number, and locations of the building sanitary sewer services will be determined by the Plumbing Engineer.

The building, whether new or renovated, will include a cafeteria with a minimum of 100 seats; therefore; the LRWWU will require a grease trap structure for the kitchen

waste service sized to meet the Department of Environmental Protection (DEP) guidelines. Based on the DEP guidelines and 310 CMR 15.000 (Title V), grease trap sizing is calculated at 15 gallons per day (gpd) per seat, yielding a minimum grease trap size for the building of 1,500 gallons.

### Storm Drainage:

The site has a wetland resource (floodplain to the Merrimack Canal) near it and may require the filing of a Notice of Intent (NOI) with the Lowell Conservation Commission and the Massachusetts Department of Environmental Protection.

Soil testing will be required to categorize the onsite soils, identify seasonal high groundwater elevations, and determine infiltration rates. The stormwater management system for the proposed school will be designed to meet the Department of Environmental Protection's (DEP) Stormwater Management Standards to the maximum extent practicable for a developed/redevelopment site.

## CAWLEY SITE

### Water:

An existing Lowell Regional Water Utility (LRWU) 8-inch water main in Douglas Road and 8-inch water main in Village Street will provide water for the new school. A new cement-lined ductile iron water service loop will need to be provided for both fire service water (indoor sprinkler systems and outdoor hydrants) as well as the domestic water service. A flow test will be required to determine if the existing water main in the surrounding streets have enough water pressure for the building's proposed domestic and fire protection needs. Final sizing, number, and location of building water services will be determined by the Plumbing and Fire Protection Engineers. Review and approval with the LRWU will be required.

Inside the building, the LRWU will require installation of new domestic meter with a Meter Transmitter Unit ("MTU") as part of the LRWU Automatic Meter Reading ("AMR") system and will require backflow prevention installed on both the domestic and fire protection service connections to meet LRWU standards.

Fire protection services will be coordinated with and approved by the Lowell Fire Department. Proposed building Fire Department Connections will be located within 100 feet of a fire hydrant and will be coordinated with the plumbing engineer and the Lowell Fire Department. Additional fire hydrants will be provided as required by the Lowell Fire Department and/or Fire Protection Engineer.

### Sanitary Sewer:

New building sanitary sewer services will be designed to connect to the existing Lowell Regional Wastewater Utility (LRWWU) sanitary sewer main in Douglas Street with PVC SDR 35 pipe and tee connections and in compliance with LRWWU

regulations. It is unknown at this time if an exterior sewer pump system will be required for the proposed school. Final sizing, number, and locations of the building sanitary sewer services will be determined by the Plumbing Engineer.

The new building will include a cafeteria with a minimum of 100 seats; therefore; the LRWWU will require a grease trap structure for the kitchen waste service sized to meet the Department of Environmental Protection (DEP) guidelines. Based on the DEP guidelines and 310 CMR 15.000 (Title V), grease trap sizing is calculated at 15 gallons per day (gpd) per seat, yielding a minimum grease trap size for the building of 1,500 gallons.

Acidic wastes from chemistry labs or other uses such as MEP systems will require neutralization prior to discharge into the main, and any interior floor drains will be directed to this system.

### Storm Drainage:

The site has wetland resources (floodplain, wetlands, etc.) located on it and will require the filing of a Notice of Intent (NOI) with the Lowell Conservation Commission, the Massachusetts Department of Environmental Protection, and, depending on the proposed site design, possibly with the Tewksbury Conservation Commission.

Soil testing will be required to categorize the onsite soils, identify seasonal high groundwater elevations, and determine infiltration rates. The stormwater management system for the proposed school will be designed to meet the Department of Environmental Protection's (DEP) Stormwater Management Standards to the maximum extent practicable for a developed/redevelopment site.

See appendix for additional information.

### Phase 1 Geo-environmental:

### Existing HS Site:

A Phase I Environmental Site Assessment (ESA) has been performed per ASTM E1527-13 and MGL Part I, Title II, Chapter 21: Massachusetts Oil and Hazardous Material Release Prevention and Response Act. This report also includes 75 Arcand Drive which is included as part of the "expanded" existing site options. Based on the findings Nobis Engineering recommends that a Phase II subsurface investigation be conducted including collection and analysis of soil samples and a surface geophysical survey (electromagnetic and ground penetrating radar) in the vicinity of the steam plant to determine the presence or absence of a historical underground storage tank.

See appendix for further information.

### Cawley Site:

Preliminary research by Nobis indicates that the Cawley Site appears to have been initially developed as athletic fields prior to 1938, and been used for this purpose since. There are several registered underground storage tanks to the south of the Cawley Site along Rogers Street, and one known release site (Release Tracking Number 3-2076) located within 1,500 feet of the site. Should this site be selected, Nobis recommends that a Phase 1 ESA be done.

## H. Zoning Requirements

### EXISTING HS SITE:

Based on the City of Lowell, Massachusetts Zoning Map, updated May 13, 2014, the existing HS site is located in the Downtown Mixed-Use District (DMU). Parcels located to the east of the Merrimack Canal also have an Artist Overlay District

### Portion of Section 5.1 Table of Dimensional Regulations

No building or structure shall be built nor shall any existing building or structure be enlarged which does not conform to the regulations as to maximum ratio of floor area to lot area, minimum lot sizes, minimum lot area for each dwelling unit or equivalent, minimum lot frontage, minimum setback dimensions of front, side and rear yards, minimum open space, and maximum height of structures, and all other dimensional requirements in the several districts as set forth in the Table of Dimensional Regulations, except as hereinafter provided. [Ord. 11-29-05, 4-18-06, 4-3-07, 9-27-11]

Dimensions (in feet or square feet unless otherwise noted)

| DISTRICT | **DMU** |
|---|---|
| TYPE OF USE | All permitted uses |
| Maximum FAR | 4 |
| Minimum Lot Size | ---- |
| Minimum LA / DU | ---- |
| Minimum Frontage | 25 |
| Front Yard Setbacks: Minimum | ---- |
| Front Yard Setbacks: Maximum | ---- |
| Front Yard Setbacks: Projections | ---- |
| Front Yard Setbacks: Porches | ---- |
| Front Yard Setbacks: Garages | ---- |
| Minimum Side Yard | ---- |
| Minimum Rear Yard | ---- |
| Minimum UOS / DU | ---- |
| Maximum Height | ---- |
| Maximum Stories | ---- |

----Denotes no dimensional requirement.
* Front setbacks in these districts shall be consistent with existing setbacks on the block.
† Side and rear yard setbacks in these districts must be at least 15 feet when abutting a residentially-zoned lot.
** Minimum residential frontage in these districts may be reduced by special permit under the provisions of Section 5.1.1 (7).

### Portion of Section 6.1.4 Table of Parking Requirements

Off-street parking facilities shall be provided as follows. All requirements based on square footage refer to gross floor area unless otherwise noted. The shared parking chart identifies the percentage of the established required parking spaces that must be provided for each time period in shared parking situations.

| | Zone | Min. Parking Req. |
|---|---|---|
| **INSTITUTIONAL, RECREATIONAL & EDUCATIONAL USES** | | |
| c. High School | Where Permitted | 6 spaces per instructional room |

| Shared Parking Chart | | | | | |
|---|---|---|---|---|---|
| Weekdays 8AM-5PM | Weekdays 6PM-12AM | Weekdays 12AM-6AM | Weekends 8AM-5PM | Weekends 6PM-12AM | Weekends 12AM-6AM |
| 100 | 50 | 5 | 10 | 5 | 5 |

**CAWLEY SITE:**

The Cawley site is located in three (3) zoning districts: Two (2) are located in Lowell and one (1) is located in Tewksbury. Based on the City of Lowell, Massachusetts Zoning Map, updated May 13, 2014 the zoning districts in Lowell are the Regional Retail District (RR) and Suburban Neighborhood Single Family District (SSF). The parcel in Tewksbury is based on a Town of Tewksbury Zoning Map dated October 2015 and is located in the Residence 40 (R40) District with a Flood Plain Zoning Overlay that covers a portion of the site.

**CITY OF LOWELL – Portion of Section 5.1 Table of Dimensional Regulations**

No building or structure shall be built nor shall any existing building or structure be enlarged which does not conform to the regulations as to maximum ratio of floor area to lot area, minimum lot sizes, minimum lot area for each dwelling unit or equivalent, minimum lot frontage, minimum setback dimensions of front, side and rear yards, minimum open space, and maximum height of structures, and all other dimensional requirements in the several districts as set forth in the Table of Dimensional Regulations, except as hereinafter provided. [Ord. 11-29-05, 4-18-06, 4-3-07, 9-27-11]

Dimensions (in feet or square feet unless otherwise noted)

| DISTRICT | **SSF** | **RR** |
|---|---|---|
| TYPE OF USE | All permitted uses | All permitted uses |
| Maximum FAR | 0.35 | 2 |
| Minimum Lot Size | 10000 | ---- |
| Minimum LA / DU | 10000 | ---- |
| Minimum Frontage | 90** | 25 |
| Front Yard Setbacks: Minimum | 25 | ---- |
| Front Yard Setbacks: Maximum | ---- | ---- |
| Front Yard Setbacks: Projections | 22 | ---- |
| Front Yard Setbacks: Porches | 17 | ---- |
| Front Yard Setbacks: Garages | 30 | ---- |
| Minimum Side Yard | 10 SUM 25 | 0† |
| Minimum Rear Yard | 25 | 40 |
| Minimum UOS / DU | 750 | ---- |
| Maximum Height | 35 | ---- |
| Maximum Stories | 2.5 | ---- |

----Denotes no dimensional requirement.
* Front setbacks in these districts shall be consistent with existing setbacks on the block.
† Side and rear yard setbacks in these districts must be at least 15 feet when abutting a residentially-zoned lot.
** Minimum residential frontage in these districts may be reduced by special permit under the provisions of Section 5.1.1 (7).

**CITY OF LOWELL – Portion of Section 5.2.3 Construction near Wetlands.**

No new building or structure shall be constructed nor shall any existing building or structure be enlarged within fifty (50) feet of an existing wetland or body of water, except by special

permit, and with the express written approval of the Lowell Conservation Commission, following a public hearing. No septic field shall be constructed or an existing septic field enlarged within seventy-five (75) feet of an existing wetland or body of water. No building permit for construction within one hundred (100) feet of a wetland or within the boundaries of floodplain shall be valid prior to the effective date of a wetlands determination of the applicability and/or the issuance of an order of conditions.
See section 5-120 of the Code of Ordinances of the City of Lowell for the Lowell Wetlands Regulations.

**CITY OF LOWELL – Portion of Section 6.1.4 Table of Parking Requirements**

Off-street parking facilities shall be provided as follows. All requirements based on square footage refer to gross floor area unless otherwise noted. The shared parking chart identifies the percentage of the established required parking spaces that must be provided for each time period in shared parking situations.

| | **Zone** | **Min. Parking Req.** |
|---|---|---|
| **3. INSTITUTIONAL, RECREATIONAL & EDUCATIONAL USES** | | |
| c. High School | Where Permitted | 6 spaces per instructional room |

| Shared Parking Chart | | | | | |
|---|---|---|---|---|---|
| Weekdays 8AM-5PM | Weekdays 6PM-12AM | Weekdays 12AM-6AM | Weekends 8AM-5PM | Weekends 6PM-12AM | Weekends 12AM-6AM |
| 100 | 50 | 5 | 10 | 5 | 5 |

Section B of APPENDIX A, TABLE OF USE REGULATIONS in the Town of Tewksbury Zoning By-Laws dated June 2016 appears to indicate that the "Use of land or structures for educational purposes on land owned or leased by the Commonwealth or any of its agencies, subdivisions or bodies politic or by a religious sect or denomination, or by a nonprofit educational corporation" is an allowed use in the R40 district.

**TOWN OF TEWKSBURY – APPENDIX B Table of Dimensional Regulations**

| DISTRICT | **R40** |
|---|---|
| TYPE OF USE | All permitted uses |
| Minimum Lot Area | 1 acre |
| Minimum Frontage | 150 ft. |
| Minimum Side and Rear Yard | 15 ft |
| Maximum Building Height (stories/ ft) | 2.5/ 35ft |
| Maximum Building Coverage (% of lot) | 15 |

APPENDIX C, TABLE OF PARKING REQUIREMENTS in the Town of Tewksbury Zoning By-Laws dated June 2016

| **Principal Use** | **Required Spaces** |
|---|---|
| Use of land or structures for educational purposes on land owned or leased by the Commonwealth or any of its agencies, subdivisions or bodies politic or by a | One (1) space for each staff position, plus one (1) space for each five (5) persons of rated capacity of the largest auditorium, plus one (1) space for each student vehicle which can be expected at any time on the premises |

| | |
|---|---|
| religious sect or denomination, or by a nonprofit educational corporation | |

# I. Orientation/Location Considerations

Program: A priority throughout the early planning process has been to maintain ideal north-south facing classrooms. This is seen as a critical component to creating high-performance educational spaces that can both improve learning and save energy through the controlled use of daylight.

# J. Preliminary Outdoor Program

LHS uses two City-owned facilities- Shedd Park and in Martin Athletic Complex. These two complexes accommodate the majority of the high school's athletic programs. The Cawley Complex has a brand new track and a synthetic turf football field (10 years old but still in good condition.) Both complexes are maintained by the City and students are bused to them. The Martin Athletic Complex is about two miles from LHS. The crew team uses UMASS Lowell facilities and the hockey team utilizes the Tsonga Center. Gymnastics and swimming is located in the existing school field house. Due to constant use of the multi-use fields at the Martin Athletic Complex the fields do not have time to rest causing less then optimum surface conditions. The athletic department would benefit from an additional full sized multi-use field.

Currently the existing high school does not have green space directly around the school for use by athletics or during gym class. Occasionally gym classes and teams will use the small lawn area outside of the Tsonga center across from the school.

Currently the stretch of greenspace flanking the canal is used for photography and art classes. The majority of this space is part of the Lowell National Historical Park.

**Program Existing Site:** The school would benefit from a lawn area that is within the school campus and can be accessed by foot in less than 5 minutes and able to be used during gym class.

Flexible, multi-purpose outdoor space for students should be considered to include dining, performance space and classroom space as well as a welcoming main entrance plaza. Though space is limited, the current High School Site spans the Lowell National Historical Park specifically the Lucy Larcom Park and is within a few blocks of Boarding House Park and Kerouac Park all of which are rich educational spaces.

Smaller plaza areas and sidewalks surrounding the school should be programmed with benches, adequate lighting, bike racks, trash receptacles and shade trees for both safety and to maximize the use of these streetscape edges.

Site program should include and exterior lawn area or green courtyard within the schools boundary that can be used for gym class and after school athletic programs and ROTC and SPED). It is anticipated that LHS will continue to use Shedd Park and Martin Athletic Complex to meet its athletic program needs.

**Program Cawley Site:** Flexible, multi-purpose outdoor space for students should be considered to include dining, performance space and classroom space as well as a welcoming main entrance plaza. Outdoor space for students should showcase environmental stewardship though stormwater management and highly visible low impact development techniques. A wetland is located within the northeast quadrant of the site and could potentially be used as a sustainable learning area and a part of a larger trail system.

All exterior spaces including large entrance plazas, outdoor classrooms, sidewalks to parking areas and connections to fields should include site amenities such as benches, tables, lighting, bike racks and shade trees.

Currently many of the Lowell High school athletic programs use Martin Athletic Complex. Located on a portion of this site the new high school has the advantage of being directly adjacent to the Martin Athletic Complex including the new track and synthetic football field, Stoklosa Alumni Field (baseball) and Carvalho Field (Soccer and Lacrosse). Locating the school on this site would displace the following fields:

- Martin Softball field,
- Desmond Field (Freshman Football and spring javelin practice)
- Machado Field (JV and varsity football),
- Softball practice field and a
- Field hockey/lacrosse field.

New site program can include (1) new multi-use field and (1) Softball field.

Athletic programs currently using Shedd Park including tennis and JV softball and baseball will continue to use those fields. Crew will continue to use the UMASS Lowell facilities.

## K. Site Specific Narratives

Cawley Site: Currently the existing High School is located within the city center and able to utilize the public bus system. The Cawley site is roughly 2 miles outside of the city center. There are currently bus stops located along Rogers Street and Douglas Road. It is estimated that if the school was located on this site additional dedicated bus service would be required. Currently the site is programmed for between 13-26 buses. This number is under review by the city, transit authority and school and will be refined based on their findings.

The Cawley Site has multiple access points off of Douglas Rd, Village Street, Clark Road and Rogers Street. There is currently a parking lot accessed off of Douglas Road. It is noted that this is a residential street. New school program should include both a bus a parent drop off. New circulation Drives should be accessed off of Village Street and or Clark Road to minimize additional traffic on Douglas.

Ongoing investigations have identified that a portion of the Cawley Site is possibly restricted by an Article 97 agreement between the City and the State. Conclusions pending further investigations.

See appendix for further information.

SKANSKA

**Mary Ann Williams**
Project Executive
**Skanska USA Building Inc.**
253 Summer Street
Boston, MA 02210

February 24, 2017

Ms. Sarah Blache, Project Coordinator
Massachusetts School Building Authority
40 Broad Street, Suite 500
Boston, MA 02109

**Lowell High School – FSA – Preliminary Design Program Submission**

Dear Ms. Blache,

Pursuant to the Module 3 - Feasibility Study requirements and in accordance with Section 8.1.1.2 of the OPM Contract, we have reviewed and coordinated the materials associated with the enclosed Preliminary Design Program Submittal. We certify, to the best of our knowledge, that the information is accurate, complete and in full compliance with the MSBA's Feasibility Study requirements.

The School Building Committee met February 7, 2017 to approve the Preliminary Design Program and made the recommendation to the City Council to authorize Skanska USA, the Owner's Project Manager, to submit the Preliminary Design Program to the Massachusetts School Building Authority on behalf of the School District no later than February 24, 2017.

Following that meeting, the City Council met on February 7, 2017 and after much deliberation, referred the matter to the Finance Subcommittee for further review. The subcommittee met February 16, 2017: Eight members present, also voted to narrow the 10 options presented down to four finalists: the Cawley site and three renovations of the current downtown location and then referred the matter back to the full committee who are scheduled to meet February 28, 2017.

The 3.1.7 Local Actions and Approvals Certificate, certified meeting minutes and financial narrative for the Preliminary Design Program will be available after the February 28, 2017 City Council Meeting and subsequent meeting to approve minutes of that meeting.

The submittal has been attached electronically as requested by the MSBA. We look forward to our next meeting with the MSBA team, in order to review our progress with the program to date.

Please contact us should you have any questions or concerns regarding this submission.

Sincerely,

**Skanska USA Building, Inc.**
Mary Ann Williams
Project Executive