Nelson Place Elementary School
35 Nelson Place, Worcester, MA 01605

MSBA Feasibility Study
Preliminary Design Program (PDP)

MARCH 3, 2014

MSBA
Massachusetts School Building Authority
40 Broad Street, Suite 500, Boston, MA 02111

OWNER
City of Worcester, MA
Architectural Services Division
50 Skyline Drive, Worcester, MA 01605

OPM
Tishman Construction Corporation of Massachusetts
84 State Street, Boston, MA 02108

DESIGNER
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Prepared by:
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SCHOOL BUILDING COMMITTEE VOTE:

At the School Building Committee Meeting on **Monday, February 24, 2014, 7:00pm at Nelson Place School**, committee members will be asked to vote approval of the Nelson Place Elementary School Preliminary Design Program (PDP) for submission to the Massachusetts School Building Authority (MSBA). The following Executive Summary is intended to provide an overview of both the feasibility study process, as well as the PDP. The primary components of the PDP include the educational program and proposed sites which will receive further analysis in the next phase.

Following submission to MSBA, the PDP will be available online for review in its entirety at:

Nelson Place School's homepage ([http://nelsonplace.worcesterschools.org](http://nelsonplace.worcesterschools.org)) in the Quick Links section near the bottom of the page.

INTRODUCTION

Lamoureux Pagano Associates (LPA) was selected by the Massachusetts School Building Authority (MSBA) and the City of Worcester to conduct a feasibility study for the Nelson Place Elementary School. Tishman Construction Corp. was contracted to provide Owner Project Management services.

The following are the target dates for periodic submissions to MSBA for the feasibility study according to their guidelines:

- Preliminary Design Program (PDP): March 3, 2014
- Preferred Schematic Report (PSR): April 17, 2014
- Schematic Design: October 2, 2014
- MSBA Board Meeting to approve Schematic Design: November 2014
- Local Funding Authorization for Project: within 120 days of MSBA approval
Following MSBA and local funding approval, the project will progress through the following schedule landmarks:

- **Contract Documents:** complete by November 2015
- **Bid Period:** December 2015 – January 2016
- **Construction:** February 2016 – September 2017

The Educational Program is included in the Preliminary Design Program (PDP) submission, with the intent to define the programmatic, functional, spatial and environmental requirements required to meet the Worcester Public School’s requirements for a 600 student facility projected for a 50 year life span. The requirements for the PDP focus on a thorough review of the existing building and site conditions, as well as an initial assessment of all potential alternatives including: Base Repair to the existing building; Addition and Renovation to the existing building; New Construction at the existing site; and alternate sites that have potential to meet the educational program. At the conclusion of the PDP, the most promising alternatives are identified for further review in the next phase of the feasibility study, the Preferred Schematic Report (PSR).

During the PSR phase, more detailed analysis of the selected alternatives will be conducted including conceptual site and building plans with associated comparative budgets. At the conclusion of the PSR phase, one solution will be proposed for development in the schematic design phase of the feasibility study. Upon approval of the PDP and PSR by the School Building Committee and the MSBA Board of Directors, the project will proceed into the Schematic Design phase. During Schematic Design the project will be developed to a stage suitable for detailed cost estimates prior to local funding authorization for the balance of the project design and construction.
EDUCATIONAL PROGRAM

To develop the program for the Nelson Place Elementary School, an intensive process was undertaken to garner input from the Nelson Place faculty and staff, Central Administration Academic and Facilities representatives, the design team, representatives of the City of Worcester and utility companies related to energy consumption. The resultant program includes a 110,000 sq. ft. building with supporting site features, a sustainable design plan to achieve LEED Silver status, and a Net Zero energy consumption target.

Currently a neighborhood school supporting a district wide special education program, the Nelson Place Elementary School is intended to support a 600 student Pre-kindergarten through Grade 6 student population. The proposed school is organized into two clusters: Primary for Pre-kindergarten through Grade 2, and Intermediate for Grade 3 – 6 including an integrated special education program within both clusters. Due in large part to the special education requirements, the proposed school at 110,000 sq. ft. is approximately 25% larger than the MSBA guidelines for a 600 student elementary school. See attached diagrams illustrating the proposed organization as well as variances from the MSBA recommended area guidelines.

In addition to the academic wings, the program calls for centralized gymnasium, cafetorium, and a library facility which will be supported by the Worcester Public Library.

The site program includes: 140 visitor and staff parking spaces, recess and recreational areas, and separate bus and parent pick up/drop off areas as a significant safety feature.

As part of the program, a sustainable goal of LEED Silver has been assigned for Nelson Place. Anticipated sustainable features include: low water consumption fixtures, low...
volatile organic compound (voc) material content, energy efficient lighting, heating and
ventilating systems. With this level of sustainable design, the project will be eligible for an
additional 2% reimbursement from MSBA.

In addition to the LEED Silver status, the City of Worcester program calls for a Net Zero
energy consumption target as defined by determining the annual energy consumed at the
facility and providing on-site energy production to offset that level of consumption. A
workshop was held during the PDP to address opportunities and strategies to achieve Net
Zero at Nelson Place. Representatives of the city, the design team, the OPM, and utility
companies were present.

The building and site program, including the Net Zero target, have been used as the basis
of analysis for the feasibility study options under consideration including: Base Repair;
Addition/Renovation; New Construction at the existing site; and New Construction at
alternative sites.
EVALUATION OF EXISTING CONDITIONS

Nelson Place Street Elementary School, as it exists today, was built as an elementary school in three phases; 1926, 1953, and 1967. It is assumed that the school was designed and constructed to meet building code requirements at the time of construction, however under any renovation scheme that would now be considered, the doors, stairs, ramps and systems must be upgraded to meet current building code standards. The school as a whole would also require significant updates to the existing entrances, classrooms, and toilet rooms to in order comply with 521 CMR Architectural Access Board (AAB) Regulations, as well as to provide an accessible entrance to the stage and gymnasium. While the cost of a Base Repair option may not trigger full compliance, the cost of a Renovation/Addition option would certainly exceed 30% of the building value and would be required to fully comply with 521 CMR accessibility regulations for new construction.

The structure and exterior envelope of the 1953 and 1967 buildings are in fair condition, however, exterior brick repointing and re-sealing is required. The existing mechanical and electrical systems are outdated, and the windows, doors, floor and ceiling finishes require complete replacement. Typical of building construction of this era, the walls are wholly uninsulated, and represent a substantial barrier to achieving the Zero Net Energy goal.
The 1926 building requires major remedial work, most critically to address the structural failure of the exterior wall system. In 2005, emergency shoring was installed along the exterior walls to address this issue, but was intended to be temporary in nature. The minimum level of repair would be to brace the entire structure, remove the front and rear facades from the basement window sills (top of foundation) to the underside of the newer masonry parapet, and re-tie all remaining masonry face brick to the clay tile backup. In addition to the structural issues, the 1926 mechanical, electrical and plumbing systems are antiquated, and the windows, finishes and roof require replacement. In summary, the 1926 building would not be a suitable candidate for rehabilitation.

A survey of the existing Nelson Place Site revealed several site program amenities are not accessible and do not meet the current program requirements. The existing parking lot is undersized by approximately 50% and has no dedicated handicap accessible parking. The existing baseball/softball field is situated well above the elevation of the playground, connected by an earthen path that is not universally accessible. Lastly the existing pavement and sidewalks are sloped greater than the allowable 2% and generally require repair of significant cracking and degradation.

With a proposed program of 110,000 sq. ft. to support the current Nelson Place program, the existing facility at 55,400 sq. ft. is clearly undersized. The existing core facilities for the library/media center, cafeteria/assembly and gymnasium, are only about half the size of the recommended area. Additionally, since the building was constructed without special education spaces, the programs have been placed in former administration and storage rooms, as well as isolated, inadequate, basement level accommodations.

The sprawling configuration of the existing school with multiple entrances and floor levels has been problematic for orientation, accessibility and security. The existing site has
limited parking and vehicular circulation resulting in many teachers parking on the street and resulting in severe traffic congestion especially at the beginning and end of the school day.

SITE DEVELOPMENT REQUIREMENTS

The major site program elements include:

- Provide separate bus and parent pick up/drop off vehicular circulation, ideally with 2 separate entry points to the facility:
  - 10 – 12 full size buses queued at a time in addition to five (5) after school program vans at dismissal time
  - 10 half size buses to support special education program (same bus schedule as large buses) preferably at a separate entrance from the large buses to avoid time pressure at pick up and drop off
  - 150-200 parent pick up and drop off vehicles queued on and off site
- Pre-Kindergarten program is half day, therefore requiring a four (4) bus pick up at midday arrival and dismissal of this program.
- Emergency vehicle (fire truck) access full perimeter of the building
- Parking:
  - 100 staff cars
  - 20 itinerant staff parking spaces
  - 20 visitor cars
  - 200 additional for event parking
- 2 fenced, separate, age appropriate play areas. These should be positioned for community use after hours.
- Athletic fields: flat, multi-purpose athletic fields most desirable as space permits (full size soccer field and baseball field for Little League use are desirable).
Due to the high proportion of special education students, it is both practical and desirable to have no more than two stories above grade access for the building plan.

Worcester Public Schools expressed their concern that the student population remain in its entirety at the existing facility during construction. The special education students would require significant time and effort transitioning to a temporary facility, and would suffer academically and socially adjusting to an unfamiliar routine and surroundings. This disruption would certainly be felt throughout the student population. It is therefore important that the entire school remain in operation at the existing school, in order to maintain a successful educational experience, until the approval and subsequent completion of a new facility.

PRELIMINARY EVALUATION OF ALTERNATIVES

A. Summary

LPA collaborated with Worcester Public Schools (WPS), the City of Worcester Department of Public Works and Parks (DPW+P), local officials, the Nelson Place School Building Committee (SBC), and LPA’s consulting engineers to consider multiple alternatives that would fulfill the Educational Program requirements and provide for the spaces identified in the MSBA Space Summary Template. Potential alternatives included the following:

- Analysis of School District’s Student Assignment Practices
- Tuition Agreement with Adjacent School Districts
- Rental or Acquisition of Existing Buildings
- Base Repair Option
- Renovation/Addition Option-
- New Construction on the Existing Site Option
In depth analysis can be referenced in Section 3.1.6 of the PDP, however, a summary of the options are as follows:

1. Analysis of School District’s Student Assignment Practices:
   The current school facilities are over capacity and there is no additional space to house the Nelson Place student population.

2. Tuition Agreement with Adjacent School Districts:
   The City of Worcester has no tuition agreements with other districts.

3. Rental or Acquisition of Existing Buildings:
   No suitable facilities for a Nelson Place replacement school are available in the target neighborhood or quadrant.

B. Base Repair of the Existing Nelson Place School Option

For purposes of this Feasibility Study, the Base Repair Option was defined as a “No-Build” solution that would maintain the status quo; it would not provide any additional square footage to the existing school. The Base Repair Option addresses the existing code violations and the repair/replacement of existing building systems that have exceeded their life expectancy or are failing, and either repairs to the failing 1926 building facade, or replacement of that building. This option unfortunately does not address the overcrowding of the existing facility, and existing spaces that are significantly smaller than MSBA guidelines. Additionally, the Base Repair Option does not support the District’s Team teaching methods, and does not support integrated learning environments for the extensive Special Education program the Nelson Place facility is currently struggling to support. The site constriction issues, lack of parking, bus and parent drop off areas would only be partially addressed. Lastly, the outdated mechanical, electrical and plumbing
systems, and uninsulated exterior envelope of the existing buildings represent a significant hurdle to achieving the efficiency required to achieve the Zero Net Energy goal established by the City of Worcester.

In addition to the physical shortfalls of the Base Repair Option, phased construction of this option would prove difficult given that the school district has no available swing space, and that it has been determined to be in the best interest of the student population to remain at the existing facility. In particular, the school administrators have noted that the significant special education population at Nelson Place experiences great difficulty with change in the educational environment and many are sensitive to noise and distractions. Temporary “swing space”, in the form of non-reimbursable modular classrooms located adjacent to the existing building, would be required to replace educational space undergoing renovation. The existing bus and parent pick-up and drop-off areas, already congested and problematic, would be aggravated by the introduction of construction personnel, equipment and materials. For the Base Repair Option and each of the options located on the existing site, offsite improvements would be warranted, including widening of Nelson Place or turnaround development at the end of Nelson Place.

C. Renovation and Additions Option

The Renovation and Additions Option scope of work includes a complete renovation of the existing school, along with construction of additions, to provide a solution that meets the Educational Program requirements to the maximum extent possible. This option includes the demolition of the 1926 building, due to the age and deteriorated structure and systems, as outlined in this report, and assumes that the existing school would be occupied during phased construction, and supported by non-reimbursable modular classrooms.
Demolition of 1926 classroom building & 1967 Gymnasium = 26,000 sq. ft.

Renovation of the 1953 and 1967 classroom buildings = 29,200 sq. ft.

Construction of New Additions = 80,800 sq. ft.

A three (3) storey plus basement addition would be required and could be located at the site of the 1926 classroom building, and extend to the southeast; this could house the mechanical systems for the complex.

Similar to the Base Repair Option, this option does not fully address the insufficient size and configuration of the existing spaces in the remaining buildings, and cannot fully resolve the inefficiency of the existing building envelope. This Renovation and Additions Option would result in similar complications during construction, in that Worcester Public schools has no available swing space, and the school must remain occupied throughout demolition and construction. Impact to students, staff and faculty would be significant.

D. New Construction on Existing Site Option

The New Construction on Existing Site Option is based on a new building located to the south of the existing Nelson Place School, and assumes construction while maintaining occupancy in the existing building. While there would be temporary construction impact with this option, the end result would be a solution that meets most of the Educational Program requirements. However, based on the limited site area due to setbacks required at the east and west wetlands, LPA feels there will be some site program items that need to be reevaluated or reduced in scope.

- New Construction = 110,000 SF
- Demolition of the existing building = 55,400 SF
Given the limited footprint and elevation changes of the existing site, the New Construction on Existing Site Option may require three stories for some portions of the building, which is not preferable for the building program. The site development would be phased to accommodate occupancy of the existing school. Play areas would be relocated to the north side or front of the school and fenced. Secondary access to the construction site would ideally be developed as separate from the existing school functions as possible and could be later utilized as emergency access. LPA envisions that traffic and parking availability will be a key challenge during construction of this Option. Detailed construction documents and careful planning will be required to minimize potential impact. LPA evaluated this option using the City of Worcester’s Priority Criteria, and General Site Evaluation Criteria as listed below.

E. New Construction on Existing Site with Additional Land Option

With the addition of adjacent land, currently owned by Assumption College, to the south of the existing Nelson Place site, this alternative appears to present a strong opportunity to meet all of the program requirements. Issues that would need further review include: the wetlands restrictions, impact on the neighborhood during construction, ability to separate the existing school functions from construction activity with minimum disruption to the curriculum. LPA evaluated this option using the City of Worcester’s Priority Criteria, and General Site Evaluation Criteria as listed below.

F. New Construction on Alternate Site Options

The New Construction on Alternate Sites Option is based on a new building which would be located on one of two sites within the Doherty Quadrant, as selected by the City of Worcester. Both sites have been evaluated on their impact on existing occupants, if any, and whether or not the Educational Program requirements have been satisfied. LPA
evaluated each of these sites using the City of Worcester’s Priority Criteria, and General Site Evaluation Criteria as listed below.

<table>
<thead>
<tr>
<th>City of Worcester Priority Criteria</th>
<th>Site Evaluation Criteria</th>
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<tbody>
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<td>- Property Location and Configuration</td>
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<td>- Topography, Slopes and Orientation</td>
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<td>- Access Potential/Traffic: Both Pedestrian and Vehicular</td>
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<td>- Neighborhood Adjacency</td>
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<td>- Orientation, Net Zero Opportunities</td>
<td>- Soils and Geologic Factors</td>
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<tr>
<td>- Project Phasing/ Construction Impacts / Safety</td>
<td>- Utility System Availability</td>
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<tr>
<td>- Acquisition Cost/Site development Cost</td>
<td>- Community Use</td>
</tr>
<tr>
<td>- Expansion Potential</td>
<td>- Community Use</td>
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Refer to section 3.1.6 E of the PDP for detailed description and full analysis of each site evaluated based on the criteria listed above. Abbreviated conclusions and recommendations are outlined below:

1. **New Construction at the Salter School Site**

The site evaluated includes the two (2) acre site and existing school with use of the adjacent park land. Restricted from development under Article 97, the adjacent recreational area cannot be developed for building, parking, or vehicular circulation features. The two acre school site would be developed as a multi-story facility with lower level parking and limited site area for vehicular circulation. It is expected that a solution at this location would result in bus and parent vehicle pick up and drop off along the adjacent streets, potentially creating traffic and safety issues. Due to these limitations, the
Salter School site has been deemed a poor candidate for further feasibility study consideration.

2. New Construction at the Forest Grove & McGrath School Site

Development at the existing Forest Grove Middle School and McGrath Elementary School site would result in a campus plan which would include the 800+ student populations of the existing schools in addition to the 600 students attending a new Nelson Place replacement school. The challenge would be to develop appropriate vehicular circulation on a site that is reportedly extremely congested now. While secondary access routes could be developed to the site, wetlands and topography changes present development limitations. It is anticipated that new construction would displace existing significant portion of the recreational fields on the current site. Acquisition of neighboring land would be beneficial to expand site development opportunities.

The Forest Grove and McGrath site has limited potential to meet many of the Nelson Place program requirements, particularly related to the site. Coupled with the undesirable result of a tight campus plan featuring one new elementary school and one older, this site did not rank highly for further feasibility study consideration.

G. Recommended Alternatives for Further Development and Evaluation

Following the analysis of all of the considered alternatives, the following three are recommended for further development in the Preferred Schematic Report phase of the Feasibility Study:

- Addition and Renovation to the Existing Nelson Place Elementary School
- New Construction at the Existing Nelson Place Elementary School Site
- New Construction at the Existing Nelson Place Elementary School Site with Additional Land
<table>
<thead>
<tr>
<th>Room Type</th>
<th>Existing</th>
<th>Proposed</th>
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<td>Health &amp; Physical Education</td>
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<td>Media Center</td>
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<td>Dining &amp; Food Service</td>
<td>2,590sf</td>
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<td>Building Gross Floor Area</td>
<td>55,398sf</td>
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</table>
Proposed Conditions Diagram - Site

3.1.2 EDUCATIONAL PROGRAM

D. Supporting Documents

Worcester Public Schools
Worcester, MA
3.1.1 INTRODUCTION

A. Narrative Summary
B. Project Directory
C. Updated Project Schedule
3.1.1 INTRODUCTION

A. Narrative Summary
In November of 2013 Lamoureux Pagano Associates (LPA) was selected by the Massachusetts School Building Authority (MSBA) in conjunction with the City of Worcester to conduct a Feasibility Study through schematic design for the Nelson Place Elementary School.

The Preliminary Design Program (PDP) portion of the study is included in their submission and will be followed, subject to MSBA review and approval, by the Preferred Schematic Report (PSR) to conclude the Feasibility Study phase. Upon approval of the Feasibility Study by the MSBA Board of Directors, the project will proceed into the Schematic Design phase.

Designed as a neighborhood elementary school, the Nelson Place School is located in the Doherty Quadrant of the Worcester Public School District. This elementary school serves the surrounding neighborhoods for grades K-6, as well as a district wide special education program, with a current enrollment of 502 students and an agreed upon enrollment of 600 students. The currently undersized site access road, Nelson Place, is a dead end street, and does not safely and efficiently serve school and neighborhood traffic, and emergency vehicles. The site itself is divided by a steep slope limiting playground space and parking. The school facility is comprised of an original two story brick structure dating from 1927; an addition from 1952 consisting of a two story brick classroom building with a one story cafeteria and administration building; as well as a brick gymnasium from 1968 for a total of 55,398 gross square feet. The brick façade of the original school building structurally failed and temporary shoring has been installed. These deficiencies are described as well in the Statement of Interest which has been included in the Appendix.

Copies of the MSBA’s invitation to the town to participate in a Feasibility Study process as well as the 600 student enrollment agreement are also included in the Appendix.

A narrative summary of the City of Worcester’s Capital Budget Statement follows, with detailed reports attached including the Fiscal Year 2014 Capital Improvement Plan and the Five Point Financial Plan.

As of November 1, 2013, the date of the City’s last bond offering, The City of Worcester had $649M in total long term debt obligations which includes $184M in self-supported debt netting out to $465.4M in net direct debt. Included in the net direct debt is $155M of Pension Obligation Bonds, replacement debt, issued to fund the Worcester Retirement system.
The net direct debt equates to approximately 4% of the 2013/14 equalized valuation of the City. Approximately 71% of the aforementioned principal debt shall be retired over the next 10 years. Additionally, the City maintains in excess of $10.4M in unused levy capacity.

With regards to future debt offerings, the City is governed by its 5 year plan (5Pt Plan) which dictates the amount of annual debt issued, factored for inflation. Within the confines of this plan the City has allocated sufficient capacity to undertake school building renovations and replacements in conjunction with the Massachusetts School Building Authority (MSBA).

The Owner, City of Worcester, and Owner’s Project Manager (OPM), Tishman Construction, have established a project budget estimate of $55,000,000.

The following PDP report is organized in accordance with the MSBA Module 3 – Feasibility Study Guidelines (dated June 2010; updated November 2011). Through the evaluation of the program objectives, development alternatives, and zoning and code reviews, we have confidence that a solution will be established to meet the objectives of the Building Committee and the MSBA. In particular, the existing site with additional land has been deemed a strong candidate for new construction. See attached recommendations in Section 3.1.6 F with proposed alternatives for further detailed study during the Preferred Schematic Report phase.

An updated Project Schedule, prepared by the OPM, projecting beyond the schematic design phase through construction is included and outlines significant milestones for the proposed project.
3.1.1 INTRODUCTION

C. Updated Project Schedule
<table>
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<th>End Date</th>
<th>Duration</th>
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<td>4/30/14</td>
<td>5 days</td>
</tr>
</tbody>
</table>

**Project Schedule Draft**

**Nelson Place School**

**City of Worcester**

*Updated: Feb 14, 2014*
3.1.2 EDUCATIONAL PROGRAM

A. Narrative
B. Teaching Philosophy Statement
C. Sustainable Design Program
D. Supporting Documents
3.1.2 EDUCATIONAL PROGRAM

A. Narrative
To develop the program for the Nelson Place Elementary School, an intensive process was undertaken to garner input from the Nelson Place faculty and staff, Central Administration School and Facilities representatives, the design team, and representatives of City of Worcester and utility companies related to energy consumption. The resultant program includes a 110,000 sf building and supporting site features, a LEED Silver sustainable design, and a Net Zero energy consumption target. Program meeting minutes are included in section 3.1.2.D. Supporting Documents and the sustainable design program is detailed in section 3.1.2.C. Sustainable Design.

Currently a neighborhood school plus a district wide special education facility, the program for the Nelson Place Elementary School is intended to support a 600 student Pre-kindergarten through Grade 6 student population. The general organization of the school includes two grade level clusters: Primary for pre-kindergarten through Grade 2, and Intermediate for Grade 3 – 6 with a significant special education facility program distributed throughout. In large part due to the special education requirements, the proposed school at 110,000 sf is approximately 25% larger than the MSBA guidelines for a 600 student elementary school. See attached diagrams illustrating the proposed organization as well as the variances from the MSBA recommended area.

In addition to the academic wings, the program calls for centralized gymnasium, cafetorium, and library facilities to support the current integration of Worcester Public Library facilities at public schools.

The site program includes: 140 visitor and staff parking spaces, recess and recreational areas, and separate bus and parent pick up/drop off as a significant safety feature and is described in more detail in Section 3.1.5.A.

As part of the program, a sustainable goal of LEED Silver has been assigned for Nelson Place. Anticipated sustainable features include: low water consumption fixtures, low voc material content, energy efficient lighting and heating and ventilating systems. With this level of sustainable design, the project will be eligible for an additional 2% reimbursement from MSBA for the project.

In addition to the LEED Silver status, the City of Worcester program calls for a Net Zero target as defined by determining the annual energy consumed at the facility and providing on-site sources to produce that energy level. A charrette workshop was held during the PDP to address opportunities for Net Zero at Nelson Place. Representatives of the city, the design team, the OPM, and utility companies were present.
The building and site program, including the Net Zero target, have been used as the basis for the analysis of the Base Repair, Addition/Renovation, New Construction, and sites under consideration for the Nelson Place feasibility study.
3.1.2 EDUCATIONAL PROGRAM

B. Teaching Philosophy Statement
The following Teaching Philosophy Statement describes the District’s vision for the Nelson Place Elementary School. This document was used as the basis for the Space Summary Template and articulation of the programmatic goals for the project.
Worcester Public Schools is engaged in a feasibility study for Nelson Place Elementary School which currently supports 504 general and special education students in preschool through grade six and is seeking to serve 600 students through a renovation/addition or new facility. This document describes the educational program for Nelson Place School designed to meet the requirements of the Department of Elementary and Secondary Education (DESE).

Worcester Public Schools serve a diverse special education student population, as well as English as Second Language learners at each grade level. In addition, Nelson Place School is host to one of two elementary level, district wide Specialized Approaches to Individualized Learning (SAIL) programs designed to educate students who have been identified as having Autism Spectrum Disorders (ASD), a developmental disorder with on average a 10% district wide growth in student diagnosis each year since 2010, and with over half of the special education student body at Nelson Place diagnosed with this disability (see Appendix A). This fiscal year, 2013-2014, Nelson Place has seen an increase in our SAIL program enrollment which has resulted in the need to add a fourth classroom.

The class size policy of the Worcester Public Schools allows for up to 27 students per general classroom; see Class Size Policy for Worcester Public Schools on page 3. The attached Nelson Place School Space Summary Template is predicated on 25 students per general classroom, 15 students per prekindergarten classroom, and the balance of the 600 student body in substantially separate special education classrooms.

To support the unique needs of students in the primary grades (prekindergarten-2) and students in the intermediate grades (3-6) the proposed school will be divided into two academic clusters, referred to as the primary cluster and the intermediate cluster. This configuration allows for students to be with their peers and for teachers to partake in team
teaching, collaborative planning, and resource sharing, as well as for the exchange of learning experiences among age appropriate classes and students.

The Nelson Place Elementary School and its additions were built prior to the implementation of laws and regulations requiring the education of students with learning and physical disabilities to take place in the least restrictive and most inclusive environment. The following educational program requires additional and often specialized instructional, testing and support spaces, with careful consideration given to adjacencies, technology and transportation.
Class Size Policy for Worcester Public Schools

The Superintendent uses a Zero-Based Budget approach to develop the recommended budget that is submitted to the School Committee for consideration. The Superintendent’s budget process allows for all building principals to be fully engaged in the budget process to work toward the development of a more collaborative approach, that tightly allocates resources to align with district goals with each school’s needs.

A Zero-Based budget approach is very much a so-called “bottom-up” process that requires each building principal to be actively engaged in the budget process. For each budget cycle, all programs start at a base of zero and are funded based on enrollment and program needs and justification. The staffing levels for next year are based solely on the future (enrollment and programs) and do not build upon staffing that already exists at the school. It allows a budget to be built on agreed upon district goals rather than history of resource allocation.

The following are the parameters that schools should use to develop a Zero-Based Budget for your school for next year:

ELEMENTARY SCHOOL CLASSROOM TEACHER ALLOCATION PARAMETERS

The following table provides the parameters of elementary teachers provided based on grade level enrollment:

<table>
<thead>
<tr>
<th>Enrollment (per grade)</th>
<th>Number of Teachers</th>
<th>Average Enrollment Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 27</td>
<td>1</td>
<td>Up to 27</td>
</tr>
<tr>
<td>28-50</td>
<td>2</td>
<td>14-25</td>
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<tr>
<td>51-75</td>
<td>3</td>
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<tr>
<td>76-100</td>
<td>4</td>
<td>19-25</td>
</tr>
<tr>
<td>Greater than 100</td>
<td>5 or as appropriate</td>
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</table>
School Scheduling
The schedule for Nelson Place is designed with student outcomes as the forefront. Each grade level participates in three 40 minute specials within a week; these include art, music, and physical education. The schedule is design to allow common planning time for teachers at each grade level. These common planning times are used for curriculum development, lesson planning and data review.

Spatial and Facility Deficiencies Impacting Educational Programming
The 2011 MSBA Statement of Interest identified some of the facility deficiencies detracting from the educational goals of the Nelson Place School. The following describes the existing facility’s limitations and their subsequent effects on the educational program. Additionally, program and facility requirements are proposed here and in the following Educational Program.

Spatial limitations include:

- The current building is designed for 21 classrooms. To support the current student population this shortfall of space has lead to four classes held in the basement and one class in a former teachers’ room.
- The basement of the building is used as classroom space for one general education grade four classroom and three special education (SAIL) classes. The partial inclusion kindergarten and the partial inclusion grade 1 and grade 2 SAIL classrooms share a single classroom space in the basement.
  - Given the remote basement location of the preschool and SAIL classrooms the DESE requirement for ASD students to be integrated in close proximity to grade level peers is not being met.
  - Additionally, inappropriate adjacencies cause higher functioning ASD SAIL students transitioning to their grade level general education classrooms to walk from one end of the building to the other, missing out on valuable learning time.
- Lack of sufficient space to provide alternative programming for students with special education needs such as language-based disabilities, behavioral disabilities, etc. resulting in more expensive out of district placements in specialized schools.
- Lack of adequate and integrated space to provide for the growing number of students with severe special needs, typically on the autism spectrum, who are entering our preschool program.
- Lack of adequate space to evaluate pre-kindergarten student placement in special education programs; see the following description of the proposed Early Childhood Assessment Center.
- Lack of sufficient learning and office space for teachers of special subjects and itinerant staff, including councilors and school psychologist.
- Due to the projected growth in Kindergarten aged students, the proposed Educational Program includes three full day general kindergarten classrooms and one special education kindergarten classroom; each classroom equipped with bathroom facilities.
- Location of preschool classroom is currently not in proximity to kindergarten classrooms and/or grade level peers.
- Necessity for half day preschool classrooms to be located near an exit for midday pick up and drop off, as well as close proximity to bathrooms due to the Activities of Daily Living (ADL) needs of autism students.
- Appropriate spaces are not currently provided for specific testing or teaching accommodations required for some Individualized Educational Plans and teams to provide extended learning time to special education students.
- Parents and staff currently do not have opportunities to observe discrete trial programs and/or behavioral interventions with ASD students, which are an integral part of instruction and learning for ASD children. These observation rooms allow opportunities for parents, school based staff, behavioral specialist and evaluators to observe ASD students in their natural learning environment unobtrusively and inform more effective interactions, instruction and learning methods for students. The need to build an observation area adjacent to the preschool classrooms and to each substantially separate SAIL classrooms is critical and will allow the opportunity for demonstration and modeling of effective strategies to increase effective teaching and learning.
- Space limitations do not allow for art or music to take place in a designated space. These enrichment courses are currently served from basement storage closets and move from classroom to classroom; see the following detailed program description under Visual Arts Curriculum and Classroom Design and Music Curriculum and Space.

Facility deficiencies include:

- Structural failure in the original 1927 building has caused floor sagging and a danger of masonry failure at the exterior façade. Fencing and covered egress
protects the occupants moving in and out of the building. Interior shoring has temporarily provided support of ceilings and floors at the interior of each classroom in this building. Continual inspection by the Engineer of Record for movement in this shoring is necessary to ensure the safety of the occupants.

- Windows in the 1927 building do not open properly due to movement in the exterior wall caused by the structural failure, thus limiting control of ventilation in these classrooms.
- The general education and special education classrooms located in the basements have poor ventilation, inadequate lighting, and two of the classrooms are not equipped with wireless or hardwired internet access, all limiting learning.
- Current acoustics are inadequate to serve ASD students who have difficulty filtering environmental sounds in both general and specialized classroom environments. The proposed building should be acoustically designed to filter background noises. The support of a sound field system will insure high acuity of sound sensitivities throughout the building.
- During the month of July and August, extended school year services are required and mandated by *Individuals with Disabilities Education Act (IDEA Regulations)* for individualized students with disabilities to prevent regression of academic, behavioral and social skills. These requirements are not adequately met due to lack of air conditioning.
- Lack of sufficient technology infrastructure in classrooms to provide online learning.
- Lack of adequate infrastructure to support the science and engineering program including sinks, storage and furniture; see *Science and Technology Engineering Curriculum*.
- Lack of adequate space in the media center to support multiple and varied groups at one time; see the following *Library Media Center* program detailing proposed space.
- Lack of classroom telephone/communication network to contact the administration or others in and out of the building for routine and emergency communication.
- The school is currently not accessible to support physically disabled students.
Educational Program

The educational program at the Nelson Place School follows the Massachusetts Curriculum Frameworks and Individuals with Disabilities Education Act (IDEA Regulations) to provide:

- English language
- Mathematics
- Science and Technology/Engineering
- History and Social Science
- Library Media Center
- Music and Drama
- Visual Arts
- Physical Education
- Occupational and Physical therapy
- Response to Intervention Model for Math and Reading
- Speech and Language therapy
- Special Education

English Language Arts Curriculum

Preschool - Kindergarten

The PreK curriculum includes an emphasis on speaking and listening skills in order to establish social skills and to encourage children to ask and answer questions about literary and informational texts. Students will learn how text is organized and the basic features of print. Emphasis will also be placed on rhyming words, initial sounds and linking initial sounds to a picture of an object. Students will learn to recognize their own name and familiar environmental print.

Kindergarten

Kindergarten students will recognize certain types of texts and actively engage in group reading activities. They will demonstrate an understanding of the organization and basic features of print, spoken words, syllables and sounds (phonemes) and apply grade-level phonics and word analysis skills in decoding words. They will recognize and produce rhyming words and segment syllables in spoken words. Kindergartners will be expected to read emergent-reader texts with purpose and understanding and use a combination of
drawing, dictating and writing to compose opinion, informative and narrative writing. They will be beginning to learn basic conventions of writing.

**First Grade**
First grade students will be able to key details of stories and other texts, describe characters, settings and major event/details. They will identify words and phrases in stories or poems that suggest feelings or appeal to the senses and who is telling a story. They will be able to compare and contrast the experiences of characters in text. They will recognize the distinguishing features of a sentence, distinguish long from short vowel sounds in spoken words and orally produce single-syllable words by blending sounds, including consonant blends. They will be able to decode regularly spelled one-syllable words and decode two-syllable words following basic patterns by breaking the words in syllables. They will read grade-level texts with purpose and understanding. They will write opinion, informative and narrative pieces introducing purpose and providing facts or details and a sense of closure.

**Second Grade**
Second grade students will recount stories including fables and folktales from diverse cultures and determine their central message, lesson or moral. They will describe how characters in a story respond to major events and challenges and the overall structure of a piece of literature. They will acknowledge differences in the points of view and use information gained from the illustrations and words in a print or digital text to demonstrate understanding of characters, setting and major events. Students will determine the meaning of words and phrases in a text relevant to a grade 2 topic or subjects area and describe how reasons support specific points the author makes in a text. They will decode words with common prefixes and suffixes and identify words with inconsistent but common spelling-sound correspondences. They will use context to confirm or self-correct words recognition and understanding. They will write in all three genres: opinion, informative and narrative but use appropriate linking words and supply supporting reasons, facts and descriptive detail to support the purpose. They will learn conventions of language in the areas of collective nouns, reflexive pronouns, verb tense, adjectives and adverbs. Second graders will demonstrate an understanding of word relationships and nuances in word meanings.

**Third Grade**
Third graders will add knowledge of myths from diverse culture to their learning, explaining how the central message is conveyed through key details in the myths. They
will determine how words and phrases can have literal and nonliteral meanings. Students will refer to parts of stories, dramas and poems when writing or speaking about a text, using terms such as chapter, scene, and stanza. They will discuss how their own point of view may differ from that of the narrator or a character. They will describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. Third graders will decode multisyllabic words and decode words with common Latin suffixes. Students will write in all three genre: opinion, informative and narrative and participate in shared research and writing projects.

**Fourth Grade**

Fourth grade students will refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. They will learn to compare and contrast a firsthand and secondhand account of the same event or topic and describe the differences in focus and the information provided. Students will learn how to interpret information presented visually, orally or quantitatively and explain how the information contributes to an understanding of the text. They will integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. Students will use their combined knowledge of all letter-sound correspondences, syllabication patterns and morphology to read accurately unfamiliar multisyllabic words in context. Writing in all three genres will increase in in sophistication in terms of the reasons, information and details provided to achieve the author’s purpose. In addition, students will learn to develop and strengthen writing as needed by planning, revising and editing.

**Fifth Grade**

Fifth Grade students will quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. They will learn to compare and contrast two or more characters, individuals, settings or events in a story, drama, historical, scientific or technical text, drawing on specific details and information in the text and explain how the narrator’s or speaker’s point of view influences how events are described. They will analyze how visual and multimedia elements contribute to the meaning, tone or beauty of a text. They will compare and contrast stories in the same genre on their approaches to similar themes and topics or the overall structure in informational text. Students will continue to write in all three genres, increasing in sophistication of topic development, planning and revising. Students will demonstrate a command of the function of conjunctions and prepositions, use verb tenses to convey various times, sequences,
Sixth Grade
Students in sixth grade will cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text. They will describe how a particular story’s or drama’s plot unfolds in a series of episodes as well as how the characters respond or change as the plot moves toward a resolution. They will analyze the impact of a specific word choice on meaning or tone and analyze how a particular sentence, chapter, scene or stanza fits into the overall structure of a text and contributes to the development of the theme, setting or plot.

They will learn to trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evince from claims that are not. Students will write arguments to that support a claim with clear reasons and relevant evidence, using credible sources. They will write informative texts using organizational strategies and formatting to develop a topic. In addition, students will write narratives that engage and orient the reader by establishing a context and introducing a narrator and/or characters. They will use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others. They will conduct short research projects to answer a question, drawing on several sources.

Mathematics Curriculum
Worcester Public Schools’ mathematics curriculum is a standards-based curriculum that uses multiple resources to support student mastery of the standards outlined in the MA Curriculum Framework for Mathematics and Literacy in History/Social Studies, Science and Technical Subjects, Incorporating the Common Core State Standards.

The following sections describe the critical areas for learning at each elementary grade level. The Standards for Mathematical Practice complement the content standards so that students increasingly engage with the subject matter as they grow in mathematical maturity and expertise throughout the elementary, middle, and high school years.

Pre-Kindergarten
In preschool or pre-kindergarten, activity time should focus on two critical areas: (1) developing an understanding of whole numbers to 10, including concepts of one-to-one correspondence, counting, cardinality (the number of items in a set), and comparison; and
(2) recognizing two-dimensional shapes, describing spatial relationships, and sorting and classifying objects by one or more attributes. Relatively more learning time should be devoted to developing children’s sense of number as quantity than to other mathematics topics.

(1) Young children begin counting and quantifying numbers up to 10. They begin with oral counting and recognition of numerals and word names for numbers. Experience with counting naturally leads to quantification. Children count objects and learn that the sizes, shapes, positions, or purposes of objects do not affect the total number of objects in the group.

One-to-one correspondence matches each element of one set to an element of another set, providing a foundation for the comparison of groups and the development of comparative language such as more than, less than, and equal to.

(2) Young children explore shapes and the relationships among them. They identify the attributes of different shapes, including length, area, and weight, by using vocabulary such as long, short, tall, heavy, light, big, small, wide, narrow. They compare objects using comparative language such as longer/shorter, same length, heavier/lighter.

They explore and create 2- and 3-dimensional shapes by using various manipulative and play materials such as popsicle sticks, blocks, pipe cleaners, and pattern blocks. They sort, categorize, and classify objects and identify basic 2-dimensional shapes using the appropriate language.

**Kindergarten**

In kindergarten, instructional time should focus on two critical areas: (1) representing, relating, and operating on whole numbers, initially with sets of objects; and (2) describing shapes and space. More learning time in kindergarten should be devoted to number than to other topics.

(1) Students use numbers, including written numerals, to represent quantities and to solve quantitative problems, such as counting objects in a set; counting out a given number of objects; comparing sets or numerals; and modeling simple joining and separating situations with sets of objects, or eventually with equations such as $5 + 2 = 7$ and $7 - 2 = 5$.

(Kindergarten students should see addition and subtraction equations, and student writing of equations in kindergarten is encouraged, but it is not required.)

Students choose, combine, and apply effective strategies for answering quantitative questions, including quickly recognizing the cardinalities of small sets of objects, counting and producing sets of given sizes, counting the number of objects in combined sets, or counting the number of objects that remain in a set after some are taken away.
(2) Students describe their physical world using geometric ideas (e.g., shape, orientation, spatial relations) and vocabulary. They identify, name, and describe basic two-dimensional shapes, such as squares, triangles, circles, rectangles, and hexagons, presented in a variety of ways (e.g., with different sizes and orientations), as well as three-dimensional shapes such as cubes, cones, cylinders, and spheres. They use basic shapes and spatial reasoning to model objects in their environment and to construct more complex shapes.

**Grade 1**

In grade 1, instructional time should focus on four critical areas: (1) developing understanding of addition, subtraction, and strategies for addition and subtraction within 20; (2) developing understanding of whole number relationships and place value, including grouping in tens and ones; (3) developing understanding of linear measurement and measuring lengths as iterating length units; and (4) reasoning about attributes of, and composing and decomposing geometric shapes.

(1) Students develop strategies for adding and subtracting whole numbers based on their prior work with small numbers. They use a variety of models, including discrete objects and length-based models (e.g., cubes connected to form lengths), to model add-to, take-from, put-together, take-apart, and compare situations to develop meaning for the operations of addition and subtraction, and to develop strategies to solve arithmetic problems with these operations. Students understand connections between counting and addition and subtraction (e.g., adding two is the same as counting on two). They use properties of addition to add whole numbers and to create and use increasingly sophisticated strategies based on these properties (e.g., “making tens”) to solve addition and subtraction problems within 20. By comparing a variety of solution strategies, children build their understanding of the relationship between addition and subtraction.

(2) Students develop, discuss, and use efficient, accurate, and generalizable methods to add within 100 and subtract multiples of 10. They compare whole numbers (at least to 100) to develop understanding of and solve problems involving their relative sizes. They think of whole numbers between 10 and 100 in terms of tens and ones (especially recognizing the numbers 11 to 19 as composed of a ten and some ones). Through activities that build number sense, they understand the order of the counting numbers and their relative magnitudes.

(3) Students develop an understanding of the meaning and processes of measurement, including underlying concepts such as iterating (the mental activity of building up the length of an object with equal-sized units) and the transitivity principle for indirect measurement.
(4) Students compose and decompose plane or solid figures (e.g., put two triangles together to make a quadrilateral) and build understanding of part-whole relationships as well as the properties of the original and composite shapes. As they combine shapes, they recognize them from different perspectives and orientations, describe their geometric attributes, and determine how they are alike and different, to develop the background for measurement and for initial understandings of properties such as congruence and symmetry.

Grade 2
In grade 2, instructional time should focus on four critical areas: (1) extending understanding of base-ten notation; (2) building fluency with addition and subtraction; (3) using standard units of measure; and (4) describing and analyzing shapes.

(1) Students extend their understanding of the base-ten system. This includes ideas of counting in fives, tens, and multiples of hundreds, tens, and ones, as well as number relationships involving these units, including comparing. Students understand multi-digit numbers (up to 1000) written in base-ten notation, recognizing that the digits in each place represent amounts of thousands, hundreds, tens, or ones (e.g., 853 is 8 hundreds + 5 tens + 3 ones).

(2) Students use their understanding of addition to develop fluency with addition and subtraction within 100. They solve problems within 1000 by applying their understanding of models for addition and subtraction, and they develop, discuss, and use efficient, accurate, and generalizable methods to compute sums and differences of whole numbers in base-ten notation, using their understanding of place value and the properties of operations. They select and accurately apply methods that are appropriate for the context and the numbers involved to mentally calculate sums and differences for numbers with only tens or only hundreds.

(3) Students recognize the need for standard units of measure (centimeter and inch) and they use rulers and other measurement tools with the understanding that linear measure involves an iteration of units. They recognize that the smaller the unit, the more iterations they need to cover a given length.

(4) Students describe and analyze shapes by examining their sides and angles. Students investigate, describe, and reason about decomposing and combining shapes to make other shapes. Through building, drawing, and analyzing two- and three-dimensional shapes, students develop a foundation for understanding area, volume, congruence, similarity, and symmetry in later grades.
Grade 3
In grade 3, instructional time should focus on four critical areas: (1) developing understanding of multiplication and division and strategies for multiplication and division within 100; (2) developing understanding of fractions, especially unit fractions (fractions with numerator 1); (3) developing understanding of the structure of rectangular arrays and of area; and (4) describing and analyzing two-dimensional shapes.

(1) Students develop an understanding of the meanings of multiplication and division of whole numbers through activities and problems involving equal-sized groups, arrays, and area models; multiplication is finding an unknown product, and division is finding an unknown factor in these situations. For equal-sized group situations, division can require finding the unknown number of groups or the unknown group size. Students use properties of operations to calculate products of whole numbers, using increasingly sophisticated strategies based on these properties to solve multiplication and division problems involving single-digit factors. By comparing a variety of solution strategies, students learn the relationship between multiplication and division. (2) Students develop an understanding of fractions, beginning with unit fractions. Students view fractions in general as being built out of unit fractions, and they use fractions along with visual fraction models to represent parts of a whole. Students understand that the size of a fractional part is relative to the size of the whole. For example, ½ of the paint in a small bucket could be less paint than 1/3 of the paint in a larger bucket, but 1/3 of a ribbon is longer than 1/5 of the same ribbon because when the ribbon is divided into 3 equal parts, the parts are longer than when the ribbon is divided into 5 equal parts. Students are able to use fractions to represent numbers equal to, less than, and greater than one. They solve problems that involve comparing fractions by using visual fraction models and strategies based on noticing equal numerators or denominators. (3) Students recognize area as an attribute of two-dimensional regions. They measure the area of a shape by finding the total number of same-size units of area required to cover the shape without gaps or overlaps, a square with sides of unit length being the standard unit for measuring area. Students understand that rectangular arrays can be decomposed into identical rows or into identical columns. By decomposing rectangles into rectangular arrays of squares, students connect area to multiplication, and justify using multiplication to determine the area of a rectangle. (4) Students describe, analyze, and compare properties of two-dimensional shapes. They compare and classify shapes by their sides and angles, and connect these with definitions of shapes. Students also relate their fraction work to geometry by expressing the area of part of a shape as a unit fraction of the whole.
Grade 4
In grade 4, instructional time should focus on three critical areas: (1) developing understanding and fluency with multi-digit multiplication, and developing understanding of dividing to find quotients involving multi-digit dividends; (2) developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers; (3) understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry.

(1) Students generalize their understanding of place value to 1,000,000, understanding the relative sizes of numbers in each place. They apply their understanding of models for multiplication (equal-sized groups, arrays, area models), place value, and properties of operations, in particular the distributive property, as they develop, discuss, and use efficient, accurate, and generalizable methods to compute products of multi-digit whole numbers. Depending on the numbers and the context, they select and accurately apply appropriate methods to estimate or mentally calculate products. They develop fluency with efficient procedures for multiplying whole numbers; understand and explain why the procedures work based on multiplying whole numbers; and use them to solve problems.

Students apply their understanding of models for division, place value, properties of operations, and the relationship of division to multiplication as they develop, discuss, and use efficient, accurate, and generalizable procedures to find quotients involving multi-digit dividends. They select and accurately apply appropriate methods to estimate and mentally calculate quotients, and interpret remainders based upon the context.

(2) Students develop understanding of fraction equivalence and operations with fractions. They recognize that two different fractions can be equal (e.g., 15/9 = 5/3), and they develop methods for generating and recognizing equivalent fractions. Students extend previous understandings about how fractions are built from unit fractions, composing fractions from unit fractions, decomposing fractions into unit fractions, and using the meaning of fractions and the meaning of multiplication to multiply a fraction by a whole number.

(3) Students describe, analyze, compare, and classify two-dimensional shapes. Through building, drawing, and analyzing two-dimensional shapes, students deepen their understanding of properties of two-dimensional objects and the use of them to solve problems involving symmetry.

Grade 5
In grade 5, instructional time should focus on three critical areas: (1) developing fluency with addition and subtraction of fractions, and developing understanding of the
multiplication of fractions and of division of fractions in limited cases (unit fractions divided by whole numbers and whole numbers divided by unit fractions); (2) extending division to 2-digit divisors, integrating decimal fractions into the place value system and developing understanding of operations with decimals to hundredths, and developing fluency with whole number and decimal operations; and (3) developing understanding of volume.

(1) Students apply their understanding of fractions and fraction models to represent the addition and subtraction of fractions with unlike denominators as equivalent calculations with like denominators. They develop fluency in calculating sums and differences of fractions, and make reasonable estimates of them. Students also use the meaning of fractions, of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for multiplying and dividing fractions make sense. (Note: this is limited to the case of dividing unit fractions by whole numbers and whole numbers by unit fractions.)

(2) Students develop understanding of why division procedures work based on the meaning of base-ten numerals and properties of operations. They finalize fluency with multi-digit addition, subtraction, multiplication, and division. They apply their understandings of models for decimals, decimal notation, and properties of operations to add and subtract decimals to hundredths. They develop fluency in these computations, and make reasonable estimates of their results. Students use the relationship between decimals and fractions, as well as the relationship between finite decimals and whole numbers (i.e., a finite decimal multiplied by an appropriate power of 10 is a whole number), to understand and explain why the procedures for multiplying and dividing finite decimals make sense. They compute products and quotients of decimals to hundredths efficiently and accurately.

(3) Students recognize volume as an attribute of three-dimensional space. They understand that volume can be measured by finding the total number of same-size units of volume required to fill the space without gaps or overlaps. They understand that a 1-unit by 1-unit by 1-unit cube is the standard unit for measuring volume. They select appropriate units, strategies, and tools for solving problems that involve estimating and measuring volume. They decompose three-dimensional shapes and find volumes of right rectangular prisms by viewing them as decomposed into layers of arrays of cubes. They measure necessary attributes of shapes in order to determine volumes to solve real-world and mathematical problems.
Grade 6
In grade 6, instructional time should focus on four critical areas: (1) connecting ratio and rate to whole number multiplication and division, and using concepts of ratio and rate to solve problems; (2) completing understanding of division of fractions and extending the notion of number to the system of rational numbers, which includes negative numbers; (3) writing, interpreting, and using expressions and equations; and (4) developing understanding of statistical thinking.

(1) Students use reasoning about multiplication and division to solve ratio and rate problems about quantities. By viewing equivalent ratios and rates as deriving from, and extending, pairs of rows (or columns) in the multiplication table, and by analyzing simple drawings that indicate the relative size of quantities, students connect their understanding of multiplication and division with ratios and rates. Thus students expand the scope of problems for which they can use multiplication and division to solve problems, and they connect ratios and fractions. Students solve a wide variety of problems involving ratios and rates.

(2) Students use the meaning of fractions, the meanings of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for dividing fractions make sense. Students use these operations to solve problems. Students extend their previous understandings of number and the ordering of numbers to the full system of rational numbers, which includes negative rational numbers, and in particular negative integers. They reason about the order and absolute value of rational numbers and about the location of points in all four quadrants of the coordinate plane.

(3) Students understand the use of variables in mathematical expressions. They write expressions and equations that correspond to given situations, evaluate expressions, and use expressions and formulas to solve problems. Students understand that expressions in different forms can be equivalent, and they use the properties of operations to rewrite expressions in equivalent forms. Students know that the solutions of an equation are the values of the variables that make the equation true. Students use properties of operations and the idea of maintaining the equality of both sides of an equation to solve simple one-step equations. Students construct and analyze tables, such as tables of quantities that are in equivalent ratios, and they use equations (such as $3x = y$) to describe relationships between quantities.

(4) Building on and reinforcing their understanding of number, students begin to develop their ability to think statistically. Students recognize that a data distribution may not have a definite center and that different ways to measure center yield different values. The median
measures center in the sense that it is roughly the middle value. The mean measures center in the sense that it is the value that each data point would take on if the total of the data values were redistributed equally, and also in the sense that it is a balance point. Students recognize that a measure of variability (interquartile range or mean absolute deviation) can also be useful for summarizing data because two very different sets of data can have the same mean and median yet be distinguished by their variability. Students learn to describe and summarize numerical data sets, identifying clusters, peaks, gaps, and symmetry, considering the context in which the data were collected.

Students in grade 6 also build on their work with area in elementary school by reasoning about relationships among shapes to determine area, surface area, and volume. They find areas of right triangles, other triangles, and special quadrilaterals by decomposing these shapes, rearranging or removing pieces, and relating the shapes to rectangles. Using these methods, students discuss, develop, and justify formulas for areas of triangles and parallelograms. Students find areas of polygons and surface areas of prisms and pyramids by decomposing them into pieces whose area they can determine. They reason about right rectangular prisms with fractional side lengths to extend formulas for the volume of a right rectangular prism to fractional side lengths. They prepare for work on scale drawings and constructions in grade 7 by drawing polygons in the coordinate plane.

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**Science and Technology/Engineering Curriculum**

The Science and Technology/Engineering program of the Worcester Public Schools provides students with in-depth exploration of the standards identified in the Massachusetts Curriculum Frameworks. High quality professional development and support for classroom and after-school activities are enhanced through partnerships with area colleges and cultural, environmental, and scientific institutions. PK - 12 Science and Technology/Engineering Courses are designed to have students become active participants in their learning through "hands - on" and "minds - on" activities, experiments, investigations and engineering design challenges. All of the courses are based on the 2006 Massachusetts Curriculum Frameworks for Science and Technology/Engineering. We anticipate new Frameworks will be released in the summer of 2013 and the district will realign courses once that occurs.

**Preschool – Grade 2**

In grades Preschool – Grade 2, students are naturally interested in everything around them. This curiosity leads them to observe, collect, sort, and record information about things they
encounter every day. Teachers should encourage their students’ observations without feeling compelled to offer precise scientific reasons for these phenomena. In PK – 2 Science, students will explore standards in Earth Science, Life Science, Physical Science and Technology/Engineering as they participate in activities and investigations designed to help them understand and ask questions about the natural and technological world around them.

The district recommends that Kindergarten through Grade Two students spend one hour per week "doing" science activities and investigations and an additional two hours per week "integrating" science content with math and ELA skills, social studies, art, music, or health.

**Topics: Kindergarten**
Foundational concepts and exploration in Earth Science, Physical Science, Life Science

**Topics: First Grade**

**Topics: Second Grade**

**Grade 3**
Grade 3 Science and Technology/Engineering explores content standards in Earth and Space Sciences, Physical Sciences, Life Sciences and Engineering. Students will plan and carry out investigations and will incorporate mathematical skills of measuring and graphing in their experiments. Strategies for reading nonfiction text and science textbooks will be introduced and reinforced throughout the course. The district recommends that Grade 3 students spend a minimum of two hours per week "doing" science activities and investigations and an additional two hours per week "integrating" science content with math and ELA skills, social studies, art, music, or health.

Electricity, Magnetism, Relationship Between Electricity and Magnets, Forces, Motion
Simple Machines, Living Things, Plants Animals, Habitats, Ecosystems, Food Chains and Food Webs

Grade 4
Grade 4 Science and Technology/Engineering explores content standards in Earth and Space Sciences, Physical Sciences, Life Sciences and Engineering. Students will plan and carry out investigations and will incorporate mathematical skills of measuring and graphing to communicate their findings. Students will actively engage in many reading and writing lessons as they work to become scientifically literate citizens. The district recommends that Grade 4 students spend a minimum of two hours per week "doing" science activities and investigations and an additional two hours per week "integrating" science content with math and ELA skills, social studies, art, music, or health.

Landforms, Water Cycle, Physical Science, Properties of Matter, Sound, Electricity, Simple Machines, Tools

Grade 5
Grade 5 Science and Technology/Engineering explores content standards in Earth and Space Sciences, Physical Sciences, Life Sciences and Engineering. Students will plan and carry out investigations as a class, in small groups, or independently and will incorporate mathematical skills of measuring and graphing to communicate their findings. Students will actively engage in many reading and writing lessons as they work to become scientifically literate citizens. The district recommends that Grade 5 students spend a minimum of three hours per week "doing" science activities and investigations and an additional two hours per week "integrating" science content with math and ELA skills, social studies, art, music, or health.


Grade 6
Grade 6 Science and Technology/Engineering explores content standards in Earth and Space Sciences, Physical Sciences, Life Sciences and Engineering. This course is designed for students to be active participants in their learning as they ask and answer questions, carry out investigations, conduct experiments, and solve engineering design challenges. Students will incorporate mathematical skills of measuring and graphing to communicate their findings and will actively engage in many reading and writing lessons as they work to become scientifically literate citizens. The district recommends that Grade 6 students spend a minimum of three hours per week "doing" science activities and investigations and an additional two hours per week "integrating" science content with math and ELA skills, social studies, art, music, or health.


Curriculum Limitations Due to Physical Space Constraints and a Proposed Model-
With the arrival of the new standards, it is more important than ever to have teachers using “hands on/ minds on” investigations in their daily science periods. The difficulty in this lies in the space where these “labs” now take place. Typical classrooms are not set up for this type of instruction. Currently, the Nelson Place classrooms are small rooms furnished with small student desks. There is little extra room for doing the type of science our standards require. Classrooms have no running water or ground fault outlets and become a “dangerous” space for students when trying to conductive active/interactive science activities.
In an effective science room, there would be large, long tables that could be moved around when needed. There would be floor space for students to use for activities such as measuring the distance something travels. The room would have a staging area where teachers could organize, prepare, and dispense materials. There would be both sinks and an area where drying racks for graduated cylinders, beakers, and test tubes could be safely managed. The room would have sufficient wall outlets to plug in electrical equipment such as microscopes and lamps. For safety, the room would have a locking cabinet to store chemicals. There would be plenty of storage space, including a place for “in process student projects,” especially as multiple classrooms would use the space. A twenty-first century science lab should have the latest technology such as a smart board and computer, but there would also be a library area for science books suitable for researching. A grow light for plants would be a worthwhile feature as well. In addition to Nelson Place teachers using the science lab room with their students, the district’s elementary science coach would be able to use this lab room to run professional development workshops, model lessons, and develop interactive curriculum and resources for teachers.

**History and Social Science Curriculum**

Our cultural heritage as Americans is as diverse as we are, with multiple sources of vitality and pride. But our political heritage is one – the vision of a common life in liberty, justice, and equality as expressed in the Declaration of Independence and the Constitution two centuries ago.

To protect that vision, Thomas Jefferson prescribed a general education not just for the few, but for all citizens, “to enable every man to judge for himself what will secure or endanger his freedom.” A generation later, Alexis de Tocqueville reminded us that our first duty was to “educate democracy.” He believed that all politics were but the playing out of the “notions and sentiments dominant in a people.” These, he said, are the “real causes of all the rest.” Ideas, good and bad, have their consequences in every sphere of a nation’s life.

The kind of critical thinking we wish to encourage must rest on a solid base of factual knowledge. The central ideas, events, people, and works that have shaped our world, for good and ill, are not at all obsolete. Instead, the quicker the pace of change, the more critical it will be for us to remember them and understand them well. We insist that without this knowledge, citizens remain helpless to make the wise judgments hoped for by Jefferson.
In keeping with the *Massachusetts History and Social Science Frameworks*, the History and Social Science Curriculum at Nelson Place Elementary School will include the following:

**Preschool – Kindergarten**
At the preschool and kindergarten level, learning in history and social science is built on children’s experiences in their families, school, community, state, and country. Children listen to stories about the people and events we celebrate in our national holidays and learn why we celebrate them. They also become familiar with our national symbols. The purpose of the Preschool – Kindergarten curriculum is to begin the development of their civic identity.

**Grade 1**
In first grade, children listen to and read folk tales and true stories from America and from around the world. They learn about major historical events, figures, and symbols related to the United States of America and its national holidays and why they are important to Americans. The grade 1 curriculum continues to strengthen children’s identity as American citizens.

**Grade 2**
Second graders learn world and United States history, geography, economics, and government by studying more about who Americans are and where they came from. They explore their own family’s history and learn about distinctive achievements, customs, events, places, or landmarks from long ago and from around the world. The chief purpose of the grade 2 curriculum is to help students understand that American citizenship embraces all kinds of people, regardless of race, ethnicity, gender, religion, and national origin. American students come from all countries and continents in the world. A history and social science curriculum should help students acquire a common understanding of American history, its political principles, and its system of government in order to prepare them for responsible participation in our schools and civic life.

**Grade 3**
Drawing on information from local historic sites, historical societies, and museums, third graders learn about the history of Massachusetts from the time of the arrival of the Pilgrims. They also learn the history of their own cities and towns and about famous people and events in Massachusetts’ history.
Grade 4
In grade 4, students study the geography and people of the United States today. Students learn geography by addressing standards that emphasize political and physical geography and embed five major concepts: location, place, human interaction with the environment, movement, and regions. In addition, they learn about the geography and people of contemporary Mexico and Canada. Teachers may choose to teach the standards on the geography and social characteristics of the nations in Central America and the Caribbean Islands. Teachers may also choose to have students study in the first half of the school year one early civilization. We recommend China because it is not taught in grade 7 and can be easily connected to the English language arts curriculum through its myths, legends, and folktales.

Grade 5
Students study the major pre-Columbian civilizations in the New World; the 15\textsuperscript{th} and 16\textsuperscript{th} century European explorations around the world, in the western hemisphere, and in North America in particular; the earliest settlements in North America; and the political, economic, and social development of the English colonies in the 17\textsuperscript{th} and 18\textsuperscript{th} centuries. They also study the early development of democratic institutions and ideas, including the ideas and events that led to the independence of the original 13 colonies and the formation of a national government under the U.S. Constitution. The purpose of the grade 5 curriculum is to give students their first concentrated study of the formative years of U.S. history.

Grade 6
Sixth graders systematically study the world outside of the United States and North America by addressing standards that emphasize political and physical geography and embed five major concepts: location, place, human interaction with the environment, movement, and regions. Students systematically learn geography around the world continent by continent, similar to the way in which atlases are organized. They also learn about each continent in an order that reflects, first, the early development of the river valley civilizations and then the later development of maritime civilizations in the Mediterranean area and in Northern and Western Europe. In so doing, students are better prepared for the study of early civilizations around the Mediterranean area in grade 7. At each grade level, students will focus on both history standards and the literacy standards designed to promote the reading, writing, speaking and listening skills necessary for our students to become better learners.
Currently the Library Media Center at Nelson Place Elementary School is a small, outdated space. Due to space constraints throughout the building, part of the Library Media Center has been dedicated to English as a Second Language staff and students. Thus making what is a small space for classroom students even smaller. There are presently twenty computers in the space, but most classes average twenty five students. The configuration of the computers in this limited space is not conducive to classroom learning, research instruction or group work. There are very limited hard copy reference materials, no periodicals, an outdated and dilapidated primary grade collection of materials and inadequate and incomplete materials for upper level students. The collection totals 6,726 titles. The American Association of School Libraries (AASL) published the average elementary school collections totaled 13,517 titles. This means that the current library at Nelson Place Elementary School is falling 6,791 titles short of the national average. AASL also reported that nationally elementary school Library Media Centers average 30 computers, 250 video materials, 12 current periodicals and 46 audio materials (audio books, CD’s, music on tape) and an annual budget of $4,200.

A new 21st Century, state of the art Library Media Center will be a hub of student curiosity and discovery as well as a source of their social, cultural and educational growth. This new space will allow students and teachers to access books, audio, visual and technology by providing an up to date book and reference collection and computer access. Students will be able to work in groups or independently with teacher direction on focused intellectual content and information literacy skills necessary for students to become college and career ready.

In 2013 Worcester Public Library began a program to open public branch libraries at select elementary schools in Worcester. Roosevelt and Tatnuck Magnet Elementary School branch libraries opened in the fall of 2013. It is the intent of the City of Worcester and Worcester Public Library to expand this successful program at other elementary schools, including the new Nelson Place School. Forethought and planning would enable the library branch to be seamlessly incorporated into the new facility, at no additional cost to the project. Worcester Public Library staff would service the facility after school hours. Additionally, the book collection is provided by the Worcester Public Library, providing greater resources to students during school hours.
Music Curriculum and Space

The elementary general music curriculum closely adheres to the Massachusetts Arts Curriculum Frameworks. The five discipline specific standards are:

I. Singing alone and with others.
II. Reading and Writing musical notation
III. Playing Instruments alone and with others.
IV. Improvisation and Composition.
V. Critical Response.

The Worcester Public Schools has developed a grade K-6 scope and sequence that identifies the sequential building of skills and concepts in these areas as well as benchmarks of growth. The scope and sequence and the Frameworks documents focus on students growing as expressive communicators, positive collaborators, creators and performers of music and critical thinkers. The curriculum is designed to provide students with the tools to actively make music independently and to think critically about their own performances and the performances of others. Lessons involve singing, playing instruments, movement, folk dance, problem solving, improvisation, composition and discussion.

Curriculum Limitations due to facilities constraints:
Currently, the music classes at Nelson Place are held in 25 individual classrooms. The music teacher manages her supplies, data, and other records, instruments, etc. from a storage area in the basement. The once weekly grades 5 and 6 chorus also meets in a classroom. The limitations of using another classrooms space are most evident in the arrangement of a classroom. Students are unable to revisit objectives or use visuals to access learning. In addition, it is often difficult to modify the environment to facilitate learning. In an average 40 minute lesson, 5-8 minutes of instructional time can be lost in the rearrangement of the classroom, posting of materials etc.

In addition to general music and chorus, Nelson Place has a vibrant instrumental program. More than 60 students in grades 4-6 participate in an instrumental pull-out program weekly. There is no dedicated storage space of ensemble space for the instrumental program. The instrumental teacher teaches where he is able to find a space. The school owns no instruments.
The implementation of curriculum suffers in multiple ways with the current environment. Traveling from room to room, the number and variety of hands on learning tools is severely limited. Playing instruments can mean 30 recorders, various drums, unpitched percussion, adaptive technology instruments, iPads, etc. Secure storage space must be “borrowed” from classroom teachers.

A well designed music space provides students with the opportunity to explore and master each of the discipline specific standards. The music space has dedicated instrument areas, visuals, music technology space, secure storage, teacher work area and movement space. The biggest benefit is that students enter the room and immediately begin to learn. Students can also move between standards and compose, play instruments, move and critique within a lesson to deepen understanding. Students of differing abilities and understandings can learn using multiple scaffolds and supports. Students excelling in a particular area can expand and extend their learning through composition, conducting or critique. A classroom gives the teacher many more tools to reach students. In addition, placement of the music room near the performance space allows for smooth transitions from independent growth to ensembles skills development. When students can play or sing together, they learn social and emotional skills that transfer out of the music classroom. When a classroom is designed thoughtfully, all students benefit from greater understanding and skills development.

**Visual Arts Curriculum and Classroom Design**

The Visual Arts Program at Nelson Place Elementary School is guided by documents in the *WPS Compass* (see attached Appendix B), the *Massachusetts Curriculum Frameworks* and the WPS Elementary Scope and Sequence. Both the Primary and Intermediate Curriculum provide students with opportunities to develop their capacity for creative and reflective thinking. Students are engaged in a variety of ways to learn, explore and communicate their own artistic voice. Students utilize materials to explore both the fine arts (drawing, painting, printmaking, and sculpture) as well as design (graphic design, architecture, animation, and other forms of electronic image making.) This curriculum is guided by the following Standards:

1. **Methods, Materials, and Techniques.** Students will demonstrate knowledge of the methods, materials, and techniques unique to the visual arts.
2. **Elements and Principles of Design.** Students will demonstrate knowledge of the elements and principles of design.
3. Observation, Abstraction, Invention, and Expression. Students will demonstrate their powers of observation, abstraction, invention, and expression in a variety of media, materials, and techniques.

4. Drafting, Revising, and Exhibiting. Students will demonstrate knowledge of the processes of creating and exhibiting their own artwork: drafts, critique, self-assessment, refinement, and exhibit preparation.

5. Critical Response. Students will describe and analyze their own work and the work of others using appropriate visual arts vocabulary. When appropriate, students will connect their analysis to interpretation and evaluation.

Curriculum Limitations Due to Facility and Space Constraints:
Currently, the art teacher uses a closet space in the basement for storage and planning. Transporting reference materials, studio equipment, and students’ projects from this space to various classrooms throughout the day becomes inefficient and affects instruction. These daily transitions pose several challenges to instructional time and practice because of the transitory nature inherent in this design. These limitations compromise several areas of curriculum delivery including: lack of consistent technology usage, lack of sufficient flexibility to permit individual and group activities and lack of adequate art specific equipment for daily instruction.

Proposal for Primary and Intermediate Art Room
Dedicated spaces for teaching art would eliminate these challenges and offer an effective renewal of teaching practice carefully aligned with the frameworks and scope and sequence determined by the district. The following additional elements in the design of this art room may be considered:

Space: The basic building blocks necessary to provide a functioning art room would include: varied student work stations, storage closet, kiln room, classroom cabinets, sinks, wall mounted projector, updated technology, and display space. Effective approaches to art teaching often take on interactive, kinesthetic learning which requires many of these items to be moveable.

Accessibility: The design should provide provisions for physically challenged learners to include the ease of movement for wheelchairs and students that are visually impaired. Sinks and work surfaces should be adapted for height of wheelchairs.

Display Space: Wall space in an art room is educationally valuable. Display boards, whiteboards, and locked clear cabinets provide opportunities for critique, reflection, self-assessment and revision. Students and teachers engage in these meaningful processes as a method for preparing students for exhibit and portfolio preparation. A wall of shelves,
electrical outlets, and other meaningful plumbing should be thoughtfully designed around these areas to avoid wasted space. Nearby hallway display surfaces provide a convenient way to share work with other students, teachers, and visitors to the school.

**Technology:** As students are responsible for engaging in meaningful dialogue and critical response of their own work and the work of their peers, the art room should aid with these interactions in a way that reinforces 21st century skill building and use of technology. To have this multimedia access these rooms should be equipped with Smartboards, Elmos, computers, and wall mounted projectors.

**Storage:** Elementary Art rooms are supply and equipment intense. To provide an effective arts education, the art room will demand a significant amount of storage space often requiring a general storage room in addition to carefully placed cabinets in the classroom. An art room is also a production facility for many different groups of learners using the same space. In-process projects and supplies must be accounted for to maintain seamless management of this room. Storage units should include some deep drawer shelving with suspension hardware for flat paper and display posters. Perimeter, lockable cabinets are convenient as long as they do not interfere with valuable display space.

**Kiln Room and Ventilation:** Clay is a contemporary staple for elementary, middle and high school curriculums. Electric kilns need good ventilation to remove toxins from volatile clay impurities and glaze ingredients. Place kilns in separate rooms; masonry walled kiln rooms allow kilns to be closer to the wall. Air from a kiln needs to go directly outside-never into a common exhaust or ventilation system.

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**Elementary Physical Education Program**

**Overview of Physical Education:**
A physical education program has the potential to significantly impact the cognitive, affective, and psychomotor development of students in unique ways. It not only teaches physical skills, but skills that carry over into every aspect of a child’s life: goal setting, building self-esteem, increased alertness after physical activity, cooperation, tolerance for people with differences, and socialization. Additionally, physical education makes a unique contribution to the education of the student: it is the only subject area in the school devoted to the study of human movement, the acquisition of physical skill, and the promotion of fitness - promoting the development of the whole child.

**Goal of Physical Education:**
The goal is to develop physically literate individuals who have the knowledge, skills and confidence to enjoy a lifetime of physical activity. A physically literate individual has learned the skills necessary to participate in a variety of physical activities; knows the implications and the benefits of involvement in various types of physical activities; participates regularly in physical activity; is physically fit; and values physical activity and its contributions to a healthy lifestyle.

**Important Considerations:**

- The ultimate purpose of any physical education program is to guide children into being physically active for a lifetime.
- Children should engage in physical activity appropriately designed for their developmental levels.
- Recess and physical education are important but different parts of the school day.
- Physical activity and physical education are not the same. (Physical activity is the subject matter of physical education while physical education is an instructional program that teaches skills by teachers certified in physical education)
- Living in an age of computers and technology, the emphasis is on sedentary pursuits rather than active ones. While old style physical education programs focused on learning specific sports, present day physical education emphasizes helping students to discover which physical activities they can enjoy and use in a lifelong personal fitness program and encourages students to become lifelong movers.
- Today’s physical education program is significantly more individualized, concept centered, and technology based than the traditional physical education program. The infrastructure, use of space, and equipment/supply demands are very different.

**Elementary Grades:**

Emphasis is placed on helping students develop positive self-worth, social skills, and safety awareness. Students are encouraged to work together to achieve common goals by participating in cooperative activities at this level.

**Grades K-3**

Physical education at this level emphasizes the development of gross and fine motor skills, manipulative skills, creative movement, rhythms, gymnastics, and game skills.
Grades 5-6
Fundamental and manipulative skills are refined along with dance and game skills in these later years. Inclusion of individual, partner, and team activities and fitness skills are introduced in these years as well.

Adapted Physical Education Programs:
The Individuals with Disabilities Education Act (IDEA) is a law that was originally enacted in 1975 as the Education of All Handicapped Children Act of 1975. This legislation identified physical education as a curriculum area that was to be provided for all children with disabilities if it is provided to nondisabled.

The implications for physical education are that all children are required by law to have an appropriate physical education program. In addition, these services should be provided in such a manner that promotes maximum interaction between children with disabilities and their non-disabled peers. These codes, along with federal legislation, ensure the rights of children to have an appropriate physical education program with peers.

Modifications and adaptations for students with disabilities in the instructional program may be necessary depending on the students needs. In order to meet the needs of many children with disabilities, schools must consider indoor and outdoor facility accommodations for these students. All students should have appropriate access to the gymnasium.

Occupational and Physical Therapy
Occupational and Physical therapy services are related educational services that are provided for students requiring intervention in order to access the curriculum and the life of the school due to a disability. Occupational Therapists work with children to improve fine motor and sensory functioning, while Physical Therapists focus on gross motor needs of students. Occupational and Physical Therapists often work collaboratively in a co-treatment model.
Limitations at Nelson Place Due to Current Occupational and Physical Therapy Space:

Currently, Occupational and Physical Therapy takes place in an area that was designed as an entry way. It is a drafty area open to a stairwell leading down to the original main entrance door to the school. There is inadequate space for gross motor equipment due to the size of motor equipment needed during therapy sessions. The current location is clearly not conducive to engage students in a wide range of physical therapy activities. A significant safety concern is due to the open stairwell; as a result physical activities are limited for safety considerations. Due to inadequate space for therapy as well as limitations for storage existing therapy materials cannot be used to engage children in a variety of sensory and fine motor activities.

Proposal for Occupational Physical Therapy Space:

Ideally, an Occupational and Physical therapy motor room should be adequate in size similar to a full-size classroom to accommodate space for both gross and fine motor activities to be taught simultaneously. The IEP needs for students often recommend specialized motor equipment. The motor room should also allow space for gross motor activities, individual and/or small group therapy sessions. There would also need to be equipment for the children, including a large floor mat, balance beam, a swing, and a ball pit, as well as ample room for gross motor movement. Sensory motor activities and/or fine motor work would require a space for up to two tables and up to eight student chairs. If possible one of the walls should be mirrored to allow students to model and demonstrate their skills. One will be located in the primary wing with developmentally learning tools that size-appropriate for students in preschool through second grade and one will be located in the intermediate wing appropriately equipped for that age group. Location of one Occupational Therapy / Physical Therapy room in each wing will be minimize transition times and maximize time for therapeutic supportive services.

Therapeutic Planning Room

A Therapeutic Planning Room is a nurturing environment where emotional and social skills are explicitly taught to children who exhibit difficulties in these areas of development. This room is aesthetically calming and soothing with noise reduction and appropriate lighting. Students with difficulty regulating their bodies because of their emotional and social skills can be explicitly instructed to use several therapeutic
interventions to build their self-regulation capacity. This room will also be used for small social skill groups that include students with emotional and social goals as well as typically developing peers. Therapeutic interventions include: explicit teaching of emotional and social skills; play therapy activities; non-directed play; relaxation activates; role-play; and access to sensory areas. This room is essential to the success of our students who are unable to fully access the curriculum due to emotional regulation.

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**Speech Language Pathologist**

The Speech Language Pathologist improves the communication skills of students in social and academic settings. SLP services insure that students with disabilities have access to the core curriculum through a range of interventions and research based strategies. The following responsibilities represent how SLP’s supports schools:

- Perform screenings and evaluations to assess the need for intervention
- Develop and implement Individual Education Plans and Section 504 Accommodation Plans
- Provide intervention services to students identified with communication and language based disabilities either individually or in a small group
- Services are provided in the following settings: inclusion, pull out models and substantially separate classrooms

**Nelson Place Speech Therapy Current Space:**

Currently, the Speech Language Pathologist (SLP) for the primary grades works in a small space that is accessed by walking through two kindergarten classrooms. This is not conducive to learning, as therapists are rotating students in and out of the space for therapy, and there can be disruption to the learning environment based on the proximity of the two kindergarten classrooms.

The therapy space is not adequate in size, and in addition, there is significant noise from the adjacent classroom. The noise level interferes with therapy and evaluation sessions for students. There is one computer and a printer for use by students and staff; however, there is no internet access which limits the instructional benefit from the available technology.

The Speech Language Pathologist for the intermediate grades is also working in a space that is shared with the learning disabilities teacher. When both staff members are working in the room at the same time, there is potential for distraction. Also, the teachers’
bathroom is accessed through this room, creating consistent traffic that is disruptive to the therapy sessions or evaluations of students.

**Proposal for Speech Therapy Space:**

Ideally, the speech therapy space should be acoustically designed to support up to three adults working simultaneously and comfortably. The logistics of having large enough rooms to accommodate the evaluation of students, therapy sessions and observations would be highly recommended. Also, it is common practice to have a Speech Language Pathologist Assistant and/or a graduate level student working with a Speech Language Pathologist. Therefore, the rooms would need to be large enough to accommodate tables, teacher desks and chairs for up to six students, as well as a work planning area for the adults.

Additionally, the size of the SLP rooms should be designed to allow space to evaluate children while other children are receiving SLP therapy services. The room should be accessible from a hallway and should have dry erase board. Acoustics should be a consideration, keeping noise levels to a minimum. Technology should include computers with wireless internet access, tablets student use, and a shared printer. An observation area should be adjacent to the SLP room to allow parent, staff, evaluators and college students to observe sessions for training purposes. Storage space is also needed for therapy materials, evaluation materials, files, and supplies.

One speech room should be located in the primary wing and one in the intermediate area to minimize transition time and maximize time for therapy.

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**Learning labs**

Teachers of moderate special needs will utilize the learning labs rooms to provide explicit instruction across the content areas. Each of these rooms are required for students whose IEPs stipulate that specialized instruction be delivered outside the general education setting in a distraction free environment. These classrooms will also be utilized during standardized state testing, annual testing, and re-evaluations for students who require special testing accommodations. These rooms will need to provide wireless access for teaching and learning and assessment purposes.
Early Childhood Assessment Center

Overview: This area will be a multipurpose area required to conduct Developmental Assessments year round for preschool age children with suspected developmental disabilities. The WPS offers integrated preschool programs to enhance the development of preschool students with disabilities prior to their entering kindergarten. Referrals for preschool assessments are made by health service providers, pediatricians, early intervention programs, social service agencies, Head Start, child care centers and other community based providers. Children referred to these assessments typically range in age from 2 years, 5 months to 4 years, 11 months.

Developmental assessments and screenings are conducted by a multidisciplinary team that typically includes a school psychologist, a speech and language therapist, and occupational therapist and a physical therapist. In addition, parent/guardians are present as well as community based providers who have been working with the family and/or are providing transportation. The assessment is conducted in a play-based format to maximize rapport building with both the child and the parent, as well as maximize the child’s performance in developmental tasks. Standardized, qualitative and observational components are all included in a developmental Arena Assessment. A parent interview is typically a component of the process, along with consultations with service providers.

Goal: The purpose of developmental assessments is to conduct cultural and linguistically fair developmental assessments of children with developmental delays and of high-risk psychosocial backgrounds. The integration of formal, qualitative and observational components in the assessment, as well as the parent and community providers input, significantly increases obtaining data and information about the whole child, thus minimizing the risk of over-identifying young children at risk as learning disabled. Likewise, the comprehensive arena assessment approach provides opportunity to assess both formal and functional skills in all major areas of development (cognitive, speech and language, gross-motor, fine-motor, social-emotional and behavioral), so as to be able to develop appropriate Individualized Educational Plans for the children who meet the criteria for learning disability.

Space: The Early Childhood Assessment area requires not only space for the assessment but also space for carrying out all phases that are involved in completing the full developmental evaluation. The space requires ground floor accessibility as children are
very young and typically accompanied by young siblings and/or baby siblings in strollers. This accessibility supports families having proper access to the area.

Assessment Space: This space is required to conduct the actual assessment with the students. A classroom size area is necessary to accommodate the mobility needs of young children as well as facilitate exploratory behavior from the children, which is a critical component of the assessment.

The area is typically prepared with developmentally appropriate materials and toys, such as pretend play stations, which also take space. These typically include a pretend play kitchen, a doll house, a pretend play tools area, and ample space for floor play with blocks, cars, and other toys / materials. In addition, space is required to allow the children to run, do jumping drills, walk on a line to assess their balance, gait and posture and ability to use stairs safely. In addition, suitable space in this room will be required to hang a swing, place a board above the floor, a toy tunnel and other sensory based materials would be necessary to properly assess children with suspected Autism Spectrum Disorders.

Observation Room: A one way mirror room adjacent to the arena assessment Space is required to conduct observations during the assessment by other staff when necessary and to provide non-intrusive participation of parents and community providers when appropriate. It will also accommodate the opportunity of professional development and training of staff for developmental assessments.

Parent Interview Area: An area adjacent to the Assessment Area is required to conduct interviews with the parent, so that the parent is not so far or out of reach from the child being assessed, but also so that the interview is not conflicting with the assessment process with the child.

Office Space: a room adjacent to the assessment area is needed for at least 4 staff member to work on reports/paperwork and take phone calls. This work area requires computers to write reports and requires internet access.

Bathroom: A bathroom facility with a child size toilet is required, as well as a changing table as the young children participating in the arena typically need to use the bathroom or to be changed if they are still in diapers. Having the bathroom integrated in the area would not only facilitate comfort and convenience for the parent, but also add to assessment process as the child’s self-care skills would be more readily observable through his/her use of toileting skills.
Storage: Multiple assessment materials are used in the arena Assessments. Many of the materials are standardized test booklets and other manipulatives which are costly and require proper storage when not in use. A closet area or at least two built in cabinets would be necessary to support storage.

The Early Childhood Assessment Center should be located near the Main Administration and entrance.
**Specialized Approaches to Individualized Learning (SAIL)**

The Specialized Approaches to Individualized Learning (SAIL) program is designed to educate students who have been identified as having Autism Spectrum Disorders. The SAIL program is highly structured to provide direct support and instruction as behavioral techniques are used to promote independence, reduce aberrant behaviors and increase academic, functional and social skills. Instruction may include: highly structured one on one instruction, small group learning and/or full inclusion to include emphasis on generalization. Classrooms must be designed to provide a designated area for students to receive specialized discrete trial instruction via the applied behavioral analysis (ABA) methodology. Program components include highly structured, individualized programming; intensive communication and language training; social skills training; utilization of natural environments for instruction, positive behavioral programming; and educationally based sensory activities as well as inclusion with typically developing peers and activities when appropriate. SAIL students receive related services including speech/language, occupational therapy, and physical therapy education is also provided based on the individual needs of our students.

The Nelson Place SAIL program currently consists of five classrooms:
- Preschool integrated classroom
- Substantially separate kindergarten/grade 1,
- Substantially separate grade 3-4 classroom,
- Partial inclusion kindergarten and
- Partial inclusion grade 1 and 2.

We are proposing that the SAIL program provide:
- 2 Integrated preschool classrooms
- 1 Substantially Separate preschool classroom
- 1 Substantially Separate classroom for each K-6 grade level

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**Family Learning Center**

The Family Learning Center is a multipurpose space that would be utilized to conduct family focused workshops for special education and general education parents, as well as to conduct clinical meetings, which include special education staff and parents, to discuss student progress and to provide resources to assist parents and guardians.
A Family Learning Center sends a clear message that the school wants parents to be true partners in the education of their child, making the school staff and resources accessible to families and encouraging parent engagement. Additionally, Nelson Place School’s active and involved Parent Teacher Organization (PTO) would utilize this space for planning meetings, yearly family events, and supporting school programs through volunteering and fundraising.

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**Technology**

**Information Technology Requirements**

The new Nelson Place is being designed for a 50-year lifespan. Technology will be utilized at this school that has not been invented or even conceived of yet. The technology infrastructure must be designed in a way that will allow growth and flexibility to accommodate technology as it evolves. In addition, Nelson Place has a large district wide special education program. The technology must accommodate the current and future needs of these students.

The front of each classroom will be the Classroom Technology Center (CTC). The CTC will include an Eno interactive whiteboard, short throw wall mounted projector, desktop computer, and document camera. The desk will not be a traditional desk, but rather a small workstation area that will be the hub of the CTC. The district plans on using interactive whiteboards because they support non-verbal learners and they promote student engagement. The district uses the Eno interactive whiteboard with mini slate for several reasons. Environmentally, they are made from all recyclable materials, they are MBDC Cradle to Cradle certified, they are a LEED certification contributor, and the ceramic steel surface has a forever warranty. There are 3 levels of users for Eno boards. The first level user simply uses the board as a dry erase board. Not all interactive whiteboards can be used as a dry erase board, so having dry erase functionality is important. The second level of user is the basic user. These users will use the interactive features of the board as a simple mouse. Using the portable Eno slate, the teacher can move throughout the classroom, controlling the mouse movements of the computer wirelessly, allowing them to open documents, web pages, and presentations. The third level of user is the advanced user. This user will use the interactive lesson plan tool to design and save classroom lessons and present and interact with them while teaching the class. For example, a
teacher may design an interactive worksheet that has words scrambled and students interact with the lesson and put the letters in the correct order. While the ideal implementation will have all teachers using the boards at the advanced level, the Eno board has a low barrier to entry for beginning users. These users can use the board as a dry erase board or basic board while they move towards and advanced user. In order to facilitate this migration, the bid specification for the interactive boards will include an extensive training component.

The Classroom Technology Center (CTC) will also include a document camera. Every school in the district has anywhere from 8 to 60 document cameras. Documents cameras have been a run away success in the district with schools continually asking for more, most wanting one per classroom. Like the Eno boards, document cameras have several different levels of user. Document cameras in their simplest form can be used as a modern overhead projector. The difference is anything can be placed below a document camera, whether it is a student writing sample, a frog dissection, or a model plane. Whatever is placed under the document camera is projected on the interactive board. This technology is so easy to use it simply needs to be powered on and the teacher can use it. The advanced user can go even further. The cameras can be connected to a computer or memory stick and lessons can be loaded or saved directly from the camera. There is no need to dissect multiple frogs, just dissect it once and record the lesson to a video file for playback later. Environmentally document cameras make sense because they reduce the need to copy items like student work. Rather than copying the samples and handing them out, the teacher can project and discuss the work using the document camera. Finally the CTC will include a teacher’s computer for attendance, communicating with parents, printing, and other technology needs.

Nelson Place uses a small group student centered instruction format. Students are rotated through stations in a classroom, allowing for differentiated instruction. While at a computer station, students access software programs such as First in Math, Boardmaker, literacy and math online books and materials, and Kahn Academy. Currently most classrooms have four student computers, limiting the teacher’s ability to rotate the class through stations. The faculty has found six computer stations to be ideal to support the small group teaching station format; therefore the average classroom is designed with six student computers.
The school currently utilizes computer labs for standardized assessments such as MAP and PARCC. PARCC testing is currently scheduled to occur in grades 3 through 6 for elementary students. In order to accommodate recommended testing times and sessions, the PARCC assessment should optimally occur in a computer lab or similar isolated environment.

Currently the maximum allowable window for testing is twenty school days, but this is not preferable. Nelson Place currently has 248 students in grades 3 through 6. Assuming a school size based on 600 students, it is estimated that there could be up to 298 students in these grades. PARCC provides a tool to calculate the number of lab computers needed to administer the test. The PARCC Capacity Planning Tool – Interactive Version can be found at: http://www.parcconline.org/sites/parcc/files/PARCCCapacityPlanningTool_3-5-13FINAL4-12-13.xlsx; see also the attached Appendix G: PARCC Assessment Administration Guidance Version 1.0, March 2013 for additional testing parameters.

Assuming 298 students and 50 computers (25 in two computer labs), the tool calculates the school will require a 15 school day window; see PARCC Exhibit 1. This three week window is longer than the school would prefer to test in, but a minimum of two labs is needed to complete testing in this window. Standardized testing is very disruptive to the normal school routine forcing recess to be suspended, visitors curtailed, etc. Therefore, minimizing the window needed to PARCC test is critical.

In addition to student assessment, computer labs are used for virtual field tours, interactive classroom instruction, and staff professional development. The lab spaces will be maximized year round, before, during, and after school by students and staff with software applications including Lexia, First-In-Math, CoolMath, Study Island, Raz Kids, Starfall and others. Moreover, locating a lab adjacent to the media center supports research skills vital for successful language, technology, and science based projects for upper grade level students, effectively preparing them for middle school. Students would develop word processing skills needed for projects utilizing Microsoft Word, Excel, and Power Point. These labs are intended to be used therefore, not only in the assessment of students, but to support them in the learning process.
The district recommends building two computer labs and supplementing the labs with a laptop cart for the special education (SPED) accommodations. The district does not want to rely on laptops alone for computer labs. Laptops are costlier to service and maintain, and are more fragile than desktop computers. If a keyboard fails on a laptop, the laptop is inoperative until it is repaired. If the same thing happened with a desktop computer, the keyboard can be replaced quickly at very little cost. In addition, laptop labs require setup and breakdown, taking away valuable on task time as well as requiring some technical knowledge by the teacher. The district’s experience with full laptop labs is they work well at first, and over time expensive failures and costly replacements force laptop labs to be replaced by computer labs. If the school is not built with computer labs from the start, the school will struggle in the future to find a location to house these labs.

While the district does not want to rely on laptops for the majority of lab space, Nelson Place has a large special education (SPED) population. Many of these SPED students have special needs that require testing to occur in a quiet small group with accommodation for extended testing time. An additional computer lab is impractical because generally the

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special needs students must be tested in groups of five or fewer. Therefore the district will purchase a laptop cart and test these students in SPED Learning Labs, which will be designed to accommodate the necessary power needs and wireless capability.

The district would like to reduce its printing costs, paper usage and electrical demand. In order to do this, the school will be designed with centralized printing in a teacher’s planning center. There will be a multi-function device (MFD) that is a copier, scanner, fax, and printer in these rooms. These MFDs will require a teacher’s PIN to access. Each teacher will be assigned a monthly allotment of copies. In addition to the MFD, the teacher center will have three color laser jet printers. These color laser jets will be networked and the printing will be either divided by grade level or the district will implement a load balancing print solution such as PaperCut. To further reduce printing costs, the district will implement a print management solution (PMS). When a teacher prints, the PMS will automatically default to black and white printing even if a teacher chooses color. There will be an option to override and print in color, but the PMS will discourage it and limit to total number of monthly color prints.

The teacher planning center will also have one teacher computer for quick access to email, documents, and online research. In addition every teacher planning center will have a heavy duty laminator. The laminator will be used to support behavioral programs such as autism spectrum disorder as well as preserving instructional learning manipulatives.

The network infrastructure is critical to the success of the technology that is being implemented in the school. The current school has a 10/100MB Ethernet network and only three wireless access points. The district considered a wireless only school, but concluded a limited wired network is needed in addition to a high-density wireless solution.

Current Ethernet technology can deliver 1GBps to the desktop. New “Gigabit” WiFi actually only provide a theoretical max of 400MBps to desktop. In addition, the new generation of WiFi access points require two network drops rather than the previous one. The IT department is very concerned about relying solely or even heavily on WiFi for a school’s computing needs. Wired networking still far exceeds the speed of wireless networking and it is very expensive to add wired networking in the future. Wireless speed and reliability can be greatly affected on a day-to-day basis based on radio interference by surrounding neighbors/external sources. In general, the administration recommends two
wired connections at the teacher’s Classroom Technology Center (CTC) in the front of the classroom and two wired connections in the rear of each classroom. In addition, the administration recommends two power-over-Ethernet connections in the ceiling of each classroom for a WiFi access point (next generation access points will require two Ethernet connections) and one wired Ethernet connection in the ceiling for control of the projector. In larger spaces such as cafeterias or auditoriums, the administration recommends wiring for four WiFi access points (eight power over Ethernet connections).

Additional info on Gigabit WiFi:

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**Security**

We are looking to create a safe and welcoming Nelson Place school. As part of the planning, we need to be cognizant of the concept of school security and safety. There are many things that we need to consider in regards to planning the new facility. This narrative is designed to give a couple of ideas and design thoughts that can be integrated into the process.

We need to ensure adequate lighting in all areas of the facility, to include egress lighting and emergency power lighting, to ensure safe travel through the school during power outages. This should include adequate exterior lighting of all walkways, parking and the building perimeter.

We need to ensure that all visiting pedestrian traffic enter the building through the main office. This entry point should hold the visitor in a vestibule in full view, while communicating with office personnel to request admission into the building.

We need to consider in the design that all areas of the facility are in view as the faculty and staff move throughout the building. We need to minimize blind spots and “nooks and crannies” that can be used for hiding places.

We need to consider that all classroom and offices have the same internal-keying so that the faculty and staff have one key to lock down or “shelter in place” utilizing that one key anywhere in the building. The remainder of the door-keying throughout the facility needs to be discussed to ensure the most efficient operation of the building. All exterior door-keying should be restricted to essential personnel and be strictly controlled. We need to keep a complete and accurate list of all key holders in the main office.
We need to install a CCTV system in the building to ensure coverage at all corridors, entrances, the building perimeter, and playgrounds. This video surveillance should be web based to allow the principal and select staff to view activity from a tablet device or off site computer. A significant amount of data storage should be provided for archival purposes. An intrusion system should be provided that covers the entire envelope of the facility. This should include but not be limited to door contacts, glass break sensors, motion detectors, and any other intrusion activation devices. This system will need to be remotely-monitored by the districts contracted monitoring company. The partition of the system can be discussed as to how it relates to the operation of the school. We have learned in past projects that singular-partitioning works best for the district.

We should look to ensure the playground equipment is installed in such a place that is easily observed and monitored by the faculty and staff. It should be safe and well-lit as well as labeled and clearly marked clearly for the age-appropriate occupants. There may potentially be two distinct playground areas for the different age groups at the school. This area should be considered as an area to have video surveillance.

We will need to limit roof access by keeping dumpsters, transformers, and all other mechanical components away from the building. During the facility and landscape design we should also consider that roof access is limited to maintenance. Trees that are planted in the infancy can eventually grow to be access points to the roof. We also need to avoid planting hedges and decorative features within ten feet of the building. We will need to make sure that we cover drainpipes and downspouts, so that they cannot be climbed.

We need to build into the design protective measure for the main entrance, so that vehicular traffic cannot gain easy access to the main entrance. These protective measures need to be accomplished by utilizing bollards, explicit design, and other restrictive measures. We also want to ensure that emergency responders and night surveillance personnel can drive completely around the perimeter of the building.

We need to design the traffic flow to allow for proper use of the facility while discouraging unnecessary through traffic, by utilizing speed bumps, signage, and various other mechanical measures. We need to separate visitor parking from faculty parking and create a separate parking area for staff that arrive early or stay late.

We need to use fencing and gates with discretion to create a safe and welcoming environment while ensuring that the facility is secure. We will need to secure all gates with heavy-duty padlocks.

There are many articles and narratives about school security. Some interesting points are highlighted in Appendix C.
Transportation

Most of the students attending Nelson Place School in its current location are eligible to receive transportation due to distance, safety considerations, or an IEP that includes transportation as a related service. Although most students are eligible for transportation, the traffic volume at school entry and dismissal times is magnified by a significant number of private vehicles competing for limited street and parking lot space on and off current school property, presenting extra challenges for safety and scheduling. The already compact parking area becomes further condensed with the introduction of both large and small school buses. Available space does not provide for a fluid traffic flow for either school buses or private vehicles. Rather, all traffic must navigate in patterns that can vary day by day. Additionally, all traffic must stop when each school bus activates its red flashing lights when loading, as required by law. Inclement weather that increases the number of private vehicles dropping off and picking up students, and winter snow banks, further compound the traffic and parking issues in the neighborhood of the school.

As a result, a number of parents park at the bottom of Nelson Place and wait at dismissal time for their children to walk from the school to their vehicles. This narrows the roadway used to access the school property and increases the danger to students walking unattended in a high traffic area.

Creating a parking and traffic plan for a new school building that separates school bus loading zones from private vehicle traffic presents an opportunity to prioritize student safety while reducing congestion through an improved design for traffic flow. Private vehicles will not be delayed due to the legal requirement of waiting while school buses activate their red flashing lights when unloading and loading. Students walking between the school building and school buses can be insulated from the private vehicle traffic, reducing the opportunity for injury to the students from distracted drivers. Additional safety advantages will be realized if there can be further separation of regular education “big buses” from the special education school buses. There are a number of students in special education programs, as well as preschool students, eligible for curb to curb transportation through an IEP currently attending Nelson Place School. Some of these students participate in a specialized program designed for students along the autism spectrum and may require even closer supervision by school and transportation staffs. The additional time occasionally needed to load or unload these students on the school bus
would be accommodated without restricting the flow of all other traffic. Their safety in loading and unloading on school buses will only be enhanced through a separation from the significant vehicular and pedestrian traffic in other areas around the building.

Finally, an improved traffic flow will contribute to a reduction in the time needed for a safe and smooth school arrival and dismissal, lessening the impact on the neighborhood in which the school is sited.

**Nutrition-Cafeteria**

The Worcester Public Schools Child Nutrition Programing is part of a larger coordinated effort of all school departments and services contributing to the overall goal of promoting students’ physical, emotional and social being.

Since under-nutrition adversely affects the behavior of children, performance in school, and cognitive development, the cafeteria environment will focus meal production, consumption and marketing efforts on USDA reimbursable school meals: breakfast, lunch, after-school snack, and evening meals.

School meals will incorporate “whole food” commodities, fresh vegetables/fruits, whole grains, and milk all components with a preference for locally grown, as stated in the federally mandated nutrition guidelines of the *Healthy Hunger Free Kids Act of 2010* and the *Worcester Public School Wellness Policy*; see Appendix D.

Per the School Wellness Policy noted above, meals will be provided in a clean, safe, and pleasant setting with sufficient time and space for students to eat thereby promoting health-enhancing nutrition practices and the consumption of minimally processed and healthfully prepared foods. It is anticipated that 200+ breakfasts and 400+ lunches will be served daily along with school program-dependent afterschool snacks and evening meals. A full-service kitchen of conscience, non-dated design and layout will be necessary to maximize the nutrient density of the school meals while meeting federal, state, and local nutrition requirements for students and staff.

Student nutritional status would be further strengthened by the presence of a garden with direct physical and visual links to the kitchen and dining areas, as well as a greenhouse providing year round fresh food production, intended to foster a comprehensive experience
about healthy eating and an active lifestyle. Student grown foods, supported by both the educational program, as well as the community, will be integrated into lesson plans, and the school meal programs. The gardens would serve as a defining characteristic of the landscape design. This immediate source of food production would serve to strengthen the link between healthy fresh food production and consumption in support of the *School Wellness Policy* and the *Massachusetts Farm to School Kindergarten Initiative*.

**Massachusetts Farm to School Kindergarten Initiative**

*Massachusetts Farm to School Kindergarten Initiative* and the Worcester Public Schools are helping kindergarteners understand how and where food is grown. They are teaching children about nutrition through local food tastings, farm and farmer visits, cooking demonstrations and take home produce. The Worcester Kindergarten Initiative is currently operating at nine elementary schools in Worcester, MA, for the 2013-2014 school year. This innovative program of school nutrition utilizes locally grown food which is prepared in school kitchens to feed the students. Additionally, Worcester has a program for kindergarteners to learn about nutrition and recycling. Students take part in a unique outreach program aimed at tying food waste to energy production through a visit to Jordan Farm’s digester. It is through a school garden and greenhouse that we propose further developing and supporting these programs at the Nelson Place School; see Appendix F.

**Composting**

The Massachusetts Department of Environmental Protection has proposed a ban on the disposal of commercial food waste, to take effect by July 1, 2014. The ban would require large restaurants, supermarkets and foodservice institutions to begin separating food waste. The Massachusetts Department of Agricultural Resources and MA Clean Energy Council are looking to install organic waste digesters on dairy farms in Massachusetts for the production of electricity. The Department of Environmental Protection and Worcester Public School Cafeterias are proposing organic materials be sent to Jordan dairy farm in Rutland and converted to a slurry through the use of a InSinkeRator™ system to create electricity for the farms; see Appendix E.
The Worcester Public Schools school meal programming’s contributions to the student’s whole-health status with academic and public health relevance has been acknowledged by the following:

- Winner of the 2010 Healthiest School System in Massachusetts given by the Massachusetts Health Council.
- Winner of the 2011 Harvester Award from the Worcester County Food Bank “for outstanding commitment to the Food Bank’s mission of feeding hungry people today while working towards creating hunger-free communities of tomorrow.”
- The district was among five pilot districts in 2003 to purchase locally grown fruits and vegetables. For the past decade the district has maintained that commitment because we see the value of providing the freshest produce for our students. The daily and regular consumption of fresh fruits and vegetables aids in displacing their desire for foods of minimal nutritional value.
- In 2009, WPS launched its partnership in the “Know Your Farmer, your Food” initiative which Worcester Public Schools has developed strong prevention and wellness initiatives that are multi-faceted and serve the diverse population within the school system.
  To name a few, these initiatives include the school district engaging students, parents, teachers, food service professionals and other interested community members in developing, implementing, monitoring, and reviewing district-wide nutrition and physical activity policies.
- Massachusetts Farm to School Kindergarten Initiative - project benefiting 300 kindergartners in 14 schools throughout the district.
- All of the foods and beverages sold at school to students in the cafeteria minimally meet the nutrition guidelines of the U.S. Dietary Guidelines for Americans.
- Qualified child nutrition professionals assist school administrators to provide students with access to a variety of affordable, nutritious, and appealing foods that meet their health and nutrition needs; accommodate the religious, ethnic, and cultural diversity of the student body in meal planning; and provide a clean, safe, and pleasant setting and adequate time for students to eat.
According to the Center for Disease Controls (CDC), in 2000, 1 out 150 children were diagnosed with ASD. In 2008, 1 out 88 children are being diagnosed with autism spectrum disorder. Overall, the district continues to see an increase of our ASD students as the year progresses evidenced in the charts.
### Actual Counts

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### Percentage of Nelson Place

<table>
<thead>
<tr>
<th>SchCode</th>
<th>SchName</th>
<th>Autism</th>
<th>Communication</th>
<th>Developmental Delay</th>
<th>Emotional</th>
<th>Health</th>
<th>Intellectual</th>
<th>Multiple disabilities</th>
<th>Neurological</th>
<th>Physical</th>
<th>Sensory/Deaf-Blind</th>
<th>Sensory/Hearing</th>
<th>Sensory/Vision</th>
<th>Specific Learning</th>
<th>Total Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>76</td>
<td>Nelson Place</td>
<td>52.1%</td>
<td>15.4%</td>
<td>6.8%</td>
<td>5.1%</td>
<td>2.6%</td>
<td>0.9%</td>
<td>4.3%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>12.8%</td>
<td>100.00%</td>
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</tbody>
</table>

### Percentage of District Disability

<table>
<thead>
<tr>
<th>SchCode</th>
<th>SchName</th>
<th>Autism</th>
<th>Communication</th>
<th>Developmental Delay</th>
<th>Emotional</th>
<th>Health</th>
<th>Intellectual</th>
<th>Multiple disabilities</th>
<th>Neurological</th>
<th>Physical</th>
<th>Sensory/Deaf-Blind</th>
<th>Sensory/Hearing</th>
<th>Sensory/Vision</th>
<th>Specific Learning</th>
<th>Total Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>76</td>
<td>Nelson Place</td>
<td>13.7%</td>
<td>2.8%</td>
<td>1.6%</td>
<td>0.8%</td>
<td>2.1%</td>
<td>0.2%</td>
<td>1.0%</td>
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<td>0.9%</td>
<td>2.2%</td>
</tr>
</tbody>
</table>
Appendix B

Worcester Public Schools COMPASS
Delivering on High Expectations and Outstanding Results for All Students

♦ 100 percent of students will be guaranteed a rigorous core curriculum resulting in measurable gains in student learning.

Milestones for College and Career Readiness

♦ A 50 percent reduction in the proficiency gap in English Language Arts, Mathematics and Science & Technology/Engineering by 2016-17
  ♦ In ELA, a CPI of 88.1 by 2016-17
  ♦ In Mathematics, a CPI of 83.7 by 2016-17
  ♦ In Science & Technology/Engineering, a CPI of 80.8 by 2016-17

♦ Increase the WPS graduation rate to 90 percent over 4 years or 95 percent over 5 years by 2016-17

♦ A 50 percent reduction in the annual dropout rate to 1.9 percent by 2016-17

♦ 100 percent of graduates will successfully complete high school coursework that prepares them for both college and career.
Worcester Public Schools Improvement Strategy

Theory of Action
If all Worcester Public Schools’ personnel provide or support high quality teaching and learning, then all Worcester Public Schools’ students will continuously achieve higher performance levels, thus closing the achievement gaps.

ELL: Increase language proficiency of ELLs to meet State goals (listening, speaking, reading, writing)

SPED: Increase MCAS scores to exceed State scores

Grade 3 Reading: Decrease gaps among subgroups in MCAS, MAP and MEPA

21st Century Skills: Ensure students demonstrate skills necessary to achieve college readiness

Instructional Focus

Differentiated Practice

CONTENT

PROGRESS

PRODUCT

LEARNING ENVIRONMENT

Implement research-based instructional programs, interventions and supports

Collaboratively develop shared vision of high-quality teaching & learning

Develop effective communication structures to facilitate instructional core implementation

Provide and support high-quality professional development
District Instructional Focus

All personnel in the Worcester Public Schools will align efforts to have all students show growth in their ability to read fluently, comprehend deeply, think critically and respond effectively. This will be accomplished through the implementation of rigorous evidence-based instructional practices and a standards-based curriculum across all content areas. Multiple measures including formative and summative assessments will be used to monitor our progress, refine our practice and improve our capacity to ensure all students reach and exceed grade level expectations and graduate college and career ready.

All Worcester Public Schools students will regularly engage in listening, speaking, reading, and writing to become highly literate, creative collaborators, strategic problem solvers and effective communicators. Our students will be self-directed learners who critically examine varied points of view and carefully weigh and manage complex information presented through multiple media. Our students will also demonstrate respect and understanding of their position as contributing members in their local and global community.
Framework of High Quality Teaching and Learning

High Quality Teaching & Learning is content rich, student-centered, measurable and exists in a culture of high expectations for all students Pre K - 12. High quality teaching and learning classrooms are sensitive to students’ needs, interests, strengths, abilities, modes of contribution, social/cultural backgrounds, and address three essential elements: organization of the classroom; instructional design and delivery and student ownership of learning.

<table>
<thead>
<tr>
<th>Organization of the Classroom</th>
<th>Instructional Design and Delivery</th>
<th>Student Ownership of Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>Teachers</td>
<td>Students</td>
</tr>
<tr>
<td>Construct learning climate by respectful interactions, routines, tones, and discourse</td>
<td>Activate Prior Knowledge</td>
<td>Explain how routines, procedures and processes are helping their thinking and learning</td>
</tr>
<tr>
<td>Post, discuss and revisit content objectives throughout the lesson</td>
<td>Align instructional material with student needs</td>
<td>Express, in their own words, what they are learning and why</td>
</tr>
<tr>
<td>Post discuss and revisit language objectives throughout the lesson</td>
<td>Scaffold for content &amp; language development</td>
<td>Articulate the connection between what they are learning and the school wide instructional focus</td>
</tr>
<tr>
<td>Effectively manage time to maximize student learning</td>
<td>Demonstrate deep content knowledge throughout the presentation of the lesson</td>
<td>Utilize methods/strategies, models, and materials independently and/or collaborate to support their own learning</td>
</tr>
<tr>
<td>Use classroom walls and environment as a learning tool</td>
<td>Instruct using a range of techniques</td>
<td>Articulate personal data, goals, growth and benchmark expectations</td>
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<tr>
<td></td>
<td>Pose questions that require students to engage in a process of application, analysis, synthesis and evaluation</td>
<td>Ask questions to deepen their understanding of process and content</td>
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<td></td>
<td>Pace lessons to ensure that all students are actively engaged</td>
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<td></td>
<td>Use timely formative assessments to check for understanding to inform instruction &amp; celebrate growth</td>
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<td>Provide specific feedback to students to inform revision</td>
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<td>Maximize use of human capital to support student learning</td>
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<td>Teachers</td>
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<td>Construct learning climate by respectful</td>
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<td>- Establish rules and routines, encourage</td>
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<td>students to use materials purposely</td>
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<td>and respectfully</td>
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<td>- Facilitate discussion and compromise as</td>
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<td>students work with peers</td>
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<td>- Demonstrate positive interactions as a</td>
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<td>model for students in student-to-student</td>
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<td>and teacher-to-student communication</td>
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<tr>
<td>- Maximize the amount of time-on-learning by</td>
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<td>creating experiences and procedures for</td>
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<td>communication and behavior focused on</td>
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<td>achieving classroom goals</td>
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<td>Post, discuss and revisit content objectives</td>
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<td>throughout the lesson</td>
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<td>- Use MA Framework and district curriculum</td>
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<td>to develop content objectives</td>
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<td>- Build connections between standards and</td>
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<td>exemplary products as models to support</td>
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<td>student learning goals</td>
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<td>- Connect content learning objectives to real-</td>
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<tr>
<td>life examples and relevant application</td>
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<tr>
<td>- Post objective in clear student friendly</td>
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<tr>
<td>language</td>
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<td>- Focus students attention on what they</td>
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<td>should know and be able to do as a result</td>
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<td>Post discuss and revisit language objectives</td>
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<td>throughout the lesson</td>
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<td>- Use content-based language when presenting</td>
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<td>information and asking questions to build</td>
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<td>students’ academic language</td>
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<tr>
<td>- Orchestrate varied learning opportunities</td>
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<td>so that students reinforce continual</td>
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<td>language development through peer</td>
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<td>interaction, classroom participation and</td>
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<td>other modes of differentiated instruction</td>
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<td>- Scaffold language development of students</td>
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<td>toward academic language proficiencies</td>
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<tr>
<td>- Ensure that the four domains of language</td>
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<td>development are employed (Listening,</td>
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<td>Speaking, Reading, Writing)</td>
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<td>- Post language objective in clear student</td>
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<td>friendly language</td>
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<td>Effectively manage time to maximize student</td>
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<td>learning</td>
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<td>- Organize learning opportunities that</td>
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<td>address various learning styles, to</td>
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<td>ensure high student engagement</td>
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<td>- Providing scaffolded support as students</td>
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<td>become self-directed and skilled at</td>
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<td>transitioning from one learning experience</td>
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<td>to another</td>
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<td>- Use a variety of strategies to provide</td>
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<td>optimal levels of learning challenges as</td>
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<td>well as adequate support to address the</td>
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<td>diverse learning profiles of all their</td>
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<tr>
<td>students</td>
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<td>Use classroom walls and environment as a</td>
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<td>learning tool</td>
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<tr>
<td>- Organize learning materials and physical</td>
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<td>space to provide adequate and equitable</td>
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<td>engagement in productive tasks</td>
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<td>- Modify the learning environment to</td>
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<td>facilitate appropriate behavior and</td>
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<td>characteristics</td>
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<tr>
<td>- The learning environment continually adjust</td>
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<tr>
<td>to match learning objectives and student</td>
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<tr>
<td>needs to ensure engagement</td>
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</tr>
</tbody>
</table>
Worcester Public Schools Instructional Design and Delivery

Teachers

- Activate Prior Knowledge
  - Connect instruction to prior classroom learning
  - Use instruction and materials to access students' background knowledge, linguistic/cultural experience, and previously learned content

- Align instructional material with student needs
  - Use varied instructional modalities to optimize student strengths (i.e. use of visuals, multimedia, peer modeling, physical demonstrations, verbal explanation)
  - Select Texts based on students' independent level to scaffold reading development
  - Explicitly teach, discuss and reinforce key content vocabulary and provide opportunities for meaningful application
  - Presents content in a manner which is appropriate for age, grade and language and proficiency level of students

- Scaffold for content & language development
  - Assist all students developing key vocabulary strategies necessary for understanding and applying content
  - Use Academic vocabulary and complex language structures, scaffolding as necessary, during interaction related to lesson objectives and content
  - Model thinking, academic language, and comprehension strategies (i.e. think-aloud, ask and/or listen to a peer, narrated trial and error)
  - Appropriately match leveled texts to student needs

- Demonstrate deep content knowledge throughout the presentation of the lesson
  - Use of technologies related to their content area to deepen students understanding
  - Ensure that students are engaged with current and relevant information
  - Use multiple relevant instructional approaches to scaffold students' attainment of standards

- Instruct using a range of techniques
  - Provide opportunities to practice and receive feedback in all language domains: listening, speaking, reading and writing
  - Employ techniques that facilitate comprehension throughout the lessons
  - Frame questions to engage all students of different proficiency levels and skills
  - Provide appropriate wait time to brainstorm, collect thinking, practice responses, collaborate with a peer, and/or write before responding
Worcester Public Schools Instructional Design and Delivery

**Teachers**

- Pose questions that require students to engage in a process of application, analysis, synthesis and evaluation.
- Pace lessons to ensure that all students are actively engaged.
- Use timely formative assessments to check for understanding to inform instruction & celebrate growth.
- Provide specific feedback to students to inform revision.
- Maximize use of human capital to support student learning.

- Ask probing questions that challenge students to explore concepts/big ideas.
- Pose both oral & written questions to stretch student thinking beyond grade level standards and to generate connections to related content from across disciplines.
- Frequently queries the students or prompts students to explain thinking and rationale for responses and actions.
- Ask many open-ended questions.

- Utilize wait time in order to allow students to collect thinking and respond to questions.
- Use time effectively to allow all students meaningful participation.
- Facilitate classroom discourse to engage all students.

- Align assessment with instructional goals.
- Seek information about students’ backgrounds to improve their own teaching.
- Establish routines to systematically monitor what each student knows and is able to do.

- Confer with individuals or small groups to develop & support understanding and record notes from the session.
- Offer feedback that is constructive and specific.
- Encourage students to evaluate their progress.

- Provide student access to the lesson through direct support from him or her self or other adults in the classroom.
- Promote positive respectful relationships (i.e. teacher to student, student to teacher).
- Structure the classroom in a manner that provides students with access to more competent partners.
### Worcester Public Schools Student Ownership of Learning

#### Students

<table>
<thead>
<tr>
<th>Explain how routines, procedures and processes are helping their thinking and learning</th>
<th>Express, in their own words, what they are learning and why</th>
<th>Articulate the connection between what they are learning and the school wide instructional focus</th>
<th>Utilize methods, strategies, models, and materials independently and/or collaboratively to support their own learning</th>
<th>Articulate personal data, goals, growth and benchmark expectations</th>
<th>Ask questions to deepen their understanding of process and content</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Follow classroom routines well enough that minimal time is spent on listening to instructions and organizational details</td>
<td>□ Articulate the relevance of what they are learning, make real-world connections, and apply their learning In response to questions, students express opinions and defend their reasoning with evidence while using appropriate content language</td>
<td>□ Make interdisciplinary connections □ Articulate the school focus and explain why it is important to their learning □ Explain how what they are learning is connected to the focus</td>
<td>□ Access or generate support materials that address their individual learning needs □ Choose appropriately challenging activities and assignments □ Engage in activities which are appropriate in terms of complexity and pacing for their current level of knowledge and skill, but which challenge them to move forward</td>
<td>□ Understand the posted data celebrating growth and progress and articulate what they are doing to improve their learning □ Evaluate their own work in relation to rubric and standards based models of proficiency (exemplars) □ Chart their performance and set goals for what they need to learn to move to the next level(s) of proficiency □ Can describe the standards they have mastered and what requires additional work □ Know and can explain how their work/performance reflects their level of mastery in relation to the standards(s)</td>
<td>□ Ask questions and contribute throughout the lesson □ Responses direct discussions and set the context for teachable moments □ Ask clarifying, probing, and open-ended questions of their teacher and of one another to examine their thinking and develop a deeper understanding of content □ Use oral and written questions to push thinking beyond grade-level standards and generate connections to related content from across disciplines □ Monitor their own understanding and ask for assistance when they need it</td>
</tr>
</tbody>
</table>

- Utilize rubrics, and/or exemplary work to define what constitutes a high-quality product
When teachers …

systematically support the match of text readability to student reading performance, explicitly key students into text structure, and frame the assigned reading with a question,

teachers effectively use reading to support improved learning outcomes.

When students …

read text with clear connections to the student and learning standards, read to develop their skills and content knowledge, and read to deepen their thinking, writing and disclosure in the content areas,

students effectively read to support improved learning outcomes.

When teachers …

frame writing as a performance task that defines outcomes for skill and content development, scaffold skill and content development to ensure students meet performance expectations, and Explicitly teach students to use patterns of thinking consistent with the structure of content areas,

teachers effectively use writing to support improved learning outcomes.

When students …

write text to reflect content-specific thinking and framed by a specific structure, write to develop their skills and content knowledge, and write with evidence connected to multiple sources and prior knowledge,

students effectively write to support improved learning outcomes.

When teachers …

use academic language to frame discourse to prompt deeper thinking about content, use discourse to promote the exchange of knowledge and evidence, and expect discourse to reflect the conventions of thinking reflected in a specific content area,

teachers effectively use discourse to support improved learning outcomes.

When students …

speak with others to exchange ideas, knowledge, and thinking, speak with others to create new knowledge, and speak with others using conventions of thinking reflected in a specific content area,

students effectively engage in discourse to support improved learning outcomes.
Building Better School Security
Ideas to make your school safer
BY GEORGE R. DUTHIE

Providing a safe and secure environment for your students to learn is a complex task. Some critical elements include building a positive school culture of respect and civility, working with local policy and emergency personnel on developing proper security procedures and plans, and training faculty and staff to handle difficult situations. But there are also architectural or technological features that can be added to your school to help improve the physical security of your facilities.

Below we describe an array of solutions. Where possible, there is an estimated cost range included. The feasibility of any particular option may be dependent on such factors as your school’s existing building layout, staff availability, cost, and public perception.

The Three D’s of Physical Security Many security experts agree that three fundamentals are key to improving the security of your building.

- **Discern:** Identify anyone who wants to enter your building by requiring everyone to enter the building at locations where they can be screened. In most schools, this is the main office. Some schools may use a lobby check-in station, entry kiosk, or other means to screen visitors to a school.
- **Delay:** Install measures that slow down an intruder’s movement into and through your building.
- **Disrupt:** Provide a way to notify law enforcement of an intruder as quickly as possible. Employing delay measures may frustrate and thus disrupt an intruder. The goal is to slow down an intruder and speed up law enforcement response time.

**BUILDING SOLUTIONS TO ‘DISCERN’**

**Remove visual obstructions** Remove any obstructions that may prevent you from monitoring a building perimeter. Eliminate nooks and crannies and tall landscaping near buildings. These can provide a place for an intruder to hide. Remove trash cans, mail boxes and other objects away from the building. Expected cost: Utilizing school staff may result in little or no cost to the district. Measures such as fencing and gates may cost several hundred to several thousands of dollars, depending on the quantity and configuration needed.
Check all exterior door and roof hatch hardware and operation Doors and hatches which do not close or latch properly can allow intruders to enter a building at a place other than where they can be screened. The expected cost for changes can range from $100/door for simple repairs to $3,500 to replace a pair of exterior doors or to replace a hatch.

Improve Visibility Cut an opening in a wall and add a window or vision light in key areas to improve visibility of the building entrance and surrounding area. The expected cost can range from $1,500 for a simple vision light to $5,000 or more for complicated window configurations.

Re-Configure Main Office In some buildings the main office is located remotely from the main entrance to the school. In cases like these, there are several options to consider: Relocate the main office, relocate the main entrance or provide a separate manned control point near the entrance. Expect renovation costs to range from $225 to $275 per square foot depending on the scope of the renovation work needed.

Secure Vestibules: Configure the entrance to your building to require that visitors travel through the main office (or other check point) prior to entering the building.

Entrance intercom: The entrance intercom system (which combines call switch, camera, speaker, microphone and door release) is an efficient and economical way to screen visitors. The expected cost will range from $2,500 - $4,000 for the first door with additional doors costing $1,500 – $3,000 each.

Entry kiosks: A complete automated visitor management solution combining license scanner with limited background check, camera and visitor badge printing system. The system consists of kiosk structure and software. Expected cost will range up to $5,000 with recurring costs for software, licenses and maintenance.

Video cameras: A large variety of cameras with numerous features are available. It is important to select the correct camera for the desired application. Cameras are typically a part of a larger video management system, which can be web based. IP (internet protocol) cameras are most common. They require server capacity, power over Ethernet switches and storage capacity. Large camera systems may have a significant effect on your technology infrastructure and require network upgrades. Expected costs of a camera system will vary widely and are directly related to the sophistication and size of system. Camera costs range from $1,500 to $3,000 or more for each camera installed. Video management software may cost $5,000 or much more depending on type, features and size of system. Most systems can be scaled, allowing cameras to be added in the future. Camera licenses will also affect the price of the system. Technology upgrade costs may also be incurred if the network must be upgraded to accommodate the cameras. Recurring costs include software upgrades, maintenance and software/camera licenses.
**Door access control system:** This system allows access to locked doors by using a card, key fob, key pad or other device. The system may be local (residing in the door hardware) or global (building or district-wide). The system is usually highly customizable and can be set for users allowed, access levels, access times and other restrictions. There are a large variety of systems to choose from. It is important to be aware of the building code issues surrounding access controlled doors, and your design professional should be consulted before installing them. The modification of the operating characteristics of any door typically requires a building permit. Typical installation costs range from $2,500-$3,500 per door. Some doors may require additional hardware work which will add to the expense. There may also be recurring costs such as software, licensing and maintenance, depending on the exact system selected.

**Door status alarms (door open):** Door alarms use a set of contacts mounted on a door and frame to alert you when a door is not properly closed and/or latched. The alert may be local (at the door) or part of a security system. They are usually accompanied by a sensor (request to exit) to prevent alarms when people exit through the door normally. This system typically requires human intervention to check the door when the alarm sounds. The expected cost per door will be $1,000 to $2,000 depending on type of system. Some doors may require additional hardware work, which will add to the expense. There may also be recurring costs such as alarm company monitoring and personnel time to check doors on a regular basis.

**Intrusion detection system:** An intrusion detection system (i.e. motion sensors) in your buildings will protect your building at times when it is closed to reduce the risk of vandalism, theft or intruders with ill intent from breaking in and hiding in the building. Video cameras with motion sensor technology can also perform this function, recording the event while sending an alarm at the same time.

**Security management systems:** This system provides an integrated, comprehensive and scalable group of options, including door-access controls, video management, identification cards with door access, visitor management, forensics, intrusion detection and many others. Expected cost varies widely depending upon features and number of buildings. It is reasonable to plan for an initial budget of $50,000 in addition to the costs of hardware. There will be recurring costs as well for software upgrades, licenses and maintenance.

**BUILDING SOLUTIONS TO DELAY**

**Ballistic films and glazing:** Existing or new glass may be coated with ballistic, or bullet resistant film. Ballistic glass may be used to replace existing glass or in new applications.
Most school buildings have thousands of square feet of glass. The cost of ballistic films and glass will make them of limited use in schools, perhaps only at entrances and other key areas. There are varying strengths of film and glass. Expected cost for ballistic film is $15 - $25 per square foot installed and for ballistic glass, $100 - $300 per square foot installed.

**Intruder doors:** These are doors located in corridors that close automatically when an intruder alarm or lockdown is activated. These doors will typically lock using magnets or other mechanisms. They will automatically release in the event of an emergency, such as a fire or power outage. The doors must be equipped with a means for law enforcement and other first responders to open them as needed.

**Intruder locksets:** These locks are located on the inside of a door in all occupied rooms and are designed to lock the outside (hallway) facing door handle without having to enter the hallway. The special design of the lock allows it to always have the ability to be opened from the inside. Some newer existing locks can be retrofitted for a relatively low cost (about $100-$500/door, depending on who performs the labor). Older hardware will need to be replaced for a higher cost (about $750-$1000/door installed, depending on type of door and fire rating).

**Safe rooms:** Typically, these are windowless existing rooms, such as toilets, storage rooms or offices attached to the classroom, which serve as a hiding place in the event of a lockdown. Because the duration of a lockdown cannot be known in advance, consideration must be given to the need for temporary portable toilet facilities, drinking water, snacks and means for constant communications.

**BUILDING SOLUTIONS TO DISRUPT**

**Panic button:** This sends an immediate signal to the police, alerting them that fast action is needed. This will usually result in a robust response by law enforcement, and therefore, should only be used in the event of imminent danger or a true life or death emergency. These are typically installed and monitored by a district’s security alarm vendor. The panic (9-1-1) button can also be incorporated into some phone systems.

**Communications systems to occupants:** All school districts should have a way to communicate emergencies to building occupants. Prompt notifications can allow time for occupants to take action to disrupt or foil an intruder. Most buildings already have a public address system. This system should be kept in good operating condition at all times. Obsolete or unreliable systems should be replaced. Newer systems can be equipped with additional audio and visual features to alert occupants to different threat levels. A reasonable budget cost for a replacement public address/intercom system is $2 to $3 per square foot depending on system type and features, as well as existing conditions.
Improve access and information for law enforcement: Real time is the best time. Security management and video systems are equipped with features that can be configured to allow police officers to view video footage directly from the patrol vehicles. This can greatly aid in staging a response and containing an emergency.

Your Security Plan Each school district and building is unique. Before executing security related projects, a school district must develop a physical security plan which sets forth the goals and objectives which are in line with the district’s needs and practices. Consideration must be given to present district policies, perceived threats, staffing capabilities, budget and public perception. A district should draw upon all available resources for advice, including federal, state and local agencies (in particular local police, fire and medical first responders). If needed, districts may also engage the services of an outside security consulting firm. The security plan should be evolutionary and adaptable to constant changes in threat levels. If the plan involves any changes to building elements, you should consult with your design professional to assure that building codes are not overlooked. Most security projects which modify building elements will require approval and inspection by local agencies, including construction and fire safety.

Implementation Schedules Be aware of the time frames associated with the various types of security projects which you may choose to implement. Time must be allowed for design, project approvals (New Jersey Department of Education, construction plan review, permitting) and procurement of materials. Items such as doors and hardware may take 8-12 weeks to receive. Individual vendors should be consulted regarding the scope, cost and lead times for their respective products.

Soft Costs and Recurring Costs When determining the final cost of the project, take into account project ‘soft’ costs such as architect/engineer fees, plan review, contingency, legal fees, advertising and printing costs. Also remember that your selected security projects may create recurring costs such as staff salaries, maintenance, licensing fees, software upgrades and others. These recurring costs must be planned for and included in your annual budget.

While there are numerous architectural and technological solutions available to help make your school building safer, these solutions should only be implemented in response to a well thought-out and vetted school security plan. Consideration must be given to factors such as appropriateness, schedule, upfront and recurring costs, and public and staff perception. School districts should draw upon the wide range of resources available to them when making a decision about security solutions with the understanding that each school is unique and has different requirements and criteria.
Appendix D

Worcester Public School Nutrition Program
Wellness Policy

Preamble

It is the mission of the Worcester Public Schools (WPS) Wellness Policy to enable students to become independent and self-directed learners, responsible for meeting their own health and nutritional needs as developmentally appropriate. It is the goal of the Wellness Policy to promote the students’ physical, emotional and social well being through the coordinated efforts of all departments and services offered in the Worcester Public Schools.

Overview:

National statistics show that 15.3% of student’s ages 6 to 11 are obese (BMI > 95th%); and 15% of this same age group are overweight (BMI >85th but <95th). In Worcester, overweight and obesity is an even more significant issue, with 18.8% of students assessed in the 2009 year as obese and 17.4% as overweight.

Given that obesity has become a major concern nationwide and locally, the WPS is committed to providing school environments that promote children’s health and well-being and ability to learn by supporting healthy eating and physical activity. Therefore, it is the policy of the Worcester Public Schools that:

- The school district will continue to engage students, parents, teachers, food service professionals and other interested community members in developing, implementing, monitoring and reviewing district-wide nutrition and physical activity policies.
- Students in grades K-12 will have opportunities, support and encouragement to be physically active on a regular basis.
- Foods and beverages sold at school, to students in the cafeteria, will meet the nutrition recommendations of the U.S. Dietary Guidelines for Americans.
- Qualified child nutrition professionals will assist school administrators to provide students with access to a variety of affordable, nutritious and appealing foods that meet their health and nutritional needs. They will take into account the religious, ethnic and cultural diversity of the student body in meal planning.
- Meals will be provided in clean, safe and pleasant settings with sufficient time for students to eat.
- Schools will provide nutrition education and physical education to promote lifelong habits of healthy eating and physical activity and will establish linkages between health education, school meal programs and related community services.
- Students and staff will benefit from a coordinated program of accessible health and counseling services.

The Worcester Public Schools will work with our existing School Health Advisory Council to develop, implement, monitor, review, and as necessary, revise school health, nutrition and physical activity policies. The Council will also serve as a resource to school sites for implementing these policies, for it is the belief of this council that healthier students are better learners.
I. School Health Advisory Council

Members of the School Health Advisory Council may include:
- Director of Supplemental Support Services
- Member of Worcester School Committee
- Coordinator of Nursing Services
- Coordinator of Counseling, Psychology and Community Outreach
- Director of School Nutrition
- Director of Health, Physical Education and Athletics
- Executive Assistant to the Superintendent on School Safety
- High School Principals
- Middle School Principals
- Elementary School Principals
- High School Students
- Parents/Guardians
- Private/Parochial School Nurse Liaison
- Worcester Public School’s Physician Consultant
- School-based health center representatives
- City of Worcester Commissioner of Public Health
- Representative: City of Worcester EMS
- Representative: Edward H. Kennedy Health Center
- Representative: Family Health Center
- Representative: U Mass/Memorial Hospital
- Representative: Y.O.U., Inc.
- Representatives: Youth-serving Agencies
- Representatives: Family Organizations
- Representative: Worcester Food & Active Living Policy Council

II. Nutritional Quality of Foods and Beverages Sold and Served on Campus

School Meals

Meals served through the National School Lunch and Breakfast Programs will follow the nutritional parameters of Nutrient Standard Menu Planning whereas minimum levels are met for calories, protein, calcium, iron, vitamin A, vitamin C and maximum levels for total fat do not exceed 30% and saturated fats does not exceed 10%.

School principals will consult with the School Nutrition Office concerning lunch scheduling in order to cooperatively establish the required number of serving outlets ensuring all students have comfortable access to school meals.

The school cafeteria serving space(s) will focus on marketing the reimbursable meal and other “whole-food” commodities such as milk, fresh fruit and vegetables.

The School Nutrition Program will purchase locally grown fruits, vegetables and other commodities in season and continue to work with the Department of Agriculture to secure and develop availability.

In compliance with the Healthy, Hunger-Free Kids Act of 2010, water is available during meal service free of charge in the place where meals are served.

All school meals will continue to be free of artificial trans fats.
Competitive Foods

Consistent with local, state and federal guidelines, unauthorized food sales will not occur in the cafeteria and/or in competition with reimbursable meals offered through the National School Breakfast and Lunch Program.

2010 legislation includes the following new guidelines of particular note:

In compliance with the Massachusetts School Nutrition Bill, all foods sold in school stores, school snack bars, vending machines or any other location in the school comply with nutrition standards put forth by the Department of Public Health, provided that the nutritional standards shall not apply to competitive foods or beverages sold on school grounds 30 minutes before the beginning of the school day or 30 minutes after the end of the school day, with the exception of food and beverages sold through vending machines, in which case the nutritional standards shall apply at all times.

III. Nutrition and Physical Activity Promotion and Food Marketing

Nutrition Education and Promotion: The Worcester Public School District aims to teach, encourage, and support its students to develop healthy eating habits. Schools will provide nutrition education and engage in nutrition promotion that:

- is offered at each grade level as part of a sequential, comprehensive, standards-based program designed to provide students with the knowledge and skills necessary to promote and protect their health;
- is part of, not only health education classes, but also classroom instruction in subjects such as science, language arts and family and consumer science;
- includes enjoyable, developmentally-appropriate, culturally-relevant, participatory activities, such as contests, promotions, taste testing, farm visits and school gardens;
- promotes fruits, vegetables, whole grain products, low-fat and fat-free dairy products, health food preparation methods and health-enhancing nutrition practices;
- emphasizes caloric balance between food intake and energy expenditure (physical activity/exercise);
- links with school meal programs, other school foods and nutrition-related community services;
- teaches media literacy with an emphasis on food marketing; and
- includes training for teachers and nutrition staff

Food Marketing in Schools: School-based advertising will be consistent with nutrition education and health policy. In-school advertising of brands promoting predominantly low-nutrition foods and beverages is prohibited. The promotion of healthy foods, including water, fruits, vegetables, whole grains and low-fat dairy products is encouraged.

Staff Wellness: All staff are members of the Employee Assistance Company, which has nurses available to coach and educate individuals regarding wellness and prevention.
IV. Physical Activity Opportunities and Physical Education

Physical Education

MGL Chapter 71, Section 3 states:

*Physical education shall be taught as a required subject in all grades for all students in the public schools for the purpose of promoting the physical well being of students.*

Therefore:

- The WPS will teach physical education to all students K-12, including students with disabilities, special health care needs, and in alternative educational settings.
- Students will receive regularly scheduled physical education instruction which meets the Massachusetts state guidelines.

Certified physical education teachers will teach physical education classes.

Recess: Elementary school students will have supervised recess, preferably outdoors, one or more times daily where moderate to vigorous physical activity will be encouraged.

Wide variation in WPS facilities both indoors and outdoors presents challenges in providing active recess, but sedentary activities should not be substituted. Individual schools must explore solutions that overcome their limitations to provide students active recess time. Solutions may be found in best practices locally and around the country and may include access to nearby indoor and outdoor recreation facilities.

Physical activity before and after school:

- Students are given opportunities for physical activity through a range of before-and/or after-school programs including, but not limited to, intramurals, interscholastic athletics, and physical activity clubs (i.e. Fit Math, Walking clubs, etc.)
- After-school enrichment programs and child care programs will be encouraged to provide appropriate space, equipment, and activities that support daily periods of moderate to vigorous physical activity for all participants.

V. School Environment

School Celebrations/Fundraising:

The Worcester Public Schools encourages cultural food celebrations and sharing of food traditions amongst students, families, teachers and staff. We recognize that food is a central component to our various cultures, and we encourage celebrations to have a “healthy food” focus.

Schools should limit parties/celebrations that involve low-nutrition foods and should explore fun non-food alternatives for celebrations as well. (see http://cspinet.org/new/pdf/healthy_school_celebrations.pdf).

Fundraisers involving low-nutrition foods (such as cookie and cupcake sales) should also be limited and creative non-food fundraisers should be explored (examples include walk-a-thons, car washes, raffles for lunch with the principal): 
http://www.cspinet.org/nutritionpolicy/fundraiserfactsheet.pdf
http://www.extension.iastate.edu/Publications/PM2039A.pdf
**Water intake:** Water intake should be encouraged for all students, and students should have access to drinking water throughout the school day. Adequate water intake is not only key to prevention of obesity, but also essential for maintaining hydration. Inadequate hydration can be related to headaches, constipation, and may interfere with cognitive functioning.

**Bathroom access:** Students should readily have access to bathrooms as needed. Restriction of access to bathrooms can pose health risks to students (such as increased urinary tract infections), and result in discomfort, poor hygiene and may impede learning due to an inability to maintain attention. Furthermore, since hand washing is key to prevention of spread of germs and illness such as influenza, ready access to bathrooms (which are clean and have adequate supplies of soap and towels) is essential.

**VI. School Health/Nursing Services**

A coordinated program of accessible health services will be provided to students and staff through the leadership of the school nursing department, in collaboration with the school physician consultant various departments within the school system, and outside agencies, as applicable. The program will include communicable disease prevention, immunizations, health assessments and screenings, chronic condition management, counseling, community health referrals, immunizations, first aid and emergency care.

School nurses will continue to provide screening services including, vision, hearing, scoliosis, and BMI. Students with screening results needing follow-up will have a letter sent to parents to be shared with the student’s primary physician provider (PCP)/medical home. School nurses will make an effort to contact the PCP/medical home in cases where the family has not followed-up.

When a student with a chronic health condition (including, but not limited to, asthma, diabetes, life threatening allergies, obesity, ADHD) has an Individual Care Plan in place, and the parents/guardians have given consent, the school nurse will provide the education and training on a need to know basis to all involved staff, including coaches and physical education staff, in order to keep the student safe at school. The school nurse will act as the resource person for staff questions relating to a student’s chronic condition and will work collaboratively with the family and the student’s primary care provider. The school nurse will educate individual students on any limitations or accommodations needed, before any physical activity. The WPS Department of Nursing will continue to work with our physician consultant and other allied health organizations on issues relating to students’ overweight and obesity along with other health conditions.

**Life Threatening Allergies:** The WPS nurses will provide life-threatening allergy (LTA) awareness education and Epi-pen training as needed for WPS employees based on the Department of Public Health (DPH) and Department of Elementary and Secondary Education (DESE) recommendations including but not limited to:

- The significance of life threatening allergies (LTA) and a discussion on the most common types of LTA (food, stinging insect, latex and medication allergies);
- Creating a safe environment for students with LTA’s;
- Designation, when necessary, of a table in the cafeteria or a student’s classroom as a peanut-free or a food specific-free zone;
- Implementation of a “NO FOOD OR UTENSIL” sharing practice among students, as needed, with focus on the elementary level;
- Training of cafeteria employees about the precautions necessary to ensure the safety of student/staff from the cross contamination of food or utensils;
- Parent guidelines regarding snacks;
- The signs and symptoms of anaphylaxis;
- Use of an Epi-pen
- Activation of the Emergency Response System, i.e. nurse and 911 EMS, to deal with an actual, suspected or potential anaphylactic reaction.

**Asthma**: The school nurse will provide education and instruction to all staff involved with students, on a need to know basis including:

- guidelines established for students to self carry and administer their own inhaler, with parent/physician permission, and cleared by the school nurse. A medication plan will be developed and in place for the student. The school nurse will instruct the student and staff on recognizing the signs and symptoms of an asthma attack; what is a rescue inhaler vs. nebulizer treatment
- activate the Emergency Response System when a student is still having difficulty breathing after using his/her inhaler or nebulizer treatment.

The school nurse will work collaboratively with the family and student’s PCP, to assist in asthma management, and will educate and reinforce teaching of students on the use of their asthma action plan.

**Diabetes**: The school nurse will provide education and instruction to all staff on a need to know basis, to keep the student safe in the school setting:

- guidelines established for students to carry, test and administer their own insulin with parent/physician permission and cleared by the school nurse. A medication plan will be developed and in place for the student;
- the signs and symptoms of low blood sugar and the necessary treatment established by the student’s physician;
- the dietary and carbohydrate needs of a student in consultation with school nutrition;
- activation of the Emergency Response System when the student is still not responding to treatment.

**ADHD**

ADHD is one of the most common chronic health conditions for school aged children, and collaboration amongst medical providers, families, and schools is key for diagnosis and management to ensure school success. School nurses will provide medication administration for students with ADHD when necessary, and will act as a resource for teachers and staff regarding medication use/side effects. School nurses will assist with communication between families, physicians and school regarding ADHD evaluation and management.
Mental Health and Counseling Services

Mental health and positive social and behavioral skills are integral to the wellness of our students.

In both elementary and secondary schools, our Counseling and Psychological Services staff members provide supportive services to address identified social, emotional and adjustment needs of students in cooperation with their parents or guardians, as well as our teachers and administrators.

With regard to this policy, on the elementary level, School Adjustment Counselors and School Psychologists work closely with administrators, teachers and school nurses when children develop adjustment or behavioral difficulties that may be related to their emotional health and may compromise their abilities to be successful learners. In our middle and high schools, every student is assigned to a guidance counselor who is knowledgeable about the developmental needs of adolescents regarding issues that result from unmet emotional needs. The guidance counselors will refer parents and students to the school adjustment counselor or school psychologist for assistance in determining an appropriate course of action when needs are identified. This support staff may assist families to access community-based services through a school-based health center or through our referral protocol with local providers of behavioral health services when such ongoing support appears necessary.

If a student is functionally disabled by the condition of their mental health referrals to the Student Support Process are made so that additional necessary services or supports in school can be accessed.

VII. Communication

The Wellness Policy will be made available publicly on the WPS website and shared with the community partners

Communications with Parents:

- The WPS will distribute the Wellness Policy to CPPAC, Site Councils and PTOs and will engage families in the goal of creating a health-supporting environment at school.
- Each year the WPS will send families a letter that includes relevant research findings, local and national child health statistics, examples of healthy snacks, fund-raising and celebrations, and school-based programs and policies that are designed to guide children in making wise nutritional choices. The district/school will also provide families with information about physical education and other school-based physical activity opportunities before, during and after the school day and support parents’ efforts to provide their children with opportunities to be physically active outside of school through distribution of information regarding services available from youth serving agencies.
- The WPS will also utilize school newsletters, the school health website, individual school websites and community partners to inform parents about wellness and highlight promising practices.
Communication with principals and staff - The Wellness Policy will be distributed system-wide to include all principals, who will share it with their staff and site councils.

VIII. Monitoring

Per Federal Regulation regarding the implementation and monitoring of Wellness Policies, this policy will be implemented at both a district and individual school level, and the monitoring of activities will reflect this implementation strategy.

The Superintendent will meet annually, each spring, with the School Health Advisory Council to review, recommend and approve revisions to the Wellness Policy as needed.

The School Health Council will provide implementation templates for the following sectors:
- General school environment: This piece of implementation will be monitored at an individual school level. Principals will work collaboratively with their Site Council and PTO to implement and monitor activities.
- School Nursing: This piece of implementation will be monitored at a district level by the head of School Nursing with input from individual school nurses.
- Physical Education and Nutrition Education: This piece of implementation will be monitored at the district level by the Athletic Director with input from teachers and individual schools.
- School Nutrition: This piece of implementation will be monitored at the district level by the School Nutrition Director with input from individual schools.

Data regarding implementation will be collected annually by the School Health Council and an annual report will be prepared summarizing district-wide activities for implementing the Wellness Policy. The report will be submitted to the School Committee’s Standing Committee on Teaching, Learning, and Student Supports. It will also be shared with WPS staff, students and families and the community.
<table>
<thead>
<tr>
<th>Meal Pattern</th>
<th>Breakfast Meal Pattern</th>
<th>Lunch Meal Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grades K-5&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Grades 6-8&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Fruits (cups)&lt;sup&gt;c,d&lt;/sup&gt;</td>
<td>5 (1)&lt;sup&gt;e&lt;/sup&gt;</td>
<td>5 (1)&lt;sup&gt;e&lt;/sup&gt;</td>
</tr>
<tr>
<td>Vegetables (cups)&lt;sup&gt;c,d&lt;/sup&gt;</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dark Green&lt;sup&gt;f&lt;/sup&gt;</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Red/Orange&lt;sup&gt;f&lt;/sup&gt;</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Beans/Peas (Legumes)&lt;sup&gt;f&lt;/sup&gt;</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Grains (oz eq)&lt;sup&gt;i&lt;/sup&gt;</td>
<td>7-10 (1)&lt;sup&gt;j&lt;/sup&gt;</td>
<td>8-10 (1)&lt;sup&gt;j&lt;/sup&gt;</td>
</tr>
<tr>
<td>Meats/Meat Alternates (oz eq)&lt;sup&gt;k&lt;/sup&gt;</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Fluid milk (cups)&lt;sup&gt;j&lt;/sup&gt;</td>
<td>5 (1)</td>
<td>5 (1)</td>
</tr>
</tbody>
</table>

**Other Specifications: Daily Amount Based on the Average for a 5-Day Week**

<table>
<thead>
<tr>
<th>Min-max calories (kcal)&lt;sup&gt;m,n,o&lt;/sup&gt;</th>
<th>350-500</th>
<th>400-550</th>
<th>450-600</th>
<th>550-650</th>
<th>600-700</th>
<th>750-850</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saturated fat (% of total calories)&lt;sup&gt;n,o&lt;/sup&gt;</td>
<td>&lt; 10</td>
<td>&lt; 10</td>
<td>&lt; 10</td>
<td>&lt; 10</td>
<td>&lt; 10</td>
<td>&lt; 10</td>
</tr>
<tr>
<td>Sodium (mg)&lt;sup&gt;p&lt;/sup&gt;</td>
<td>≤ 430</td>
<td>≤ 470</td>
<td>≤ 500</td>
<td>≤ 640</td>
<td>≤ 710</td>
<td>≤ 740</td>
</tr>
<tr>
<td>Trans fat&lt;sup&gt;r&lt;/sup&gt;</td>
<td>Nutrition label or manufacturer specifications must indicate zero grams of trans fat per serving.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

<sup>a</sup>In the SBP, the above age-grade groups are required beginning July 1, 2013 (SY 2013-14). In SY 2012-2013 only, schools may continue to use the meal pattern for grades K-12 (see § 220.23).

<sup>b</sup>Food items included in each food group and subgroup and amount equivalents. Minimum creditable serving is ⅛ cup.

<sup>c</sup>One quarter-cup of dried fruit counts as ½ cup of fruit; 1 cup of leafy greens counts as ½ cup of vegetables. No more than half of the fruit or vegetable offerings may be in the form of juice. All juice must be 100% full-strength.

<sup>d</sup>For breakfast, vegetables may be substituted for fruits, but the first two cups per week of any such substitution must be from the dark green, red/orange, beans and peas (legumes) or “Other vegetables” subgroups as defined in §210.10(c)(2)(iii).

<sup>e</sup>The fruit quantity requirement for the SBP (5 cups/week and a minimum of 1 cup/day) is effective July 1, 2014 (SY 2014-2015).

<sup>f</sup>Larger amounts of these vegetables may be served.

<sup>g</sup>This category consists of “Other vegetables” as defined in §210.10(c)(2)(iii)(E). For the purposes of the NSLP, “Other vegetables” requirement may be met with any additional amounts from the dark green, red/orange, and beans/peas (legumes) vegetable subgroups as defined in §210.10(c)(2)(iii).

<sup>h</sup>Any vegetable subgroup may be offered to meet the total weekly vegetable requirement.

<sup>i</sup>At least half of the grains offered must be whole grain-rich in the NSLP beginning July 1, 2012 (SY 2012-2013), and in the SBP beginning July 1, 2013 (SY 2013-2014). All grains must be whole grain-rich in both the NSLP and the SBP beginning July 1, 2014 (SY 2014-2015).

<sup>j</sup>In the SBP, the grain ranges must be offered beginning July 1, 2013 (SY 2013-2014).

<sup>k</sup>There is no separate meat/meat alternate component in the SBP. Beginning July 1, 2013 (SY 2013-2014), schools may substitute 1 oz. eq. of meat/meat alternate for 1 oz. eq. of grains after the minimum daily grains requirement is met.

<sup<l>Fluid milk must be low-fat (1 percent milk fat or less, unflavored) or fat-free (unflavored or flavored).

<sup>m</sup>The average daily amount of calories for a 5-day school week must be within the range (at least the minimum and no more than the maximum values).

<sup>n</sup>Discretionary sources of calories (solid fats and added sugars) may be added to the meal pattern if within the specifications for calories, saturated fat, trans fat, and sodium. Foods of minimal nutritional value and fluid milk with fat content greater than 1 percent milk fat are not allowed.

<sup>o</sup>In the SBP, calories and trans fat specifications take effect beginning July 1, 2013 (SY 2013-2014).

<sup>p</sup>Final sodium specifications are to be reached by SY 2022-2023 or July 1, 2022. Intermediate sodium specifications are established for SY 2014-2015 and 2017-2018. See required intermediate specifications in § 210.10(f)(3) for lunches and § 220.8(f)(3) for breakfast.
Food Components and Vegetable Subgroups Using USDA Foods for Massachusetts

USDA Foods include a variety of convenient products that school districts may select to match their needs and meet the current meal pattern for the National School Lunch Program (NSLP) and School Breakfast Program (SBP). The foods listed below are commonly used in menu planning. USDA Foods that are currently available in Massachusetts are represented in bold italics with an asterisk.

<table>
<thead>
<tr>
<th>MEAT/ MEAT ALTERNATE</th>
<th>GRAINS</th>
<th>FRUITS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Beef</strong> (ground, patty, taco filling, lower sodium)*</td>
<td>Breads (slice whole wheat, french, Italian)</td>
<td><strong>Applesauce unsweetened</strong> - (Canned* and Shelf Stable Cups*)</td>
</tr>
<tr>
<td><strong>Cheese</strong> (reduced fat cheddar, American skin, light or part skim mozzarella)*</td>
<td>Buns (hamburger, hot dog)</td>
<td>Canned fruits (apple slices unsweetened, cranberry sauce sweetened)*</td>
</tr>
<tr>
<td><strong>Chicken</strong> (oven roasted, diced, cut up, fajita strips)*</td>
<td>Crackers (graham, saltines)</td>
<td>Canned fruits in extra light sucrose (mixed fruit, peaches)*</td>
</tr>
<tr>
<td>Egg products-liquid eggs, bulk eggs*</td>
<td><strong>Flour</strong> (all purpose, whole wheat)*</td>
<td>Dried fruits (raisins*, cherries, plums, apricots and fig pieces in fruit nut mix, Fruit Mix No Nuts*)</td>
</tr>
<tr>
<td><strong>Lean meat, pork, poultry and fish products</strong>*</td>
<td>Pita bread (whole wheat, whole grain)</td>
<td><strong>Frozen fruit cups</strong> (strawberry, peaches)*</td>
</tr>
<tr>
<td><strong>Pork</strong> (roast leg, pork ham-lower sodium)*</td>
<td>Pizza crust (whole wheat, whole grain)</td>
<td><strong>Frozen fruits</strong> (unsweetened blueberries, whole strawberries, apple slices)* (sweetened strawberry slices)*</td>
</tr>
<tr>
<td>Tuna(light)</td>
<td>Pretzels</td>
<td>100 % juice (orange*, grape, apple)</td>
</tr>
<tr>
<td><strong>Turkey</strong> (roast, breast deli-lower sodium, taco filling)*</td>
<td>Macaroni (regular, plain elbow)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Rice</strong> (enriched white or brown long grain rice)*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rolled oats</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rolls (whole wheat, whole grain)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stuffing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Taco shells (whole wheat or whole corn)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Tortillas</strong> (whole wheat*, whole corn)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Whole grain pancakes</strong>*</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Whole grain pastas</strong> (spaghetti, rotini, macaroni)*</td>
<td></td>
</tr>
</tbody>
</table>

**VEGETABLE SUBGROUPS**

<table>
<thead>
<tr>
<th>DARK GREEN</th>
<th>RED/ORANGE</th>
<th>STARCHY</th>
<th>BEANS AND PEAS (LEGUMES)</th>
<th>OTHER</th>
</tr>
</thead>
<tbody>
<tr>
<td>arugula</td>
<td>acorn squash</td>
<td>black-eyed peas, fresh (not dry)</td>
<td><em>black beans</em></td>
<td>artichokes</td>
</tr>
<tr>
<td>beet greens</td>
<td>butternut squash</td>
<td>cassava</td>
<td><em>garbanzo beans (chickpeas)</em></td>
<td>asparagus</td>
</tr>
<tr>
<td>bok choy</td>
<td>carrot*</td>
<td><em>corn</em></td>
<td><em>Great Northern beans</em></td>
<td>avocado</td>
</tr>
<tr>
<td><em>broccoli</em></td>
<td>Hubbard squash</td>
<td>*cowpeas, fresh (not dry)</td>
<td><em>kidney beans</em></td>
<td><em>bean sprouts</em></td>
</tr>
<tr>
<td>broccoli</td>
<td>pumpkin</td>
<td>*green banana</td>
<td>lentils</td>
<td>beets</td>
</tr>
<tr>
<td>collard rabe</td>
<td>red peppers</td>
<td>*green lima beans</td>
<td><em>navy beans</em></td>
<td><em>brussels sprouts</em></td>
</tr>
<tr>
<td>broccoliini</td>
<td><em>sweet potatoes</em></td>
<td><em>green peas</em></td>
<td><em>pinto beans</em></td>
<td>cabbage</td>
</tr>
<tr>
<td>collard greens</td>
<td>tomato juice</td>
<td><em>jicama</em></td>
<td><em>soy beans</em></td>
<td>cauliflower</td>
</tr>
<tr>
<td>dark green leafy lettuce</td>
<td><em>tomatoes</em> (diced, spaghetti sauce, pasta, salsa)*</td>
<td><em>plantains</em></td>
<td><em>split peas</em></td>
<td>celery</td>
</tr>
<tr>
<td>kale</td>
<td><em>taro</em></td>
<td><em>taro</em></td>
<td><em>white beans</em></td>
<td>cucumbers</td>
</tr>
<tr>
<td>mesclun</td>
<td><em>water chestnuts</em></td>
<td><em>water chestnuts</em></td>
<td><em>green beans</em></td>
<td>eggplant</td>
</tr>
<tr>
<td>mustard greens</td>
<td><em>white potatoes (wedge, round, oven frites)</em></td>
<td><em>yams</em></td>
<td></td>
<td><em>green peppers</em></td>
</tr>
<tr>
<td>romaine lettuce</td>
<td></td>
<td></td>
<td></td>
<td>iceberg lettuce</td>
</tr>
<tr>
<td><em>spinach</em></td>
<td></td>
<td></td>
<td></td>
<td>leeks</td>
</tr>
<tr>
<td>swiss chard</td>
<td></td>
<td></td>
<td></td>
<td>mushrooms</td>
</tr>
<tr>
<td>turnip greens</td>
<td></td>
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<td></td>
<td>okra</td>
</tr>
<tr>
<td>watercress</td>
<td></td>
<td></td>
<td></td>
<td><em>olives</em></td>
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</tbody>
</table>

Adapted from the Connecticut State Department of Education by the Massachusetts Department of Elementary and Secondary Education Office of Nutrition, Health and Safety Programs, August 2013.
**Note:** All School Choice items MUST be from existing inventory - if there is not an item for menu, call the office and we will transfer from another site.

<table>
<thead>
<tr>
<th>MONDAY (2-Dec)</th>
<th>TUESDAY (3-Dec)</th>
<th>WEDNESDAY (4-Dec)</th>
<th>THURSDAY (5-Dec)</th>
<th>FRIDAY (6-Dec)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>B Students may</strong></td>
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<tr>
<td><strong>K decline</strong></td>
<td>4 oz. Orange Juice</td>
<td>4 oz. Orange Juice</td>
<td>4 oz. Orange Juice</td>
<td>4 oz. Orange Juice</td>
</tr>
<tr>
<td><strong>F ONLY</strong></td>
<td>Assorted Cereal</td>
<td>Assorted Cereal</td>
<td>Assorted Cereal</td>
<td>Assorted Cereal</td>
</tr>
<tr>
<td><strong>S one item</strong></td>
<td>Whole Grain Animal Crackers</td>
<td>4 oz. Fruited Yogurt Cup</td>
<td>Whole Grain Muffin</td>
<td>Mini Bagel with Egg and Cheese Omelet - C</td>
</tr>
<tr>
<td><strong>T</strong></td>
<td>8 oz. - 1% Milk</td>
<td>8 oz. - 1% Milk</td>
<td>8 oz. - 1% Milk</td>
<td>8 oz. - 1% Milk</td>
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<td><strong>K-12</strong></td>
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</tr>
<tr>
<td><strong>S</strong></td>
<td>&gt;Chicken Nuggets’s (2 oz.)</td>
<td>&gt;Vegetarian Chili Bean Cheese</td>
<td>&gt;Taco (2 oz.) - C Nachos</td>
<td>&gt;BBQ Pork Roast (2 oz.)</td>
</tr>
<tr>
<td><strong>E MUST TAKE</strong></td>
<td>Corn Bread (1.5 oz.)</td>
<td>Whole Grain Tortilla Wrap</td>
<td>(1 oz.) with Nacho Cheese Sauce</td>
<td>on a Whole Grain Bun (2 oz.)</td>
</tr>
<tr>
<td><strong>C 3 COMPONENTS</strong></td>
<td>OR</td>
<td>Shredded Cheese Cup (5 oz.) - C and Salsa Cup (1/4 cup)</td>
<td>OR</td>
<td>OR</td>
</tr>
<tr>
<td><strong>O OR</strong></td>
<td>OR</td>
<td>Whole Grain Rice (1/2 cup)</td>
<td>OR</td>
<td>OR</td>
</tr>
<tr>
<td><strong>N Mozzarella Cheese - C (1 oz.)</strong></td>
<td>OR</td>
<td>and Black Beans (1/4 cup)</td>
<td>(1 oz.) and Cheese (1 oz.)</td>
<td>Tuna Salad Grinder - C (2oz.)</td>
</tr>
<tr>
<td><strong>D Sandwich on Whole Wheat (2 oz.)</strong></td>
<td>&gt;Beef Hamburger - CFS</td>
<td>OR</td>
<td>OR</td>
<td>OR</td>
</tr>
<tr>
<td><strong>A OR</strong></td>
<td>or Cheeseburger (0.5 oz.) on</td>
<td>Whole Wheat Rotini with Marinara</td>
<td>OR</td>
<td>Cheddar Goldfish (0.75 oz.)</td>
</tr>
<tr>
<td><strong>R OR</strong></td>
<td>&gt;Entrée Salad (2 cup+) with</td>
<td>WW Bun (2 oz.) Catsup, Mustard (1/2 cup)</td>
<td>&gt;Entrée Salad (1 cup) with Cubed</td>
<td>OR</td>
</tr>
<tr>
<td><strong>Y OR</strong></td>
<td>Shredded Cheese (5 oz.) - C</td>
<td>Relish, Salsa Cup</td>
<td>Sauce - C (min 1/4 cup sauce)</td>
<td>Ham (1 oz.), Cubed</td>
</tr>
<tr>
<td></td>
<td>Roasted Chick Peas (1/4 c+)</td>
<td>OR</td>
<td>Whole Grain Cheesy (2 oz.) - C</td>
<td>Black Beans (1/4 cup) - C</td>
</tr>
<tr>
<td></td>
<td>Whole Grain Croutons (2 oz.) - B</td>
<td>&gt;Entrée Salad (2 cup+) with Cubed</td>
<td>Garlic Bread (1 oz.) - B</td>
<td>Whole Grain Sweet Potato Muffin</td>
</tr>
<tr>
<td><strong>4 oz. Yogurt</strong></td>
<td>4 oz. (1 oz.), and White Beans</td>
<td>OR</td>
<td>(2 oz.) C/R</td>
<td>Round Tortilla Chips (1 oz.)</td>
</tr>
<tr>
<td></td>
<td>(1/4 cup) Mozzarella (5 oz.)</td>
<td>&gt;Entrée Salad (2 cup+) with</td>
<td>Cubed Turkey (1 oz.) and - C</td>
<td>Salsa Brown Rice and Beans - C / R</td>
</tr>
<tr>
<td></td>
<td>Whole Grain Corn Muffin - 2 oz.</td>
<td></td>
<td>Mozzarella Cubes (1 oz.)</td>
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<td></td>
<td></td>
<td></td>
<td>Whole Grain Cheesy Garlic Bread: B</td>
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<td></td>
<td></td>
<td></td>
<td>(2 oz.)</td>
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<tr>
<td><strong>Side(s):</strong></td>
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</tr>
<tr>
<td>(1/2 cup portions)</td>
<td>&gt;Shredded Romaine Lettuce (1/2 c.)</td>
<td>&gt;Oven Roasted Potato Wedges</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>*Vegetarian Chili and Beans - C / R and Tomato (1/4 cup) Cup</td>
<td>Massachusetts Grown</td>
<td>Shredded Lettuce (1/2 c.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>*BBQ Baked Beans - C</td>
<td>*Shredded Lettuce (1/2 c.)</td>
<td>*Celery, Carrot, and Turnip Sticks and Tomato (1/4 cup) Cup</td>
<td></td>
</tr>
<tr>
<td><strong>12 Fresh in Season Wedged</strong></td>
<td>*Fresh, Chilled, and Dried Fruit and Tomato (1/4 cup) Cup</td>
<td>with Ranch Dressing Cup</td>
<td>Seasonal Raw Vegetable Dippers and</td>
<td></td>
</tr>
<tr>
<td>**<strong>App. (Cupped w/Toppings)</strong></td>
<td>*Mass Grown Fresh, Chilled, and</td>
<td>*Mass Grown Fresh, Chilled, and</td>
<td>Fruit Selection - C including</td>
<td>*Fresh, Chilled, and</td>
</tr>
<tr>
<td></td>
<td>*Fiesta Corn and Black Bean Salad-C</td>
<td></td>
<td>Peaches and Dried Fruit Selections - C / B</td>
<td>Apple Cobbler with Topping - C/B</td>
</tr>
<tr>
<td></td>
<td>*Oven Roasted Potato Wedges - C</td>
<td></td>
<td>Dried Fruit Selections - C / B</td>
<td></td>
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<tr>
<td></td>
<td>*Selection - C including</td>
<td></td>
<td>Dried Fruit Selections - C / B</td>
<td></td>
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<tr>
<td></td>
<td>*Mass Grown Fresh, Chilled, and</td>
<td></td>
<td>Apple Cobbler with Topping - C/B</td>
<td></td>
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<tr>
<td></td>
<td>Peach/Cranberry Cobbler with</td>
<td></td>
<td>Dried Fruit Selections - C / B</td>
<td></td>
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<tr>
<td></td>
<td>Fruit Selection - C including</td>
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<tr>
<td></td>
<td>*Fresh, Chilled, and</td>
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<tr>
<td></td>
<td>*Seasoned Carrots (1/4 c) and Peas</td>
<td></td>
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<tr>
<td></td>
<td>*Fiesta Corn &amp; Black Bean Salad - C/ R</td>
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<tr>
<td></td>
<td>*Hearty Vegetable Soup - C</td>
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<tr>
<td></td>
<td>*Broccoli Dippers - C</td>
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<tr>
<td></td>
<td>*Oven Roasted Broccoli - C</td>
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<td></td>
<td>(1/4 c.)</td>
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<tr>
<td></td>
<td>*Fresh, Chilled, and</td>
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<tr>
<td></td>
<td>*Oven Roasted Fries - C</td>
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<tr>
<td></td>
<td>*Mass. Grown Fresh, Chilled, and</td>
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<tr>
<td></td>
<td>Italian Green Bean Salad - MFS C/R</td>
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<td></td>
<td>*Fresh, Chilled, and</td>
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<tr>
<td></td>
<td>Selections - C / B</td>
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<td></td>
<td>*Oven Roasted Fries - C</td>
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<td></td>
<td>Dried Fruit Selections - C</td>
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<tr>
<td></td>
<td>*Chilled Peaches - C</td>
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<td></td>
<td>Dried Fruit Selections - C / B</td>
<td></td>
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<tr>
<td></td>
<td>*Oz. Milk Choices</td>
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<td>*Oz. Milk Choices</td>
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</tr>
<tr>
<td><strong>E Elementary</strong></td>
<td>Grilled American - C (1 oz.) and</td>
<td>BBQ Pork Roast (2 oz.)</td>
<td>Taco (2 oz.) - C Nachos</td>
<td>Chicken (2 oz.) Pot Pie with</td>
</tr>
<tr>
<td><strong>L Entrée</strong></td>
<td>on a Whole Grain Bun (2 oz.)</td>
<td>OR</td>
<td>(1 oz.) with Nacho Cheese Sauce</td>
<td>Mashed Potato Topping (1/4 c) - C/R</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or and Salsa Cup (1/4 cup)</td>
<td>Cranberry Sauce / Corn Bread (1 oz.)</td>
<td>and Pepperoni</td>
</tr>
<tr>
<td><strong>M MUST TAKE</strong></td>
<td>or on a Whole Grain Bun (2 oz.)</td>
<td>&gt;Slppy Joe (2 oz.)</td>
<td>Salts Brown Rice (1/4 cup)</td>
<td></td>
</tr>
<tr>
<td><strong>K-6 3 COMPONENTS</strong></td>
<td>Tomato Dipping Sauce (1/4 c) - C</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>*Hearty Vegetable Soup - C</td>
<td></td>
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<tr>
<td></td>
<td>*Broccoli Dippers - C</td>
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<td></td>
<td>*Oven Roasted Broccoli - C</td>
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<td></td>
<td>(1/4 c.)</td>
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<tr>
<td></td>
<td>*Fresh, Chilled, and</td>
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<tr>
<td></td>
<td>*Oven Roasted Fries - C</td>
<td></td>
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<tr>
<td></td>
<td>*Mass. Grown Fresh, Chilled, and</td>
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<tr>
<td></td>
<td>Italian Green Bean Salad - MFS C/R</td>
<td></td>
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<td></td>
<td>*Fresh, Chilled, and</td>
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<tr>
<td></td>
<td>Selections - C / B</td>
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<tr>
<td></td>
<td>*Chilled Peaches - C</td>
<td></td>
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<tr>
<td></td>
<td>Dried Fruit Selections - C</td>
<td></td>
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<td></td>
<td>*Oz. Milk Choices</td>
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<td>*Oz. Milk Choices</td>
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<td>*Oz. Milk Choices</td>
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<td></td>
<td>*Oz. Milk Choices</td>
<td></td>
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</tr>
<tr>
<td><strong>Items Prepared</strong></td>
<td>6 oz. 100% Pure Fruit Juice</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>*Ocean Spray Craisins</td>
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<tr>
<td></td>
<td>*8 oz. Milk Choices</td>
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<td>*8 oz. Milk Choices</td>
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<tr>
<td><strong>School on</strong></td>
<td>Whole Grain Gold Fish</td>
<td></td>
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</tr>
<tr>
<td><strong>Total</strong></td>
<td>Assorted Granola Pouch</td>
<td></td>
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<tr>
<td></td>
<td>Educational Cookie Snack</td>
<td></td>
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<tr>
<td></td>
<td>Whole Grain Nacho Tortilla Chips</td>
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<tr>
<td></td>
<td>Assorted Granola Snacks consisting of</td>
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<tr>
<td></td>
<td>Production Sheets !</td>
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</tbody>
</table>

*In addition to the regular menu, the following will also be available daily: Sunflower Butter and/or Peanut Butter and Jelly Triangles on Whole Grain Bread with 4 oz. Yogurt Cup*
Appendix E

Composting
Patrick administration lays out food-service compost law

The Massachusetts Department of Environmental Protection has proposed a ban on the disposal of commercial food waste, to take effect by July 1, 2014, state Energy and Environmental Affairs officials announced today. The ban would require large restaurants, supermarkets and food-service institutions to begin separating food waste.

Beyond that, $4 million in grants and low-interest loans would be put toward anaerobic digestion, which converts the garbage to renewable energy.

The ban would require any business that dumps a minimum of one ton per week of organic waste to dispose of it in a different way – either by donating or repurposing the food. The excess would be sent to an anaerobic digester or a composting plant, or become animal-feed.

Previous reports have placed the fine for a first offense in the neighborhood of $1,000, but for now, DEP officials say they expect the ban to take effect voluntarily, resorting to enforcement only if necessary. Officials say they expect businesses will find it is less expensive to send waste to the anaerobic digestion or composting plant than it is to dump in a landfill or incinerators.

The ban would not apply to residential waste but would impact supermarkets, large restaurants, colleges, hospitals and food manufacturers, among others. The Boston Business Journal previously reported the one-ton threshold is designed to include restaurants with more than 70 full-time employees.
A total of $3 million in low-interest loans, managed by BCD Capital Group through MassDEP’s recycling loan fund, has been made available by the state for private companies to construct anaerobic digestion plants. The Department of Energy Resources is also providing $1 million in grants to public businesses through MassDEP’s Sustainable Materials Recovery Program.

The first grant, valued at $100,000, has been given to the Massachusetts Water Resources Agency.

Currently, 20 to 25 percent of the waste flowing to landfills and incinerators is from food and organic waste. The potential ban is expected to help the state in its goal to diminish the waste by 30 percent by 2020 and 80 percent by 2050, according to the statement.

The process of anaerobic digestion creates electricity and heat from organic waste by enclosing the excess in a chamber without oxygen, where microbes break down the organics to produce a biogas that can generate electricity and heat. This source of energy would replace fossil fuels and consequently decrease emissions.

**Industries:**

Retailing & Restaurants, Energy, Environment

by Taboolaby Taboola

Promoted Content
Appendix F

Massachusetts Farm to School Kindergarten Initiative
The Kindergarten Initiative: Connecting Students and their Families to the Worcester Food Environment

Posted by Penny Weaver, Campaign and Partnership Coordinator, Northeast Regional Office, Food and Nutrition Service, Boston, MA, on January 17, 2014 at 1:00 PM

Kindergarteners, family members, and teachers from Grafton Street School in Worcester, MA touring the REC’s Organic Farm with Mass. Farm to School Project’s Kindergarten Initiative program.

Massachusetts Farm to School Project and the Worcester Public Schools are helping kindergarteners understand how and where food is grown. They are teaching children about nutrition through local food tastings, farm and farmer visits, cooking demonstrations and take home produce. The Worcester Kindergarten Initiative is running at nine elementary schools in Worcester, MA, for the 2013-2014 school year! We are pleased to share this piece from the Worcester Kindergarten Initiative Evaluation and Education Specialist, Isabel Burgess.

Guest post by Isabel Burgess, Worcester Kindergarten Initiative Evaluation and Education Specialist

“This is so cool! Our first ever farm!” These are the sounds of kindergartners from Worcester, MA stepping onto one of the Regional Environmental Council’s YouthGROW farms. The farm is small – a vacant lot sandwiched between triple-deckers – but the students are thrilled. They spend the morning taking a tour of the farm; hearing about the youth farmers that manage the space; taste-testing chard and collards straight from the soil; and planting seeds of their own. The
family members that joined their children on the trip are also excited to explore. They cannot believe that the farm is there – smack in the middle of the city, so close to where they live.

Field trips to local farms are just one piece of the Massachusetts Farm to School Project’s Worcester Kindergarten Initiative, a year-long holistic food education program made possible through partnership with Worcester Public Schools and based on a program created by The Food Trust. The program, which teaches kindergartners about healthy eating and where food comes from, now reaches 700 students in nine urban, predominantly low-income public schools. The KI’s primary component is a hands-on classroom curriculum taught weekly by kindergarten teachers. These lessons are supplemented by activities that engage students and their families through farm visits; taste-tests; cooking demonstrations; visits from the mobile farmers market and local farmers; and take-home packages of produce, recipes, and nutritional information.

Kindergarten students learn to make apple chips an applesauce. For more photos follow the Worcester Kindergarten Initiative on Facebook.

The KI is all about making connections. The program aims to teach concepts that students can relate to in their classroom, cafeteria, and community. We hope that, in turn, kindergartners take
what they learn home to share with their families. For example, in the fall students make applesauce as they learn about Johnny Appleseed and locally grown fruits. The next week, the mobile market comes to their schools for a visit and students explore the concept of a farmers market as one of the places we get our food. The market delivers each student a bag of local apples and pears, and applesauce recipes for them to take home to their families – with the idea that students are now equipped with both the knowledge of where to find local produce and how to teach their parents about a healthy “anytime” snack.

By starting at the literal and figurative roots of both healthy eating and Worcester’s youth, the KI is working to plant the seeds of lifelong nutrition and active engagement in the local food community.

Kindergarten students from Belmont Street Community School exploring Swiss chard at the Regional Environmental Council’s Grant Square Farm.

打好打打打

Appendix G

- PARCC Assessment Administration Guidance Version 1.0
  March 2013

- Technology Guidelines for PARCC Assessment V3
  September 2013
I. Purpose of this Guidance

Since work began on PARCC in September 2010, great strides have been made by the PARCC states in developing next generation assessments based on the Common Core State Standards (CCSS). Among other accomplishments, the design of both the assessments and the technology infrastructure needed to deliver them has been finalized, test development is well underway, and item prototypes have been released. PARCC has also made progress in drafting and releasing test administration policies for public comment – including draft policies for students with disabilities who need accommodations.

As the work continues, PARCC is committed to keeping stakeholders and policy makers informed. To that end, this guidance is the first in a series of publications that PARCC intends to release over the coming months; all publications will be designed specifically to assist state and local policy makers prepare to administer PARCC assessments in 2014-2015.

The March 2013 guidance includes information about:

1) the design of PARCC’s English Language Arts/Literacy and Mathematics assessments;
2) the number of testing sessions and approximate testing time;
3) the number of days over which schools may administer the assessments (testing window);
4) “rule of thumb” guidance for the number of computer devices needed to administer the assessments; and
5) a new tool designed to assist local policy makers and educators build the technology capacity they need to administer PARCC’s computer-based assessments in 2014-15.

The information provided here will continue to be refined after PARCC reviews results of several research studies currently underway and a large-scale field test scheduled for Spring 2014. That said, major changes are not anticipated. Local educators can be confident that this information can be used to (1) develop general scheduling plans for the assessments in 2014-2015; and (2) determine whether they may need to acquire additional devices and/or bandwidth to administer computer-based forms of the assessments in an efficient and timely fashion.

II. Overview of the PARCC Assessment Design

The PARCC summative assessments in English Language Arts (ELA)/Literacy and Mathematics will include a rich set of performance-based tasks that address a long standing concern among educators about large scale student assessments – they have been unable to capture some of the most important skills that we strive to develop in students. The PARCC assessments are being carefully crafted to accomplish this important goal. They will enable teachers, schools, students and their parents to gain important insights into how well critical knowledge, skills and abilities essential for young people to thrive in college and careers are being mastered. PARCC assessments in English Language Arts/Literacy and Mathematics will be administered in grades 3-11 beginning in the 2014-2015 school year. Tests at each grade level will be based on the Common Core State Standards (CCSS) for that grade level. In high school, the mathematics tests will be based on CCSS designated for two course sequences – a traditional sequence including Algebra I, Geometry, and Algebra II; and an
integrated sequence including Mathematics 1, 2, and 3. For more information regarding high school mathematics course standards, readers should refer to the Mathematics Model Content Frameworks at http://www.parcconline.org/parcc-model-content-frameworks.

In order to promote improvements in curriculum and instruction and support various forms of accountability, the PARCC assessments are designed to measure the full range of the CCSS and full continuum of student abilities, including the performance of high and low performing students. To effectively carry out the PARCC design, assessments in both content areas will be administered in two components:

- **A performance-based assessment (PBA)** component, administered after approximately 75% of the school year, and
- **An end of year assessment (EOY)** component, administered after approximately 90% of the school year.

**PARCC ELA/Literacy Assessments**

The ELA/Literacy PBAs at each grade level will include three tasks: a research simulation, a literary analysis, and a narrative task. For each task, students will be asked to read one or more texts, answer several short comprehension and vocabulary questions, and write an essay that requires them to draw evidence from the text(s). The ELA/Literacy EOYs at each grade level will include 4-5 texts, both literary and informational (including social science/historical, scientific, and technical texts at grades 6-11). A number of short-answer comprehension and vocabulary questions will also be associated with each text.

Results of the ELA/Literacy assessments will be reported in three major categories: (1) ELA/Literacy; (2) reading and comprehending a range of sufficiently complex texts independently (reading) and (3) writing effectively when using and/or analyzing sources (writing). ELA/Literacy results will be based on a composite of students’ reading and writing scores.

Students will receive both a scale score and performance level scores for ELA/Literacy, and scale scores for the reading and writing categories. Performance level scores will be reported according to five levels. More information about the PARCC’s performance levels can be found by visiting http://www.parcconline.org/parcc-assessment-policies.

**PARCC Mathematics Assessments**

The mathematics PBAs at each grade level will include both short- and extended-response questions focused on conceptual knowledge and skills, and the mathematical practices of reasoning and modeling. The mathematics EOY assessments will be comprised primarily of short-answer questions focused on conceptual knowledge, skills, and understandings.

Overall results of the mathematics assessments will be reported in terms of scale and performance level scores.

A full listing of the reporting categories for both ELA/Literacy and mathematics assessments will be released along with updated testing blueprints later this spring. The blueprints will provide greater detail about the nature of each content area assessment in terms of the specific CCSS that are addressed in each component (PBA, EOY), as well as the number, types, and value of the items that will appear on each component.

Readers can find more information about PARCC item and task prototypes and the purposes, design, and content of the assessments by visiting: http://www.parcconline.org/samples/item-task-prototypes.
III. **Number and Length of Testing Sessions**

The PARCC PBA and EOY assessments will be administered in a total of nine sessions. At each grade level the PBA component will require **five sessions** – three sessions for ELA/Literacy and two sessions for mathematics. The EOY component at each grade level will require **four sessions** – two sessions for ELA/Literacy and two sessions for mathematics.

Appendix A provides a breakdown of the sessions by grade level, including an estimate of the amount of time the typical student will need to complete each session, which is presented or shown in the table as the “estimated time on task.” These estimates may be refined based on the results of research and field tests conducted over the next 18 months.

While it is anticipated that most students will complete the test sessions within these estimated times, all participating students will have a set amount of additional time for each session to provide them with ample time to demonstrate their knowledge. The additional time will reduce the need to provide increased time as an accommodation, although time beyond the set additional time will be allowed for students with disabilities who have an unlimited/untimed time accommodation documented in their Individualized Education Plan. Guidance issued later this year will provide more information on scheduling testing sessions and on accommodation policies for students with disabilities and English learners.

IV. **Number of Test Administration Days (Testing Window)**

Preparing for PARCC’s computer-based tests will necessitate changes from how schools have planned for paper-based assessments in the past. The vision for computer-based assessments is that they will allow for more flexible scheduling than current paper-based tests and become more integrated into instruction. The testing window described below is designed to provide flexibility for schools that are in the process of building the capacity to administer tests via computer.

Schools will have a maximum of 20 school days to administer the Performance Based Assessment (PBA) component and a maximum of 20 school days to administer the End of Year Assessment component (EOY). It is important to note, however, that while the testing windows will span 20 days for each component, schools will be able to complete administration of the tests in fewer days, if they have sufficient capacity to administer assessments to large numbers of students simultaneously.

The 20 day windows are provided primarily to provide ample opportunity to administer the assessments via computer in schools with a limited number of devices and limited bandwidth. While the testing window in some schools may span as many as 20 days, individual students will participate in testing sessions for both the PBA and EOY components over five to nine days.

One of the primary reasons state leaders joined PARCC is so they could compare results across states, districts, schools, and various student populations. Accordingly, it is important that all students in PARCC states have had an opportunity to learn the material covered by the assessments prior to being tested. To that end, there will be several testing windows, each with a different start and end date to accommodate districts with different school opening and closing dates. At a later date, each state in PARCC will provide additional guidance to their districts regarding the specific testing windows in which they may participate.
V. Guidance on Number of Devices for Computer-Based Test Administration

PARCC encourages schools and districts to consider their computer device needs for assessment as only one factor in an overall strategy for educational technology that supports high-quality student instruction, teacher professional development, and school community communications, as well as next generation assessment. With this in mind, one of the most important determining factors in a school’s ability to administer PARCC’s computer-based assessments in an efficient and timely fashion is the number of computer devices, including desktops, laptops, and tablets that meet or exceed the PARCC minimum technology specifications and are actively available for testing purposes. Readers can view the specifications at: http://www.parcconline.org/technology.

The number of devices a school needs for assessment is largely dependent on:
1) the number of students enrolled at each tested grade level;
2) the number of students that can be tested simultaneously given the way in which available devices are deployed (e.g., in labs, in classroom, on carts, etc.); and
3) the available bandwidth capacity.

To assist schools in planning for an adequate number of devices for the PARCC assessments in 2014-2015, some “rule of thumb” guidance is provided in Table 1 below.

Guidance in the table is divided between schools that will be testing three grade levels (e.g., K-5, 6-8, 9-12 schools), and those that will be testing six grades (e.g., K-8 schools). The guidance is then divided further between the **minimum number of devices** that a school will need to administer the assessments within 20 and the **recommended number of devices**, which is the number needed to administer the assessments in fewer than 20 days.

These are general guidelines and states and districts may wish to recommend lower student to device ratios that will ensure that schools can continue with computer-based instruction at the same time as they are conducting computer-based assessments.

**Table 1. “Rule of Thumb” Guidance on Number of Devices Needed to Administer Computer-Based Tests**

<table>
<thead>
<tr>
<th>School type</th>
<th>Minimum number of devices</th>
<th>Recommended number of devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>For a school with three tested grades (K-5, 6-8, 9-12)</td>
<td>One device for every two students in the largest tested grade</td>
<td>One device per student for the largest tested grade</td>
</tr>
<tr>
<td>For a school with six tested grades (K-8)</td>
<td>One device per student for the largest tested grade</td>
<td>One device per student for the two largest tested grades</td>
</tr>
</tbody>
</table>

**Note on Paper and Pencil Test Administration**

The expectation is that all students will take the PARCC assessments on a computer. Among many other advantages, computer-based testing will be engaging for students, result in lower costs and ultimately allow for faster scoring and reporting of results. The PARCC assessments will be available in paper and pencil format for students with disabilities whose Individualized Education Plans require it, and for schools that have gained approval for paper and pencil-based testing from their State Educational Agency (SEA).
VI. Assessment Administration Capacity Planning Tool

The PARCC Assessment Administration Capacity Planning Tool is designed to assist local educators in determining roughly how many days they will need to administer the assessments given their current device/bandwidth capacity, and how they might accommodate a reduced number of days by increasing the number of devices and/or amount of bandwidth.

The Assessment Administration Capacity Planning Tool is a spreadsheet that will allow schools to evaluate the extent to which their current computer inventory and bandwidth is sufficient to administer PARCC’s computer-based assessments, as well as model what they could do with increased capacity. The Assessment Administration Capacity Planning Tool and accompanying users’ guide are posted at http://parcconline.org/assessment-administration-guidance.

In order to make use of the Tool, school/district personnel will need to enter the following school-level information:

1) the number of students in each tested grade;
2) the number of computers available for testing that meet PARCC’s minimum technology specifications;*
3) bandwidth availability;
4) estimates for instructional and office uses of bandwidth that will be taking place during assessment sessions; and
5) the number of assessment administration days to use as a target for the calculated models.

* Data derived from the Technology Readiness Tool (http://assess4ed.net/) can be used to determine the number of devices in a school’s inventory that meet minimum technology specifications.

PARCC is assuming that schools can administer at least two testing sessions per day each day of the testing window (e.g., a morning and afternoon session). As such, the Tool provides schools with two planning models: a Device Planning Model, and an Administration Days Planning Model.

**Device Capacity Model:** Shows the number of administration days the school will need to administer the assessments based on the school’s current student to device ratio. This model also shows the number of days of administration that would be required if the school could build capacity to meet the following student to device ratios:

- If the school had two students per device at the largest grade level;
- If the school had one student per device at the largest grade level; and
- If the school had per device for each tested student in the school.

**Assessment Administration Model:**

- Shows the number of devices and bandwidth a school would need to administer the assessments in 5, 10, 15 or 20 administration days.

In addition to models that take into account a school’s current number of students, devices and bandwidth, the Assessment Administration Capacity Planning Tool allows schools to conduct “what if” modeling by entering different numbers of students, devices and/or bandwidth. For example, a school could explore the impact on
the number of days it would take to administer the assessments if they added 25 additional computers to the number originally entered into the Tool.

Use of the Assessment Administration Capacity Planning Tool is voluntary and provides estimates only. The Tool should not be used as a single source of readiness information and its resulting calculations should always be examined in the unique contexts of individual schools.

The assumption that schools can only administer two sessions per day is a conservative assumption. In actuality schools may be able to administer three or more sessions per day. However, by constraining this factor at this time, the Planning Tool is less likely to overestimate a school’s capacity to administer the PARCC assessment components in 20 or fewer days. The Tool will be updated later this year as more precise information is known about testing time, the demand the assessments will place on bandwidth, and the number of different test sessions PARCC can deliver on any given day.

VII. Looking Ahead

In the coming months, PARCC will issue additional guidance for educators to assist with planning for the administration of the PARCC assessments in the 2014-2015 school year. Readers are also encouraged to also look for updates at www.parcconline.org and to sign up for the PARCC newsletter to receive updates directly. Local educators with questions or comments about this guidance should contact their state education agency’s office of student assessment or its equivalent. Other readers should address questions to http://parcconline.org/contact.
Appendix A: Estimated Time on Task by Grade and Session

Note: estimated time on task refers to an estimate of the amount of time the typical student will need to complete each session. While it is anticipated that most students will complete the test sessions within these estimated times, all participating students will have a set amount of additional time for each session to provide them with ample time to demonstrate their knowledge.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Performance-Based Component</th>
<th>End-of-Year Component</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ELA/Literacy</td>
<td>Math</td>
</tr>
<tr>
<td></td>
<td>Literary Analysis</td>
<td>Research</td>
</tr>
<tr>
<td>3</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>4-5</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>6-8</td>
<td>80</td>
<td>85</td>
</tr>
<tr>
<td>Grades</td>
<td>Performance-Based Component</td>
<td>End-of-Year Component</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td></td>
<td>ELA/Literacy</td>
<td>Math</td>
</tr>
<tr>
<td></td>
<td>Literary Analysis</td>
<td>Research</td>
</tr>
<tr>
<td>9-10 Alg I/ Math I</td>
<td>80</td>
<td>85</td>
</tr>
<tr>
<td>11 Alg II / Math III</td>
<td>80</td>
<td>85</td>
</tr>
</tbody>
</table>

Estimated Time on Task (minutes): 9 hours, 45 minutes

Estimated Time on Task (minutes): 9 hours, 55 minutes
The Partnership for Assessment of Readiness for College and Careers (PARCC) has assembled these technology guidelines to inform schools and districts as they make technology decisions to best meet the instructional and assessment needs of their students. The information in this document is intended to help schools, districts, and states determine the level of readiness of their existing computer inventories and the new instructional hardware they may purchase as they implement the Common Core States Standards, and also evaluate whether they will meet PARCC’s 2014-15 minimum requirements for computer-based assessment administration.

**PLEASE NOTE:** Technology Guidelines for PARCC Assessments Version 3.0 updates, and therefore supersedes, the Version 2.1 document previously released in February 2013.

Updates in Version 3.0 include:
- Information Regarding Minimum Technology Specifications for the PARCC Field Test
- Updated Bandwidth Specifications
- Browser Specifications for the PARCC Field Test and 2014-2015 operational assessments

This document provides two sets of guidance regarding technical specifications:

**Minimum Specifications**
Minimum Specifications address the oldest operating systems and lowest levels of hardware capacity that can reasonably be compatible with PARCC computer-based assessments in 2014-2015.

- Minimum Specifications apply to existing school technology inventories.
- Computers meeting the Minimum Specifications can be considered as satisfying PARCC guidelines for **2014-2015**.

Considerations regarding computers meeting, but not exceeding, minimum specifications:
- Computers with these minimum specifications may *not* be adequate beyond the second year of PARCC assessments in **2015-2016**. PARCC recommends that schools upgrade or replace computers that have older operating systems and lower memory to raise their capacity to Recommended Specifications levels as soon as possible.
- Computers that meet only the Minimum Specifications will be compatible with the PARCC assessment delivery platform, but may be more likely to experience slower performance than higher capacity computers.

**Recommended Specifications**
Recommended Specifications outline the levels of computer and network capacity that are more likely to meet growing demands for school technology that supports learning, assessment, and administrative uses simultaneously across classrooms.

- Recommended Specifications apply to both existing inventory and new hardware purchases.
- Computers meeting the Recommended Specifications can be expected to satisfy PARCC guidelines through the **2018-2019** school year.
TECHNOLOGY GUIDANCE FOR DECISION MAKING

While PARCC’s ongoing processes for assessment and technical platform design continue, *Technology Guidelines for PARCC Assessments Version 3.0,* is intended to help states and districts inform their own readiness preparations and decision-making. As test components are piloted through the PARCC Field Test in Spring 2014, PARCC will continue to supplement the guidance in this document to reflect current knowledge about what states will need to administer PARCC’s computer based assessment components. The most current version of this document and most up-to-date information is maintained at [http://www.parcconline.org/technology](http://www.parcconline.org/technology).

INFORMATION REGARDING MINIMUM TECHNOLOGY SPECIFICATIONS FOR THE SPRING 2014 FIELD TEST

In spring 2014, the PARCC Field Test will be administered to over one million students across PARCC states. The minimum technology requirements for the Field Test are a subset of PARCC’s overall technology guidelines. However, some parts of the PARCC assessment delivery system will be in development during the PARCC Field Test year; as a result, a few operating systems and accessibility features that will not be supported during the PARCC Field Test will still ultimately be supported for the 2014-2015 operational assessments. To best communicate the distinct elements of the technology guidance that apply during field testing, PARCC is maintaining a specific set of documentation, training, and support materials for the field test.

Schools participating in the PARCC Spring 2014 Field Test should refer to the Technology Guidance for 2014 PARCC Field Test Participation for field test specific information that will help them determine their capacity to administer PARCC’s computer-based field tests in Spring 2014.

Key components of this document include:

- A detailed list of devices students can use to participate in the Field Test
- Bandwidth specifications required to support computer-based testing for the Field Test
- Information about setting up proctor caching as a low-bandwidth option for testing

More detailed systems check tools, training sessions, and other technology implementation guidance for the PARCC Field Test will be released in October 2013.

In addition, to assist schools in preparing for 2014-2015 operational assessments, PARCC will release a practice test in Spring 2014, which will include all accessibility features and be compatible with all the operating systems that will be supported during the full operational assessment. Through the practice test, schools will be able to test their local systems with compatible PARCC assessment items and administrative tools. All devices and accessibility features will be available for all operating systems defined in the Device Specifications section of this document.

For the full list of device specifications, accessibility features and accommodations available during the PARCC Field Test, please see [Full Technology Specifications for PARCC Field Test Version 1.0](#).
BANDWIDTH RECOMMENDATIONS FOR PARCC FIELD TEST AND OPERATIONAL ASSESSMENT

PARCC has developed a tiered bandwidth recommendation that provides schools with guidance around different uses of school networks during assessments. These tiers include a very low bandwidth level that requires local caching of test content ahead of test day, a minimum level for networks that do not pre-load test content, and a bandwidth level that will support simultaneous network uses for testing, instruction, and other required day-to-day school operations.

Minimum bandwidth requirements account for the level of connectivity needed to administer next generation PARCC assessment items that include complex student interactions, extended constructed responses, and embedded multimedia – although individual sessions of the Math and English Language Arts/Literacy assessments may require less than the published minimum bandwidth. Schools with low bandwidth and/or large numbers of simultaneous users, including instructional and other non-assessment uses taking place concurrent with testing, are strongly encouraged to utilize PARCC’s options for proctor caching, a strategy that will significantly reduce bandwidth demand for testing. Similarly, test forms including computer-delivered accommodations and accessibility features are anticipated to require more bandwidth and therefore caching for accommodated forms is strongly encouraged. PARCC’s assessment delivery platform provider for both the PARCC Field Test and the first PARCC operational administration in 2014-2015, Pearson, has created the document Proctor Caching: Using Caching Strategies to Better Manage Network Traffic Demand During Online High-stakes Assessments as a guide to assist schools in whether to implement caching for PARCC assessments.

<table>
<thead>
<tr>
<th>Minimum With Caching</th>
<th>Minimum Without Caching</th>
<th>Recommended for Assessment + Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Connection to the Internet</td>
<td>5 kilobits per second (kbps)/student</td>
<td>50 kilobits per second (kbps)/student</td>
</tr>
</tbody>
</table>

Minimum Bandwidth - With Caching
Schools that wish to implement Proctor Caching as a low-bandwidth solution for assessment administration should plan to have 5 kilobits per second (kbps) of available bandwidth in their external connection to the Internet for each simultaneous test-taker. With proctor caching, a school or district’s internal wired or wireless networks will distribute test content to student computers, but local internal network connection speeds may vary based on wireless network configurations or other factors. The Proctor Caching guide, (http://www.parcconline.org/field-test-technology) will help schools or districts configure caching to maximize bandwidth where local network variations exist.

Minimum Bandwidth - Without Caching
Schools that will have students connecting directly to the Internet during test administration should plan to have 50 kilobits per second (kbps) of available bandwidth for each simultaneous test-taker. The fewer students that are testing at the same time, the lower the bandwidth demand will be.

Recommended Bandwidth for Assessment + Instruction
PARCC recognizes that school networks must support a wide range of services and technology-rich educational offerngs both during and outside of PARCC assessment windows. In response to these realities, PARCC is modeling the higher recommended bandwidth guidance of the State Educational Technology Directors Association in its May 2012 publication The Broadband Imperative: Recommendations to Address K-12 Education Infrastructure Needs (http://www.setda.org). These higher bandwidth recommendations ensure schools have the adequate bandwidth needed to support instruction, assessment, professional development, and administrative processes.
Proctor Caching as a Low Bandwidth Solution
In schools and districts with very limited Internet bandwidth conditions or internal network limitations, caching provides a secure option for delivering interactive computer-based assessments. Caching involves pre-downloading as much of the encrypted test content prior to testing as possible, staging it on a computer (or multiple computers) in a district network location(s), and distributing it to student test-taking computers from the caching server. These procedures will help to avoid potential bottlenecks from testing traffic due to slower network switches, a shared Internet connection, or any other constraint from large-scale assessment traffic.

PARCC is making available to schools and districts a caching option known as “Proctor Caching” as part of the Pearson TestNav 8 delivery platform that PARCC will use for the Field Test and the first PARCC operational administration in 2014-2015. With proctor caching, a test administrator downloads test content only once from the Pearson server to the district or school. Encrypted assessment content resides on a computer within the school network, and is delivered during testing to each student's computer, where TestNav 8 then decrypts and displays the test content for students. Only the local network is used for delivering test content while the student is testing to help protect from Internet delays or other networking bottlenecks.

For the both the PARCC Field Test and the first PARCC operational administration in 2014-2015, schools should plan on bandwidth capacity equivalent to 5 kbps per simultaneous test-taker to implement proctor caching.

SECURITY REQUIREMENTS

Eligible devices of any type (desktop, laptop, netbook, tablet, thin client) or operating system (Windows, Mac, Linux, iOS, Android, Chrome) must have the administrative tools and capabilities to “lock down” the device to temporarily disable features, functionalities, and applications that could present a security risk during test administration, and should not prevent a PARCC secure browser or other test software to be determined from entering the computer into lock down mode. Features that will need to be controlled during test administration include, but are not limited to, unrestricted Internet access, cameras (still and video), screen capture (live and recorded), email, instant messaging, Bluetooth connections, application switching, and printing.

The operating systems listed here as approved for PARCC assessments meet this security requirement, but provide different mechanisms for managing user security settings at the individual device and/or enterprise levels. School technology administrators should be familiar with the particular requirements of the systems they will be using for PARCC assessments to ensure test security is maintained.

*Schools will be able to test the security lock down settings of their systems as part of the Systems Check Tools that PARCC will make available to schools by December 2013 for the PARCC Field Test and by August 2014 for the Year One Operational Assessment.*

WEB BROWSER REQUIREMENTS

## DEVICE SPECIFICATIONS

Desktops, laptops, netbooks (Windows, Mac, Chrome, Linux), thin client, and tablets (iPad, Windows, and Android) will be compatible devices provided they meet the established hardware, operating system, and networking specifications—and are able to address the security requirements described in the Security Considerations section of the Guidelines.

### Desktop, Laptop, Netbook, and Thin Client¹/VDI Computers

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<tr>
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<td>Mac OS</td>
<td>Mac OS 10.5</td>
<td>Mac OS 10.7 or newer</td>
</tr>
<tr>
<td>Linux</td>
<td>Ubuntu 9-10, Fedora 6</td>
<td>Linux: Ubuntu 11.10, Fedora 16 or newer</td>
</tr>
<tr>
<td>Chrome OS</td>
<td>Chrome OS 19</td>
<td>Chrome OS 19 or newer</td>
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¹Linux operating systems will not be supported for the PARCC Field Test.

### Tablets

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<tr>
<td>Android</td>
<td>Android 4.0 (with 512 MB RAM or greater)</td>
<td>Android 4.0 or newer (with 1GB RAM or greater)</td>
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<tr>
<td></td>
<td>iPad 2 running iOS 6 (with 512 MB RAM or greater)</td>
<td>iPad 2 or newer running iOS6 or newer (with 512 MB RAM or greater)</td>
</tr>
<tr>
<td>Windows</td>
<td>⁶Windows 8 (with 512 MB RAM or greater)</td>
<td>⁶Windows 8 or newer (with 1GB RAM or greater)</td>
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</table>
### Additional Specifications for Desktop, Laptop, Netbook, and Thin Client / VDI Computers

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<th></th>
<th>Minimum Specifications</th>
<th>Recommended Specifications</th>
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</thead>
<tbody>
<tr>
<td><strong>Memory</strong></td>
<td>512 MB of RAM</td>
<td>1 GB RAM or greater</td>
</tr>
<tr>
<td><strong>Connectivity</strong></td>
<td>Computers must be able to connect to the Internet via wired or wireless networks.</td>
<td>Computers must be able to connect to the Internet via wired or wireless networks.</td>
</tr>
<tr>
<td><strong>Screen Size</strong></td>
<td>9.5 inch screen size or larger</td>
<td>9.5 inch screen size or larger</td>
</tr>
<tr>
<td><strong>Screen Resolution</strong></td>
<td>1024 x 768 resolution or better</td>
<td>1024 x 768 resolution or better</td>
</tr>
<tr>
<td><strong>Input Device Requirements</strong></td>
<td>Keyboard - wired or wireless/Bluetooth Mouse or Touchpad or Touchscreen</td>
<td>Keyboard - wired or wireless/Bluetooth Mouse or Touchpad or Touchscreen</td>
</tr>
<tr>
<td></td>
<td>The input device must allow students to select/deselect, drag, and highlight text, objects, and areas. The input device must allow students to enter letters, numbers, and symbols and shift, tab, return, delete, and backspace. To meet security guidelines, each Bluetooth/wireless keyboard must be configured to pair with only a single computer during assessment administration. Other assistive technologies may be needed for students requiring accommodations. PARCC will release additional guidance for the use of assistive technology devices for field testing by November 2013. PARCC has released the PARCC Accessibility Features and Accommodations, which is available at: <a href="http://www.parcconline.org/parcc-accessibility-features-and-accommodations-manual">http://www.parcconline.org/parcc-accessibility-features-and-accommodations-manual</a></td>
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**Headphone/Earphone/Earbud and Microphone Requirements**

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<th>Headphones/Earphones/Earbuds Microphone</th>
<th>Headphones/Earphones/Earbuds Microphone</th>
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<tbody>
<tr>
<td></td>
<td>Headphones/earphones/earbuds are only required for English Language Arts/Literacy testing sessions, not mathematics testing sessions (except for students who need them for accommodations purposes such as text to speech). Microphones are required for all students taking the Speaking and Listening Assessment. Some student accommodations may also require microphones (e.g., speech to text, voice controls) for other parts of the PARCC assessments.</td>
<td></td>
</tr>
</tbody>
</table>

### Additional Guidance

1. Each computer operating in a thin client environment must meet or exceed minimum hardware specifications, as well as bandwidth and security requirements.

2. Computers meeting only the minimum specifications for the 2014-2015 assessment are not likely to be compatible beyond the 2015-2016 assessment. PARCC recommends that schools upgrade from the oldest operating systems and lowest memory levels as soon as possible.


4. Computers running Windows XP-Service Pack 3 may require a web browser other than Internet Explorer due to HTML5 compatibility limitations. PARCC will issue specific web browser guidance by October 2013.
Computers must accommodate the 1024 x 768 screen resolution minimum without panning. PARCC recognizes that some netbook computers may have screen resolutions slightly less than the 1024 x 768 minimum, yet may meet all other minimum requirements. Depending on netbook model specifics, school technology administrators may be able to reset screen resolution to meet PARCC guidelines. By October 2013, following final test design, PARCC will establish a means for schools to evaluate if particular netbook devices are able to display PARCC assessment items without requiring students to scroll or pan.

### Additional Specifications for Tablets

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<tr>
<th></th>
<th>Minimum Specifications</th>
<th>Recommended Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Memory</strong></td>
<td>By operating system</td>
<td>By operating system</td>
</tr>
<tr>
<td><strong>Connectivity</strong></td>
<td>Computers must be able to connect to the Internet via wired or wireless networks.</td>
<td>Computers must be able to connect to the Internet via wired or wireless networks.</td>
</tr>
<tr>
<td><strong>Screen Size</strong></td>
<td>9.5 inch screen size or larger</td>
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<tr>
<td><strong>Screen Resolution</strong></td>
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<tr>
<td><strong>Input Device Requirements</strong></td>
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<td>Keyboard - wired or wireless/Bluetooth</td>
</tr>
<tr>
<td></td>
<td>Touchscreen or Mouse</td>
<td>Touchscreen or Mouse</td>
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</tbody>
</table>

Due to the onscreen space occupied by a tablet’s virtual keyboard, PARCC assessments will require external keyboards for test takers using tablets so as not to limit or obscure the view of test item content and related functionalities when text input is required. Research studies to be conducted by PARCC in Spring 2013 are intended to yield data on students’ use of virtual versus external keyboards. PARCC will refine this guidance as needed based on these results.

External keyboards must allow students to enter letters, numbers, and symbols and shift, tab, return, delete, and backspace. Tablet touchscreen interfaces can be used for student interactions with the assessments other than text input, including to select/deselect, drag, and highlight text, objects, and areas. To meet security guidelines, each Bluetooth/wireless keyboard must be configured to pair with only a single computer during assessment administration.

Other assistive technologies may be needed for students requiring accommodations. PARCC will release additional guidance for the use of assistive technology devices for field testing by November 2013. PARCC has released the PARCC Accessibility Features and Accommodations, which is available at: [http://www.parcconline.org/parcc-accessibility-features-and-accommodations-manual](http://www.parcconline.org/parcc-accessibility-features-and-accommodations-manual).

<table>
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<td><strong>Headphone/Earphone/Earbud and Microphone Requirements</strong></td>
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Microphones are required for all students taking the Speaking and Listening Assessment. Some student accommodations may also require microphones (e.g., speech to text, voice controls) for other parts of the PARCC assessments.

### Additional Guidance

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<tbody>
<tr>
<td>6</td>
<td>PARCC has not yet evaluated the compatibility of Windows RT for 2014-2015. Further information will be issued on Windows RT in Version 3.0 of the PARCC Guidelines.</td>
</tr>
<tr>
<td>7</td>
<td>Smaller tablets (screen size less than 9.5&quot;), e-readers, and smart phones will not be supported and will not be compatible with PARCC assessments for 2014-2015.</td>
</tr>
</tbody>
</table>
3.1.2 EDUCATIONAL PROGRAM

C. Sustainable Design Program
   1. Narrative
   2. City of Worcester Climate Action Plan Executive Summary
   4. LEED Scorecard dated 30 January 2014
Nelson Place Elementary School
35 Nelson Place, Worcester, MA 01605

3.1.2 EDUCATIONAL PROGRAM
C. Sustainable Design Program

FEASIBILITY STUDY

Sustainable Design is an important component of the Nelson Place Elementary School program. Well beyond the threshold for 2% additional reimbursement for green design, the City of Worcester has established a Net Zero target for the project as defined by onsite energy production equal to the annual projected consumption.

The Nelson Place Elementary School project provides an excellent opportunity to showcase sustainable design targets as outlined in local, state, and federal action plans. In 2008, Massachusetts Governor Deval Patrick established a Zero Net Energy Buildings Task Force to evaluate opportunities to target zero net energy for all new residential and commercial projects by 2030. The City of Worcester developed a Climate Action Plan in December 2006 (currently under revision). In the City Manager’s introductory vision statement, he commented:

> Reducing our greenhouse gas emissions is within our reach. We can reduce the pollution that causes global warming by using currently available technologies that also enhance economic development. In our schools, homes and places of work, we can implement energy efficiency measures, use renewable energy, and increase waste recycling to pollute less and save money. These measures are not in conflict with economic development; instead, they are the basis on which our future economic development and quality of life will rely. Our actions can be an example to others, inspiring responsible energy and resource consumption.

In the body of the Climate Action Plan, it is noted that the City Council, in March 2005, adopted a goal to attain 20% renewable electricity and the role of municipal buildings as a vanguard for the program to set an example for other private and public ventures is emphasized.

To address the strategies and opportunities for achieving Net Zero for the Nelson Place project, LPA organized a workshop charrette with a diverse spectrum of participants on January 22, 2014. The minutes from the meeting are included in the following section of the PDP. During the final portion of the charrette, a draft LEED scorecard was completed and a copy is included in the following section.

For Net Zero, it was pointed out that important design parameters for the project include:

- Nelson Place is planned to be a year round facility with 100% air conditioning
- A full service kitchen with onsite food preparation is included in the program
3.1.2 EDUCATIONAL PROGRAM
C. Sustainable Design Program

★ 110,000 sf proposed building may affect National Grid rebate program categorization

As a general strategy, it was recommended to first determine methods to reduce energy consumption, then evaluate renewable options to produce the required annual energy on site.

The following is a summary of Net Zero definitions, potential strategies, and grant opportunities:

**Net Zero Energy Classifications:**

- **Net Zero Energy Building: Class A:** A highly efficient building that generates 100% of its annual energy use from renewable resources that are available within the building footprint.
- **Net Zero Energy Building: Class B:** A highly efficient building with a net energy consumption of zero that produces as much energy \textit{on site} as it consumes over the course of a year, through clean, renewable resources.
- **Net Zero Energy Building: Class C:** Annual net zero energy is achieved by supplementing on-site renewable energy through strategies at the scale of the campus or city, which may involve off-site Renewable Energy.
- **Net Zero Energy Building: Class D:** Annual net zero energy is achieved with the combination of on-site and off-site renewable energy, with the addition of the purchase of Renewable Energy Credits (REC’s).

For Nelson Place, a Net Zero Energy Class B Building target has been established for the program. The following are strategies under consideration:

**Potential On-Site Strategies**

- Optimal Orientation
- Passive Strategies; shading, thermal mass, and daylighting/skylights & natural ventilation
- Maximum Efficiency of Building Envelope, Lighting and Ventilation System
- Power Purchase Agreement
- Solar Photovoltaic / Solar Hot Water
- Wind Power / Microhydro Power
- Geothermal System
- Collection and Re-use of Rain Water
- Green Roof
- Fuel Cell Generator
FEASIBILITY STUDY

C. Sustainable Design Program

- Co-Generation System
- Chilled Beam / Chiller System
- Micro-hydro power
- Bio-mass/Digestion System
- Sale of Renewable Energy Credits (RECs)

Potential Owner/User Strategies:
- Building as a tool for Education
- Behavioral Change programs
- Measurement and Verification

While not part of the Net Zero Class B program, the City of Worcester may want to consider the following off-site strategies:

Potential Off-Site Strategies
- Offsite Solar, Wind or Hydro-Electric generation
- BioMass/ Digestion System
- Co-generation of power
- Purchase of Renewable Energy Credits

References:
- City of Worcester: MA-Climate Action Plan, dated December 2006
- New Buildings Institute: Getting to Zero, the 2014 Status Update, dated January 2014

Summary of Potential Incentives & Grants:
1. Massachusetts Department of Energy Resources (DOER)
   a. SAPHIRE (Schools and Public Housing Integrating Renewables and Efficiency Program)
      - Project must include energy efficiency work with renewable thermal technologies
FEASIBILITY STUDY

C. Sustainable Design Program

- Proposals displacing electric, oil, or propane heating with renewable thermal will be prioritized
- Coordinates with MA CEC and Mass Save
- Feasibility and implementation phases
- Green Communities Grant Program (Worcester enrolled)
  - Community must meet the following 5 Criteria:
    1. As-of-Right Siting-Renewable Energy
    2. Expedited Permitting for RE
    3. Energy Baseline: 20% Energy Reduction Plan w/in 5 years
    4. Purchase only Fuel efficient vehicles for municipal use
    5. Minimize Life Cycle Costs for New Construction

2. MA Clean Energy Center
   a. Commonwealth Organics to Energy Grant
      - $400,000 max grant, or 25% of contract budget
      - System must be <$1.5 per kilowatt-hour equivalent of electricity and/or useful thermal energy per year
   b. Commonwealth Solar Hot Water Financing
      - $5,000 for feasibility study
      - Construction rebates based on performance of system
   c. Commonwealth Solar II
      - Base Incentive $.40/watt up to 5 kW, system must be less than 15kW total
   d. Commonwealth Wind
      - Funding based on size and characteristics of project
      - Acoustic study funding also available
   e. MA CEC & DOER Renewable Thermal and District Energy
      - Ground Source Heat Pumps ($2,000/ton up to 27 tons (Entities participating in the SAPHIRE program will be eligible for up to $3,000/ton)
      - Biomass Boilers ($$250,000 Maximum Grant)
      - District Energy ($500,00 max Grant)

(Additional rebates are available for utilizing materials manufactured in MA)

3. Utility Incentives: NGRID/NSTAR
   a. Advanced Building Program
3.1.2 EDUCATIONAL PROGRAM
C. Sustainable Design Program

- 20%-30% More efficient than code
- Qualified Projects <100,000 SF
- $1.50-$2.00/SF incentive

b. Comprehensive Design Approach (CDA)
   - Reimbursed 75%-90% of incremental cost of efficient system
3.1.2 EDUCATIONAL PROGRAM
C. Sustainable Design Program

ZNE Precedents:

MA Zero Net Energy Task Force
Division of Fisheries & Wildlife - Field Headquarters Building, Westborough, MA,
Project Completion: May 2014
  ● LEED Gold
  ● Optimal Orientation
  ● Geothermal System
  ● Radiant heating and cooling
  ● Photovoltaic panels on the roof
  ● Mechanically assisted natural ventilation
  ● Heat recovery
  ● On site stormwater recharge

North Shore Community College, Health Professions & Student Services Building, Danvers MA
Project Completion: October 2011
  ● LEED Gold
  ● Optimal Orientation
  ● Geothermal System
  ● Chilled Beams
  ● Photovoltaic panels on the roof
  ● Green Roof
  ● Integrated ZNE into Educational Curriculum
  ● Purchased Renewable Energy Credits

Richardsville Elementary School, Bowling Green KY
Project Completion: September 2010
  ● LEED Gold
  ● High Performance Envelope
  ● On site roof and ground mounted Photovoltaic
  ● Optimal Orientation
  ● Geothermal System
  ● Energy Star-rated kitchen
  ● Integrated ZNE into Educational Curriculum
The following is the Executive Summary excerpt from the Climate Action Plan put into action by the City of Worcester in December of 2006. The document outlines the City’s goals to implement sustainable strategies that effectively reduce energy use and greenhouse gas emissions, and will result in economic stimulus, and improved quality of life for inhabitants.

LPA has referenced this plan while performing a feasibility study of the Zero Net Energy goal for the Nelson Place Elementary school.
Vision Statement

The City of Worcester seeks to be a leader in sustainability. To improve the city’s economic viability and quality of life, we are pursuing the efficient and wise use of natural resources and clean, sustainable sources of energy to serve our needs for mobility, housing, education, community building, economic growth, public safety, and other necessities.

The goal of the Climate Action Plan is to reduce Worcester’s energy use and greenhouse gas emissions through a combination of cost-recoverable and cost neutral action. This action will put Worcester on a course towards a sustainable future and improve the quality of life for Worcester’s residents, visitors, workers, businesses and institutions. It is our hope and intention that this Climate Action Plan will inspire responsible resource and energy consumption throughout the greater state, national, and global communities.
Climate change is upon us and its effects are already apparent throughout the world. The scope and magnitude of the potential changes to our environment present a clear danger to our way of life and continued economic development worldwide. Our reliance on fossil fuels has left a legacy of a fundamentally altered planet. Fortunately, the changes to our climate thus far have not yet affected our way of life. However, within a generation we may face changes that will cause great dislocation, strife and energy shortages as the world’s economic development demands more from an oil exploration and production system that has already peaked.

It is within this context that we must decide how we, the City of Worcester, will contribute to addressing this challenge.

Reducing our greenhouse gas emissions is within our reach. We can reduce the pollution that causes global warming by using currently available technologies that also enhance economic development. In our schools, homes and places of work, we can implement energy efficiency measures, use renewable energy, and increase waste recycling to pollute less and save money. These measures are not in conflict with economic development; instead, they are the basis on which our future economic development and quality of life will rely.

Our actions can be an example to others, inspiring responsible energy and resource consumption. As cities around the world make similar commitments, we can collaborate with each other to reduce climate change, improve energy security and improve our economic competitiveness. We all must work together to become more sustainable. By taking part in this global effort we can succeed. Please join me in implementing this plan and achieving a more sustainable Worcester, and help us become “The GREEN heart of the Commonwealth”!

Michael V. O’Brien
City Manager
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Executive Summary

The threat of climate change impacts - increased temperatures, more extreme heat days, and changing precipitation patterns - are becoming more real each day.

While scientists can not predict exactly how climate change will affect each area of the globe, they can model the general impacts and hazards.

What is not disputed are the facts that 1) carbon dioxide (CO₂) concentrations in our atmosphere have been steadily increasing since pre-industrial times, 2) this increase in CO₂ is largely due to human influence, and 3) that an increase in CO₂ (aka greenhouse gases) in the atmosphere increases the average temperature. Many credible scientific agencies, such as the U.S. EPA, the IPCC, and NOAA, have stated these facts.

The City of Worcester has decided to take responsibility for its contribution to greenhouse gas emissions. In October 2003, the Mayor Timothy Murray proposed a resolution to City Council and Worcester became the 19th city in Massachusetts to join the Cities for Climate Protection (CCP) Campaign - a campaign run by ICLEI Local Governments for Sustainability. CCP is an international campaign of local governments who are committed to reducing their greenhouse gas emissions. CCP offers a five step process to help local governments achieve this commitment: 1) Conduct a Greenhouse Gas Emissions Inventory and Report for the entire community as well as municipal operations. 2) Set a Greenhouse Gas Emission Reduction Target. 3) Develop a Local Climate Action Plan. 4) Implement the Local Climate Action Plan. 5) Monitor Emission Reductions.

CCP has engaged over 770 communities worldwide, 25 of which are in Massachusetts. Many of these communi-
ties have completed Step 3 by putting together an Energy Task Force to advise on and write their Climate Action Plans. In February 2006, City Manager, Michael V. O’Brien appointed 14 representatives from City government, businesses, utilities, universities and the environmental community to Worcester’s Energy Task Force (ETF) and contracted with the Regional Environmental Council to hire a part-time Energy Consultant to coordinate the group. The mission of the ETF was to create a step-by-step plan to reduce energy consumption, reduce greenhouse gas emissions and increase the use of clean, renewable energy in a cost-effective manner in the city of Worcester.

This Climate Action Plan helps Worcester complete CCP’s Step 3, but its purpose reaches beyond CCP. First, it also helps Worcester to be less wasteful in its energy use, thus saving money and making better use of energy resources.
of taxpayers’ dollars. Second, the plan helps to attain the 20% renewable electricity goal adopted by the City Council in March 2005 and support the generation of clean, renewable sources of energy, thus contributing to a more reliable, safe, and secure energy supply.

CCP Step 1, Worcester’s greenhouse gas emissions inventory, was originally completed in April 2004 by Carissa Williams, Worcester’s Energy Consultant, as part of her master’s degree work at Clark University. The purpose is to show where greenhouse gas emissions originate and thus where reduction may be made.

A municipal reduction target, the second step of CCP, of **11% below 2002 GHG emission levels by 2010** is being proposed along with submission of the Climate Action Plan to the Worcester City Council. Within this plan, the Energy Task Force proposes various actions that the City may take to reduce their greenhouse gas emissions. These measures range from increasing energy and fuel efficiency to using renewable energy sources and reducing waste. Implementation of all measures in this plan would lead to a municipal GHG reduction of approximately 43%, well over the 11% 2010 target. The majority of these emission reductions would result from reducing waste at schools, increasing residential curbside recycling, and capturing methane from the Greenwood Street landfill. Capturing methane from the landfill and turning it into energy also has the potential to produce almost 45% of the entire municipal electricity needs (including the UBWPAD sewage treatment plant) as a clean, renewable resource.

CPP Steps 4 and 5 involve implementing and monitoring the actions proposed in this plan. To effectively accomplish this, the Energy Task Force should evolve into an advisory committee and include more members from the local business community as well as more university and residential representatives. As the Energy Consultant’s grant-funded position will be ending this month, the City should hire a full-time Energy Manager (EEM) who, with the help of the ETF, would be responsible for overseeing plan implementation, helping to find sources of funding, creating new reduction targets, and enlisting citizen support. The Energy Manager could also complete an annual GHG emissions inventory to monitor energy use and the effects of emission reduction actions, as well as author an annual progress report on the status of measures that have been implemented and measures planned for the next year.

The effort to stabilize man-made greenhouse gases in the atmosphere will require a long-term commitment. The emission reduction goals that are currently being set on local, national and international levels are the starting point for an unprecedented global effort to lessen the potentially devastating impacts of an environmental problem that can affect every person on this planet. The City of Worcester has begun to take steps to protect itself and its citizens from climate change and rising energy prices by passing the Cities for Climate Protection Resolution, creating an Energy Task Force, and, most recently, becoming a member of ICLEI. The most important next steps for Worcester include hiring a full time Energy Manager, implementing cost-effective emission reduction measures, and creating a modern GHG emissions database. Creative ideas and solutions are always welcome.
# Summary of Key Proposed Reduction Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Estimated Implementation Cost</th>
<th>Est. tons eCO₂ Reduced Annually</th>
<th>Est. Annual $ Savings</th>
<th>Payback Period</th>
<th>Estimated Fuel Saved/yr</th>
<th>Page #</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Energy Efficiency</strong></td>
<td></td>
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</tr>
<tr>
<td>Upgrade 200 Exit Signs From Incandescent Lights to LEDs</td>
<td>$3,000</td>
<td>23</td>
<td>$7,972</td>
<td>&lt; 5 months</td>
<td>61,320 kWh</td>
<td>52</td>
</tr>
<tr>
<td><strong>Co-Benefits:</strong> Reduces 243 lbs/yr of criteria air pollutants. Longer life of LEDs reduces maintenance costs.</td>
<td></td>
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</tr>
<tr>
<td>Upgrade to More Efficient Lights in the Pearl/Elm Garage</td>
<td>$44,280</td>
<td>89</td>
<td>$31,387</td>
<td>1.4 years</td>
<td>241,440 kWh</td>
<td>54</td>
</tr>
<tr>
<td><strong>Co-Benefits:</strong> Reduces 957 lbs/yr of criteria air pollutants. Longer life of fluorescents reduces maintenance costs. Better light quality.</td>
<td></td>
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</tr>
<tr>
<td>Change-A-Light Campaign</td>
<td>$190,527 ($3/household)</td>
<td>2,424</td>
<td>$1,042,376 ($16.41/home)</td>
<td>.2 years</td>
<td>6,541,427 kWh</td>
<td>55</td>
</tr>
<tr>
<td><strong>Co-Benefits:</strong> Reduces 25,925 lbs/yr of criteria air pollutants. Educates the community on energy use and shows the City’s dedication.</td>
<td></td>
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<tr>
<td><strong>Renewable Energy</strong></td>
<td></td>
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</tr>
<tr>
<td>Promote Clean Energy Choice</td>
<td>To be determined</td>
<td>16,455</td>
<td>$324,124</td>
<td>Unknown</td>
<td>44,400,605 kWh</td>
<td>63</td>
</tr>
<tr>
<td><strong>Co-Benefits:</strong> Provides funding for municipal clean energy projects. Reduces criteria air pollutants by 175,971 lbs/yr. Educates the community on renewable energy and the City’s dedication to the future of its residents.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Purchase RECs</td>
<td>$25,000</td>
<td>309</td>
<td>0</td>
<td>0 (Immediate)</td>
<td>833MWh offset</td>
<td>67</td>
</tr>
<tr>
<td><strong>Co-Benefits:</strong> City recovers all cost from MTC. Reduces 3,301 lbs/yr of criteria air pollutants. Helps reach 20% by 2010 goal.</td>
<td></td>
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</tr>
<tr>
<td>Install Hydro Power at the Water Filtration Plant</td>
<td>$300,000</td>
<td>292</td>
<td>$63,072</td>
<td>4.8 years</td>
<td>788,400 kWh</td>
<td>70</td>
</tr>
<tr>
<td><strong>Co-Benefits:</strong> Reduces 3,125 lbs/yr of criteria air pollutants. Helps reach the municipal goal of 20% by 2010. Reduces electrical demand.</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Solar Heat at Schools</td>
<td>$2,788</td>
<td>1</td>
<td>$341</td>
<td>8.2 years</td>
<td>217 therms</td>
<td>72</td>
</tr>
<tr>
<td><strong>Co-Benefits:</strong> Reduces 5 lbs/lyr of criteria air pollutants.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Solar Hot Water at the Water Filtration Plant</td>
<td>$24,000</td>
<td>7</td>
<td>$1,456</td>
<td>16.5 years</td>
<td>18,194 kWh</td>
<td>74</td>
</tr>
<tr>
<td><strong>Co-Benefits:</strong> Reduces 72 lbs/yr of criteria air pollutants. Helps to reach the municipal goal of 20% renewable electricity by 2010.</td>
<td></td>
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</tr>
<tr>
<td>Install a Wind Turbine at Crow Hill (site of the new North High)</td>
<td>$1,000,000 ($500,000 w/funding)</td>
<td>148</td>
<td>$52,000</td>
<td>19.2 years (9.6 w/funding)</td>
<td>400,000 kWh</td>
<td>75</td>
</tr>
<tr>
<td><strong>Co-Benefits:</strong> Reduces 1,584 lbs/yr of criteria air pollutants. Helps to reach the municipal goal of 20% renewable electricity by 2010. Provides an educational resource for students and the community. Potential partnership with the Ecotarium.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Solar Power at Vocational School</td>
<td>$8,000</td>
<td>1</td>
<td>$390</td>
<td>20.5</td>
<td>3,000 kWh</td>
<td>77</td>
</tr>
</tbody>
</table>
## Summary of Key Proposed Reduction Measures (cont’d)

<table>
<thead>
<tr>
<th>Measure</th>
<th>Estimated Implementation Cost</th>
<th>Est. tons eCO&lt;sub&gt;2&lt;/sub&gt; Reduced Annually</th>
<th>Est. Annual $ Savings</th>
<th>Payback Period</th>
<th>Estimated Fuel Saved/yr</th>
<th>Page #</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vehicle Fleet and Transportation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enable 5-minute Shut-off in Trucks</td>
<td>$0</td>
<td>671</td>
<td>$130,150</td>
<td>0 (Immediate)</td>
<td>63,180 gallons</td>
<td>83</td>
</tr>
<tr>
<td><strong>Co-Benefits:</strong> Reduction of 16,748 lbs/yr of criteria air pollutants. Less headaches and health problems for vehicle operators.</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Increase Fuel Efficiency of Gasoline Vehicle Fleet</td>
<td>Variable</td>
<td>224</td>
<td>$36,738</td>
<td>Unknown</td>
<td>21,739 gallons</td>
<td>85</td>
</tr>
<tr>
<td><strong>Co-Benefits:</strong></td>
<td></td>
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</tr>
<tr>
<td>B-20 Pilot at Hope Cemetery</td>
<td>To be determined</td>
<td>4</td>
<td>-$1,218</td>
<td>NA</td>
<td>1,965 gallons</td>
<td>90</td>
</tr>
<tr>
<td><strong>Co-Benefits:</strong> Cost may be less from a different supplier or with credits applied. Less headaches and health problems for vehicle operators.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Increase Employee Carpooling</td>
<td>To be determined</td>
<td>4,742</td>
<td>$1,063,920 (for employees)</td>
<td>NA</td>
<td>443,471 gallons</td>
<td>94</td>
</tr>
<tr>
<td><strong>Co-Benefits:</strong> Reduction of 1,375,158 lb/yr of criteria air pollutants, including a large reduction in ground level ozone creating pollutants. Lower percentage of employee paycheck being spent on traveling to work. Opportunity to lead by example for other businesses in Worcester.</td>
<td></td>
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<tr>
<td><strong>Waste</strong></td>
<td></td>
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</tr>
<tr>
<td>Encourage Recycling at Apartment Complexes</td>
<td>To be determined</td>
<td>12,048</td>
<td>Unknown</td>
<td>Unknown</td>
<td>3,393 tons trash</td>
<td>103</td>
</tr>
<tr>
<td><strong>Co-Benefits:</strong> Prevents emissions from incineration. Reduces energy needed for new products. Educates the community on waste and energy.</td>
<td></td>
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</tr>
<tr>
<td>Increase Residential Recycling Rate</td>
<td>To be determined</td>
<td>30,407</td>
<td>$312,776</td>
<td>Unknown</td>
<td>8,565 tons trash</td>
<td>106</td>
</tr>
<tr>
<td><strong>Co-Benefits:</strong> Prevents emissions from incineration. Reduces energy needed for new products. Educates the community on waste and energy.</td>
<td></td>
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</tr>
<tr>
<td>Implement Recycling at Schools</td>
<td>To be determined</td>
<td>14,813</td>
<td>$152,376</td>
<td>Unknown</td>
<td>4,172 tons trash</td>
<td>107</td>
</tr>
<tr>
<td><strong>Co-Benefits:</strong> Provides an opportunity to teach students about the importance of recycling and sustainable living.</td>
<td></td>
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</tr>
<tr>
<td><strong>Energy Manager</strong></td>
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</tr>
<tr>
<td>Hire a Full-time Energy Manager</td>
<td>$70,000**</td>
<td>346,989*</td>
<td>$1,111,564*</td>
<td>Unknown</td>
<td>NA</td>
<td>46</td>
</tr>
<tr>
<td><strong>Co-Benefits:</strong> Provides the opportunity to designate the City as a leader on issues of the environment, energy and sustainability.</td>
<td></td>
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</tbody>
</table>

* Represents the potential municipal cost and pollution savings of the proposed reduction measures that the Energy Manager would assume responsibility for. **Includes benefits.
Proposed Next Steps for Key Measures

1. **Hire a full-time Energy Manager**
A full-time Energy Manager is needed to continue as the guiding force of the Climate Action Plan. This individual would be responsible for overseeing the implementation of the Plan, ensuring that proper plans are developed before implementing reduction measures, updating the emissions inventory, and writing progress reports. The Energy Manager would serve as a unifying entity among the fragmented municipal departments regarding energy use, planning, budgeting, supply, and load aggregation and would serve as a gatekeeper for all municipal energy use data.

*Want more info? See page 46.*

2. **Install a 100KW Hydro-Power Turbine at the Water Filtration Plant**
The water filtration plant has a rare opportunity to be a highly productive renewable electricity generation source due to the nearly constant flow of water. Installing hydro-power could produce a significant amount of the electricity consumed by the water treatment facility.

**Next Steps:**
- Bring in a small hydro-power professional to do a site and cost assessment.
- Determine the amount of money the City has available for this project and if further funding sources are needed.
- Communicate with MTC on how to proceed to ensure funding.

*Want more info? See page 70.*

3. **Develop a Plan for Installing a 250KW Wind Turbine at the New North High**
The majority of renewable electricity produced in the U.S. comes from wind power. Installing a turbine in Worcester benefits the City by reducing GHG emissions, helping to meet the clean electricity goal, saving money on electricity costs, providing an educational tool, and providing a publicity tool for demonstrating leadership in energy.

**Next Steps:**
- Allow city employees and residents to make suggestions on potential wind sites.
- Suggestions can be reviewed by the Energy Manager and ETF and she/he can create a list of potential sites to be assessed along with a document with all of the suggestions and the pros/cons of each.
- Develop and adopt appropriate zoning ordinance to regulate wind power.
- Develop a partnership with the EcoTarium.
- Bring in a wind installer to assess the Crow Hill site and (maybe) other potential sites.
- Determine the amount of municipal money available to implement a wind installation.
- Contact MTC to determine best way to proceed.

*Want more info? See page 75.*

4. **Enable 5-Minute Shut-Off in Municipal Trucks**
Medium to heavy duty trucks in the City’s vehicle fleet have the ability to be programmed to turn-off after a period of idling. A diesel vehicle idling for one hour each day wastes 500 gallons of fuel and is equivalent in engine wear to driving an additional 64,000 miles.

**Next Steps:**
• Put a plan in place for enabling the shut-off, determining who will be responsible and by when the switch should be complete.
• Do It!
• Be sure to enable shut-off on all new vehicles.

Want more info? See page 83.

5. **Municipal Anti-Idling Policy**
It is a Massachusetts law that no vehicle (unless under certain circumstances) can idle for longer than five minutes. The City should pass a supporting policy and bring awareness of this law and the harmful effects of idling to Worcester’s residents.

**Next Steps:**
• Collaborate with WPS to identify key pickup areas and determine how many signs are needed.
• Estimate cost of printing and installation.
• Apply for grant funding if needed.
• Reduce idling - print signs, install and educate!

Want more info? See page 84.

6. **Post Anti-Idling Signs at Schools**
Schools are some of the worst places for vehicle exhaust. Parents who pick-up students often idle for 10-15 minutes. The City can cost-effectively post anti-idling signs to remind people that running their cars is polluting their children’s air, not to mention wasting their gas and money.

Want more info? See page 84.

7. **Potential Electricity Generation from Methane at Greenwood Street Landfill**
Capturing the methane from the Greenwood Street Landfill and burning it to produce electricity has the potential to produce 45% of the municipal electricity needs from a clean, renewable resource and to reduce municipal GHG emissions by 30%.

**Next Steps:**
• Continue to monitor test well.
• Install more test wells.
• Contact the proper companies for site assessments and cost estimates.
• Conduct neighborhood meetings for input.

Want more info? See page 81.

8. **Promote Clean Energy Choice®**
Clean Energy Choice® is a program sponsored by the Massachusetts Technology Collaborative. Residents of Worcester participate by paying a small additional fee on their electric bills for renewable electricity. Their premium is matched by MTC is put into a Clean Energy Fund for the City to be used for renewable energy projects.

**Next Steps:**
• Create a goal for the number of sign ups.
• Create partnerships.
• Determine a plan for outreach.
• Issue a challenge to City employees.
• Secure outreach funding if needed.

Want more info? See page 63.
9. **Create a Clean Energy Choice® Competition Between Schools**

Reaching out to students is one of the most effective tactics for disseminating information. Not only are you teaching children at a young age, they often in turn relay that information to parents. The City and School Department should organize a Clean Energy Choice® competition within Worcester Public Schools to encourage increased participation. The school with the highest percentage of forms (or maybe a certain number by a certain date) returned and successfully processed would win an award and prize. This also could be incorporated into the science curriculum on renewable energy.

*Want more info? See page 116.*


It is important to educate students about energy issues. The Massachusetts Technology Collaborative offers a guide to incorporating lessons plans about energy resources and climate change into the MA science curriculum frameworks. They offer free curriculum materials on their website www.masstech.org/cleanenergy/curriculum/about.htm. There are also many locally held professional development workshops on the topic of teaching about energy.

*Want more info? See page 116.*

11. **Create an Energy Theme for the Annual School Projects Fair**

Every May WPS hold a joint Projects Fair. The Energy Task Force proposes that the theme of the 2007 fair be renewable energy and energy efficiency.

*Want more info? See page 117.*

12. **Purchase $25,000 Worth of Renewable Energy Certificates (RECs)**

The City has passed a resolution to purchase or produce 20% of the electricity used for municipal buildings and lighting from clean, renewable sources by 2010. One risk-free way of helping to meet this goal is by purchasing what are called Renewable Energy Certificates (RECs). The purchase of RECs will also be matched by MTC and put into Worcester’s Clean Energy Fund.

**Next Steps:**
- Set a Clean Energy Budget of at least $25,000 / year
- Work with MTC to expand the $20,000 match to $25,000
- Set up an agreement with Mass Energy
- Publicize this action to help market Worcester as the “Green heart of the Commonwealth”

*Want more info? See page 67.*

13. **Upgrade 200 Exit Signs from Incandescent Lights to LEDs**

LED lighting is vastly more efficient than the traditional incandescent lighting, saving energy, time, money, and preventing GHG emissions. This action will pay for itself within months.

**Next Steps:**
- Determine the number of municipal exit signs and current lighting type of each sign.
- Work with NGrid to retrofit all incandescent signs and to determine the cost effectiveness of upgrading other types of exit sign lights (i.e. fluorescents).
- Implement a policy to ensure that future municipal exit signs are the most efficient lighting available

*Want more info? See page 52.*

14. **Increase the Efficiency of Lighting in the Pearl/Elm Garage**

Parking garages have high lighting and energy requirements because of the amount of time and space that it needs to be lit. Increase the efficiency of the lights can save money, electricity, and prevent GHG emissions. Additionally,
National Grid offers a rebate for upgrading parking garage lighting.

**Next Steps:**
- Have NGrid conduct an energy audit and efficiency assessment of the Pearl/Elm Garage.
- Implement NGrid's lighting energy efficiency recommendations.

**Want more info? See page 54.**

**15. Implement a Change-A-Light Campaign: Encourage Residents to use CFL Bulbs**

If every household in Worcester changed one bulb, it would amount to an energy savings of 6.54 mega-watt hours and a cost savings of over 1 million dollars annually. Other cities have implemented similar campaign, and Worcester has a good opportunity to partner with local resellers, Spags/Building 19 and Bulbs.com, to promote this action.

**Next Steps:**
- Determine the time line, goals, and partners in the Change-A-Light educational campaign.
- Seek out necessary funding.
- Implement the campaign and save energy.

**Want more info? See page 55.**

**16. Develop an Energy Management System Using Energy Star’s Portfolio Manager**

An Energy Management System is important to the tracking of individual building’s energy use, audits, and upgrades. Knowing the energy profile of individual buildings can save the City money and energy, and can essentially pay for itself after one to two years.

**Next Steps:**
- Input buildings data into Energy Star’s Portfolio Manager online.
- Work with National Grid to set up Energy Audits and to document upgrade recommendations.
- Prioritize upgrades based on capital costs, cost savings, and energy/resource savings.
- Implement upgrades, documenting completed actions, and continue to track buildings energy and water consumption as well as energy audits and upgrade history.

**Want more info? See page 49.**

**17. Pass a Municipal Energy Efficiency Purchasing Policy**

A municipal Energy Efficiency Purchasing Policy means that when new appliances, lighting, and temperature control systems are purchased, their energy use and life-cycle costs are taken into account. This will ensure that new items have the greatest energy efficiency for their intended use, which will save the City money and reduce emissions.

**Want more info? See page 58.**

**18. Pass a Municipal Green Building Policy**

Green building means building in a way that reduces energy use, water consumption, sprawl, and indoor air pollutants. A municipal Green Building Policy means that the all new municipal buildings and major renovations would be required to meet LEED Silver standards unless the DPW & P, Architectural Services Division first makes a finding such certification is inappropriate. A draft Green Building Policy, based on the City of Arlington’s policy, can be found in Appendix A.

**Want more info? See page 59.**

**19. 2KW of Solar Electricity Panels at the New Vocational School**

Solar electric panels (aka PV), while not the most cost effective technology, can provide a wonderful educational opportunity for residents and students. This is particularly important for a vocational school where students are
being trained in up and coming technologies.

**Next Steps:**
- Determine the amount of money the City has available.
- Bring in a solar expert for a site, power and cost assessment.
- Contract with solar installer and determine from whom to purchase the solar panels.
- Ensure solar panels will be electronically monitored for production.
- Apply for MTC funding.

*Want more info? See page 77.*

**20. Look Into Solar Heating, Hot Water, and Electricity at Schools and Other Buildings**

Solar technologies, such as air and water heating, can save the City energy, money, and reduce GHG emissions. They are often easy to install and maintain and can be used as an educational tool as well.

**Next Steps:**
- Bring in a solar expert to assess several predetermined Worcester public schools for solar heating, water, and electric feasibility.
- Other municipal buildings may also be considered for solar heating, hot water, and/or electricity, including the water filtration plant, the airport, and UBWPAD.
- Determine amount of money available or an acceptable payback period.
- Seek out funding sources if needed.
- In new construction, assess the use of active and passive solar heating in the design stage.

*Want more info? See pages 72-74, 79.*

**21. Biodiesel (B-20) Pilot Program at Hope Cemetery**

The use and production of biodiesel has been increasing exponentially over the past 5 years and the growth is anticipated to continue. Many local governments in New England and throughout the country have begun to use biodiesel in their diesel vehicles. Biodiesel is made from vegetable oil and reduces pollution and GHG emissions.

**Next Steps:**
- Educate Hope Cemetery fleet director on the proper process of switching to B-20.
- Determine if a separate RFP is needed to purchase B-20 in the short term.
- Include B-20 specifications in the next RFP for vehicle fuel.
- Look into aggregating demand with other local communities.

*Want more info? See page 90.*

**22. Increase Fuel Efficiency of Vehicle Fleet by Purchasing Vehicles w/ a higher MPG Rating**

Often times inefficient vehicles are purchased for the municipal fleet when there is no need. A Fuel Efficient Vehicle Policy should be developed and passed stating that the most fuel efficient vehicle will be purchased in the class required to perform the needed tasks.

**Next Steps:**
- Pass a Fuel-Efficient Vehicle Purchasing Policy. (See Appendix A for a sample policy)
- Purchase and install a modern vehicle fleet software that can properly track mileage and fuel use.
- Develop a method for determining life cycle costs of new vehicles, and determine the increase in initial cost (if any) the City is willing to pay for more efficient vehicles.

*Want more info? See pages 85-89.*
23. **Increase Employee Carpooling**
Transportation accounts for about a third of GHG emissions in Worcester and in the state. Driving to work contributes significantly to this, and the City should be encouraging municipal employees to carpool, telecommute, take public transportation, bike, or walk to work.

**Next Steps:**
- Create an electronic survey for employees to fill out about their daily commute (samples can be found at MA DEP, ICLEI, and BWC). This will help to determine where reductions attempts should be made and to measure the results of education in changing commuter patterns.
- Create an online carpool message board for city employees so that workers coming from the same areas may easily link up.
- City Manager should send out an email to employees requesting that they complete the survey, announcing the creation of the carpool e-board, and encouraging employees to carpool - highlighting the benefits.

*Want more info? See page 94.*

24. **Offer Employee Telecommuting**

**Next Steps:**
- The feasibility of telecommuting will have to be determined by individual department heads.
- If it is feasible, they will have to decide on the number of telecommuting days that are appropriate.
- Once these two steps are completed, employees must be educated about this option (aka benefit).

*Want more info? See page 96.*

25. **Increase Employee Commuters Traveling by Public Transport/Biking/Walking**

**Next Steps:**
- Determine feasibility of various incentives.
- Create partnerships with WRTA and MBTA.
- Educate employees.
- Report on successes, obstacles, and solutions.

*Want more info? See page 97.*

26. **Promote an Employee Take Public Transportation, Bike, or Walk to Work Week**
Once a year some City officials take part in an Elected Officials take public transportation to work day. The City should expand on this idea to promote a week of taking public transportation, biking, or walking to work. Incentives could be offered by department heads for City employees, and the City could also issue a challenge to all businesses and employees who work in Worcester.

*Want more info? See page 118.*

27. **Recycle at Schools**
Implementing a recycling program in schools can save the City hundreds of thousands of dollars each year by reducing waste disposal fees. This would also significantly reduce GHG emissions and could serve as an example to other communities. Additionally, recycling in schools would teach Worcester’s youth about recycling, making them more likely to recycle at home.

**Next Steps:**
- Determine equipment and resources needed to implement a recycling program.
- Decide which products will be recycled.
- Draft an implementation plan.
• Create a plan to get students excited.
• Begin recycling and record the amount of recyclables and trash.

**Want more info? See page 107.**

**28. Increase Residential Recycling Rate from 27 Percent to 50 Percent**
Since Worcester began its curb-side recycling program in 1994, recycling rates have decreased from 36.5% of waste in 1994 to 26.6% of waste in 2005. The City has a lot to gain by encouraging residents to recycle, such as reducing a significant amount of GHG emissions and saving a substantial amount of money.

**Next Steps:**
• Educate residents on how to make it easy to recycle (i.e. put a small bin for recyclables next to every trash bin in the house).
• Recycle at schools.

**Want more info? See page 106.**

**29. Municipal Office Recycling Pilot at 44 Front Street**
Some municipal offices are in privately owned buildings, such as the Planning, Department, Grants Acquisition, and Workforce Development, which are all at 44 Front Street. There is no recycling in this building, so building occupants must either throw everything in the trash and recycle it themselves. The City should set up a pilot recycling program at 44 Front Street for the municipal offices there. This will serve as an example and case study for other businesses in Worcester that are in a similar situation.

**Want more info? See page 108.**

**30. Install Recycle Bins at City Hall and Downtown**
To show the City’s commitment to recycling, recycling containers should be installed next to trash cans inside of City Hall and in the outdoor downtown area. This will show people walking through downtown that Worcester cares about protecting the environment where they live and work. It may also motivate people to recycle in their own homes, knowing that their local government is putting in the effort to do so.

**Want more info? See page 108.**

**31. Ensure that Recycling Containers are Visible at Every Municipal Event**
Similar to placing recycling containers in City Hall and downtown, is the idea of providing the opportunity for people to recycle at City-sponsored events. This provides a leadership example for residents and lets them know that their city places importance on recycling. In 2005, the City received a DEP grant that provided event-type recycling containers that have been used at City-sponsored events at various parks. It is important to have these recycling containers visible at every City event without exception.

**Want more info? See page 108.**

**32. Enhance the Municipal Buy Recycled Policy**
The City currently has a “Buy Recycled” policy that goes out with all of its RFPs. This policy states that preference should be given to products containing recycled materials provided that the cost does not exceed 10% more than the cost of the same “new” product. However, Purchasing Director John Orrell states that he “can think of no bidder that has ever taken advantage of it”. The City should enhance this current policy to make it more prominent, perhaps requiring the proposal of products that use recycled materials and those that do not, particularly with products like paper. Having a strong “buy recycled” policy supports the demand for recycling.

**Want more info? See page 108.**
33. **Protect Open Space, Support Community Gardens, and Plant More Trees**
Increasing the “green” in a City has many benefits: 1) Trees help to shade buildings and block winds, thus reducing the need for heating and cooling; 2) Vegetation filters air of harmful pollutants and takes up CO₂; 3) Greenery helps to mitigate the Urban Heat Island effect; and 4) Studies have shown that green environments help kids concentrate, increase girls’ confidence, reduce violence and crime, and increase neighborliness.

*Want more info? See pages 109-114.*

34. **Maintain Energy and Climate Information on the City Website**
Having clear information online is vital. The City’s website is its face to the world, and information should be kept up to date and useful. In September 2006, Energy Task Force web pages were posted to the City’s website containing information about climate change, the mission of the ETF, and how residents can be a part of the solution. As GHG reduction measures are implemented, these actions should be publicized on these web pages.

*Want more info? See page 115.*

35. **Hold an Energy Fair**
This should be a highly informative and fun event that includes many community partners, vendors, and representatives. The main focus of the event should be to engage the entire community in learning about the City’s GHG emission reduction initiative and ways for individuals and businesses to take an active role in helping to meet Worcester’s GHG reduction goals. The fair would provide information about businesses, professional firms, organizations, and individuals offering sustainable energy products and services to Worcester residents and businesses and could be held on the City Common. Examples of vendors include green-building contractors, solar specialists, architects, energy conservation specialists, energy star representatives, clean energy suppliers, business consultants, environmental educators, and many other useful resources.

*Want more info? See page 118.*

36. **Collaborate with Local Universities and Partner with Local Organizations**
It is important for the City to partner with local organizations and universities for several reasons. 1) Combine efforts, many organizations are working on the same energy and climate change issues. 2) Make use of local resources, students are interested doing work on climate change and renewable energy. 3) Connect with the community, by collaborating with others, the City is reaching out into the community and creating a more unified approach to energy and climate change education.

*Want more info? See page 117.*

37. **Participate in the Annual Earth Day Fair**
Every year the City of Worcester partners with the Regional Environmental Council to sponsor the city-wide Earth Day clean-ups. The REC also sponsors an Earth Day Fair around the same time. Last year the REC partnered with the EcoTarium to put on a larger event. The City should participate in the annual Earth Day fair and distribute information about the Climate Action Plan, Worcester’s energy goals and actions, and other environmental initiatives, such as the mercury take-back campaign, curb-side recycling, and hazardous waste collection. By having a presence and distributing brochures at the Earth Day Fair, the City can help residents to understand how they can take an active role in lowering their own energy emissions output.

*Want more info? See page 118.*
From: Carrie Havey, LEED AP  
To: Katie Crockett, AIA, LEED AP  
Date: January 30, 2014  
Re: Charrette Meeting Minutes  
Project: Nelson Place Elementary School

I. Project Overview

Currently the design team is evaluating the existing site and three alternative sites for a new elementary school. The existing elementary school serves the surrounding neighborhoods for grades Pre-K through 6th grade with a current enrollment of 502 students and with an agreed upon enrollment of 600 students. The site access road, Nelson Place, is currently undersized to safely and efficiently serve school traffic and emergency vehicles. The site itself is divided by a steep slope limiting playground space and parking. The school facility is comprised of an original 2 story brick structure dating from 1927; an addition from 1952 consisting of a two story brick classroom building with a one story cafeteria and administration building; as well as a brick gymnasium from 1968 for a total of 55,000 square feet.

Sustainable project goals during the feasibility study will include:

- Analysis of optional alternative energy systems including payback duration,
- Evaluation of site options,
- Life cycle costs of operating the school based on a 20 year period, as it relates to projected yearly operational budgets, and
- Evaluation the possibility of a zero net energy building.

II. Approach

The City of Worcester has identified environmental sustainability as an important goal for this project. This goal is one that is also shared by the members of the design team. The City will be pursuing funding through the MSBA. MSBA awards a school district an additional 2% of the project’s eligible costs if the project achieves Silver Certification under LEED for Schools 2009 and achieves a minimum of 5 points in EAc1 (per 3/31/2010 MSBA Memorandum).

Making sustainable choices for the built environment requires the intense collaboration of all design disciplines in an integrated process – integrated not only with the architects and engineers, but also will involve the City, contractor and with the needs of the end users.

The following strategies will be incorporated into the design. These are four basic goals that all building projects should seek to achieve. These can be seen a sustainable design goals, but they are also basic goals all buildings should meet as part of “good design.”
1. Buildings must be safe and healthy for their occupants and visitors. We spend 90% of our time indoors. Bad air quality, poor lighting, and toxic materials in buildings can have a significant impact on our health and well-being. Buildings should not emit toxins and waste, which may have an adverse effect on the surrounding community.

2. Buildings must be resource efficient. By this we mean not only energy efficient and materials efficient, but also efficient in its use of money.

3. Building must be flexible and adaptable. Most buildings are destroyed, not because they are worn out, but rather because they are obsolete. The owner can no longer achieve his or her desired outcome in the building, so it is replaced. Robust buildings, which subscribe to the principles of “long life – loose fit”, will be reincarnated in ways undreamed of by the original designers and builders.

4. Buildings must be durable and maintainable. In order to achieve the long life span desired, the building structure must be robust. Different parts of a building have different life spans: Structures might last 100 years or more, mechanical systems 20-30 years, while IT systems will be obsolete in 5 years or less. We must recognize this fact as we design the building, so that systems can be replaced as needs warrant. We must also design so that all systems can be maintained as required to achieve top performance and energy efficiency.

Schools present special opportunities for “greening”. Some of the perceived benefits of Green Schools include:

- A healthy, productive learning environment
- Improved teacher retention
- Financial savings
- Hands-on learning
- Environmentally friendly
- Daylighting improves performance
- Good indoor air quality improves health
- Good acoustics increases learning potential
- Comfortable indoor temperatures increase occupant satisfaction

These ideas will inform our work going forward.

III. Charrette Goal Setting Exercise

Attendees

<table>
<thead>
<tr>
<th>Tom Angelo (NStar Gas Co.)</th>
<th>Katie Crockett (Lamoureux Pagano Associates)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chris Adcock (Worcester - Architectural Services)</td>
<td>Carrie Havey (The Green Engineer)</td>
</tr>
<tr>
<td>Christina Kilday (Worcester - Architectural Services)</td>
<td>Pam Shadley (Shadley Associates)</td>
</tr>
<tr>
<td>Julie Lynch (Worcester - Architectural Services)</td>
<td>Kevin Shaughnessy (National Grid)</td>
</tr>
<tr>
<td>Russ Adams (Worcester - DPW)</td>
<td>Sean McGloin (National Grid)</td>
</tr>
<tr>
<td>Azim Rawji (ART Engineering)</td>
<td>Kevin Seaman (Seaman Engineering Corp.)</td>
</tr>
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On January 22, 2014 a Nelson Place Elementary School integrated design team charrette was conducted. The charrette focused on identifying the project’s high performance goals and discussing some of the LEED prerequisites and credits to determine the best approach for credit achievement.

During the charrette the team was asked what newspaper heading describing the project would they like to see when the project is complete. Below is a sample-set of the goals that were listed by the team.

Environmental Goals
School will educate students on sustainability and the environment

Budget/Schedule
Ahead of schedule
On budget

Impact on School
Students can’t wait to attend
Daylighting feels like you’re outside
Exemplary special education program support spaces
Fits the needs of the teachers and students
A creative use of the site encourages play and environmental learning

Appearance and Acknowledgment
Most desired school in Worcester
Nelson place is national model for net-zero initiatives
The building enhances the landscape

Energy Use
Cutting edge energy system
First net-zero water school in MA with monitoring
School produces 100% of energy through solar photovoltaic
School utilizes energy efficient LED lighting throughout

Site
Rooftops support vegetable gardens
Nutrition program, which sets the bar for WPS food service
School has used innovative strategies to reduce stormwater runoff and to capture rainwater for garden
First Worcester school with porous pavement
IV. Meeting Notes

GOALS:
1. Reduce energy (heat and electricity demands). Goal is a Zero Net School.
2. Consider alternative energy systems. An investigation of system options will be performed.

SUSTAINABLE TERMS:
Off the Grid – produces all its own energy
Zero Net – at the end of the year, the meter reads zero
Carbon Neutral – buys offsets to balance energy consumption

Energy Star Targets for Nelson Place:

<table>
<thead>
<tr>
<th>Target</th>
<th>Energy Star Score</th>
<th>Site EUI (kbtu/sf/yr)</th>
<th>Source EUI (kbtu/sf/yr)</th>
<th>Energy Cost ($/yr)</th>
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<tr>
<td>Average</td>
<td>50</td>
<td>84.5</td>
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<td>Energy Star</td>
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<td>105.2</td>
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<td>52.4</td>
<td>83.5</td>
<td>$104,340</td>
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<tr>
<td>Net Zero</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

UTILITY INCENTIVES:
- Utility incentives with National Grid and NStar were discussed.
- Advanced Buildings is New Buildings Institute’s suite of technical tools and resources developed to help design teams create high performance buildings that stand out for their energy efficiency and healthy environments. Advanced Buildings can be used to determine utility incentives (12-15 measures to meet building matrix).
- Advanced building design- can earn more incentives if you go beyond 12-15 measures that are required. Does not cover any incentives for renewables.
- National Grid savings - $1.50 to $2 a square foot (electrical AND gas).
- Size of project will determine if Advanced Buildings is used.
- CDA- comprehensive design approach. Would involve an investment-grade study (similar to advanced building). Determine how much the energy savings would be, according to final measurements.
GENERAL PROJECT NOTES:

• The project is approximately 110,000 GSF and will be 100% Air Conditioned.
• There are four sites being evaluated.
• School is year round including a large summer program population.
• Project will have a full kitchen.
• Need to determine if all sites have gas available. Nelson and St. Georges sites have gas lines nearby.
• Building completion is estimated in 2017 or 2018.
• Both new construction and renovation are being considered.
• School has an autism program.
• The desire is to have a 2-story building for ease of egress.
• There will be a public library component with after school hours.
• The community will use the gym and cafeteria.
• A wellness program is being discussed. One idea is to provide a greenhouse that grows vegetables for use in the kitchen.
• Students, staff, and volunteers will tend to the greenhouse garden.
• The school administration desires a net zero building.
• Nelson place school could be a catalyst for other schools – change City mindset.
• Building will be built under the new code – ASHRAE 2010 (25% better than the ASHRAE 2007 energy code)
• Neighborhood/ residential areas surrounding sites
• School needs 140 parking spaces and bus and parent pick up circulation
• MSBA recommends a building size of 87,000 square feet for the number of students that attend, but with the special education program a larger size may be required. Targeting approx. 110,000 sf.
• The idea of the landscape as a learning tool and a vegetable garden was discussed – possible roof garden
• The school does not plan to eliminate fossil fuels from the project
• The idea of kitchen waste being brought to Rutland farm to be reused (commercial food waste) was discussed. Possible food waste digester that would convert waste into renewable energy source.
• Photovoltaic panels were of interest. Either on the roof or cover parking lot with panels – serve as dual purpose for shading (for people/vehicles) and generating energy.
• The possibility of geothermal was discussed. The site that is chosen will determine if this is an option.
• Wind energy was discussed. Past experience says that a wind turbine is not a viable alternative. A large-scale wind turbine may work (Mount Wachusett), however, this may not be feasible due to neighborhood constraints. We can investigate small wind turbines on light poles (example discussed was Walmart parking lot) to see if this is a viable technology.
• Recommended that Mass Clean Energy Center be contacted as a resource.

V. Sites:

NELSON PLACE
Existing school is 55,000 sf (2-3 existing floors)
Site access road is narrow. Nelson Place is currently undersized to safely and efficiently serve school traffic. Current school is oriented East/West, maximizing southern exposure.
Site has steep slopes.

**SALTER SCHOOL**

20,000 sf

Article 97 – (fields behind it must remain as is)

Would need a 4 story building with parking underneath because of existing site limitations

Would most likely remove existing building

**ST. GEORGES**

Located to the north and east of the Salter School

2 access roads

Wetlands in center of site (bisecting site)

Undeveloped site

**FOREST GROVE**

Developed site

Land is flat

Wetland and pond on site

Southern exposure (E/W orientation) is an option on this site

**VI. Schedule**

- March 3rd – Preliminary Design - Building size determined and review of sites.
- April 17th – Preferred Solution Report. Site identified at this time.
- SD phase will be completed in October.

**VII. LEED Scorecard and Discussion**

**LEED for Schools Credit-by-Credit Review:** After our initial review, we are currently tracking 44 ‘Yes’, 59 ‘Maybe’, and 7 ‘No’ using LEED for Schools 2009. MSBA requires 50 points (Silver), to be awarded an additional 2% of the project’s eligible costs. With 59 Maybes we are confident that we are on track for hitting 50 plus points. Details on the project’s individual credit status are listed below. Please refer to the attached LEED scorecard.

**Sustainable Sites:**

- **SSp1 – Construction Activity Pollution Prevention:** Create and implement an Erosion and Sedimentation Control (ESC) Plan.
  - **Status:** REQUIRED. Project will implement ESC Plan.

- **SSp2 – Environmental Site Assessment:** Conduct a Phase I Environmental Site Assessment (as described in ASTM E1527-05) to determine whether environmental contamination exists at the site.
  - **Status:** REQUIRED. A Phase I Environmental Site Assessment will be conducted. At this time, soil contamination does not appear to be an issue on any of the sites.
- **SSc1 – Site Selection:** Do not develop on Prime farmland, previously undeveloped land lower than 5’ above the elevation of the 100-year flood, land identified as habitat for species on the Federal or State threatened or endangered list, land within 100’ of any wetland, previously undeveloped land within 50’ of a water body, and land that was public parkland.
  - **Status:** Tracking as ‘MAYBE’. Some of the sites have wetlands and undeveloped land. This credit will depend on the site that is chosen.

- **SSc2 – Development Density and Community Connectivity:** Construct building on previously developed site AND within 1/2 mile of a residential with an average density of 10 units/acre net AND within 1/2 mile of at least 10 Basic Services AND with pedestrian access between the building and the services.
  - **Status:** Tracking as ‘MAYBE’ pending further review. Forest Grove has 10 services within a ½ mile, however, the other sites do not. The Density calculations have not been done yet - this credit may be achievable on other sites with this option.

- **SSc3 – Brownfield Redevelopment:** Develop on a site documented as contaminated OR on a site defined as a brownfield.
  - **Status:** Tracking as ‘MAYBE’. Most likely there is no soil contamination on any of the sites, however, soil testing has not yet been done. The project may also be able to achieve this credit if an existing school is renovated or torn down and requires asbestos removal.

- **SSc4.1 – Alternative Transportation, Public Transportation:** Locate within 1/2 mile of a commuter rail, light rail or subway station OR 1/4 mile of 2 or more bus lines.
  - **Status:** Tracking as ‘MAYBE’. The Forest Grove site and the Nelson Place site have one bus stop within ¼ mile. Combined with school bus routes, this site may be able to achieve this credit. The other two sites do not have access to public transportation and will not qualify for this credit.

- **SSc4.2 – Alternative Transportation, Bicycle Storage:** Provide secure bike racks and/or storage for 5% or more of all building occupants, AND provide shower and changing facilities in the building for 0.5% of FTE occupants, AND provide dedicated bike paths.
  - **Status:** Tracking as ‘NO’. Dedicated bike paths are an added cost.

- **SSc4.3 – Alternative Transportation, Low-Emitting Vehicles:** Provide preferred parking for low-emitting and fuel-efficient vehicles for 5% of the total vehicle parking capacity and provide at least 1 designated carpool drop-off area for low-emitting and fuel-efficient vehicles.
  - **Status:** Tracking as ‘YES’. Project will provide preferred parking spaces for LEFE vehicles. A designated drop-off area will also be provided.

- **SSc4.4 – Alternative Transportation, Parking Capacity:** Size parking capacity not to exceed minimum local zoning requirements AND provide preferred parking for carpools or vanpools for 5% of the total parking spaces OR add no new parking.
  - **Status:** Tracking as ‘YES’. The project will not exceed the minimum local zoning requirements and will provide preferred carpool parking spaces for 5% of the total parking spaces.

- **SSc5.1 – Site Development, Protect or Restore Habitat:** On previously developed sites, restore a minimum of 50% of the site area (excluding building footprint) or 20% of the total site area (including building
footprint), whichever is greater, by planting native or adapted vegetation. On greenfield sites, limit all site disturbance according to the parameters listed in the LEED reference guide.

- **Status:** Tracking as ‘MAYBE’. This credit can be difficult to achieve. Project must restore site with planting native or adapted vegetation; turf grass is not acceptable. Achievement of this credit will depend on the site that is chosen. For example, the Salter School site is very small and there is little room for site restoration. The St. Georges site is a Greenfield site – it is possible this credit can be achieved if this site is chosen.

- **SSc5.2 – Site Development, Maximize Open Space:** Provide vegetated open space within the project boundary to exceed the local zoning’s open space requirement for the site by 25% OR where a zoning ordinance exists, but there is no requirement for open space, provide vegetated open space equal to 20% of the project’s site area.
  - **Status:** Tracking as ‘MAYBE’. This credit will depend on the amount of open space on the site that is chosen and local zoning requirements. Playing fields can contribute to open space.

- **SSc6.1 – Stormwater Design, Quantity Control:** No net increase in the rate and quantity of stormwater runoff from existing to developed conditions; OR implement plan that protects receiving stream channels from excessive erosion by implementing a stream channel protection strategy and quantity control strategies.
  - **Status:** Tracking as ‘MAYBE’. For all four sites this credit will be difficult to achieve. This credit cannot be determined until stormwater calculations are done.

- **SSc6.2 – Stormwater Design, Quality Control:** Reduce impervious cover, promote infiltration, and capture and treat stormwater from 90% of the avg annual rainfall using acceptable BMPs capable of removing 80% of the avg annual post development total suspended solids.
  - **Status:** Tracking as ‘YES’. Currently, this credit is feasible on all four sites. Project will be able to capture and treat stormwater from 90% of the average annual rainfall.

- **SSc7.1 – Heat Island Effect, Non-Roof:** Provide any combination of the following strategies for 50% of the site hardscape (including roads, sidewalks, courtyards and parking lots): shade (within 5 years of occupancy); paving materials with a SRI of at least 29; open grid pavement system.
  - **Status:** Tracking as ‘MAYBE’. Open grid paving and porous pavement was discussed. In addition, shading the parking lot by locating solar panels in close proximity was discussed. Another option is to provide shade from a tree canopy within 5 years of landscape installation. These options are possible on all four sites, but do have an added cost.

- **SSc7.2 – Heat Island Effect, Roof:** Install 50% green vegetated roof, 75% “cool” light-colored roof, or combination of both.
  - **Status:** Tracking as ‘YES’. Roof will have white roof membrane. A vegetated roof was also discussed.

- **SSc8 – Light Pollution Reduction:** Interior- The angle of maximum candela from interior luminaires shall not exit out through the window. OR Provide automatic controls to turn off lights after hours. Exterior lighting- only light areas as required for safety and comfort. Meet ASHRAE/IESNA Standard 90.2-2004.
- **Status**: Tracking as ‘MAYBE’. Interest was shown in this credit. Priority will be to safety and security requirements. This credit requires that there is no light spill onto adjacent properties, which can be difficult to achieve.

- **SSc9 – Site Master Plan**: The project must achieve at least 4 out of the following 7 credits using the associated calculation methods: SSc1, SSc5.1, SSc5.2, SSc6.1, SSc6.2, SSc7.1, SSc8. In addition, a site master plan for the school must be developed in collaboration with the school board or other decision-making body.
  - **Status**: Tracking as ‘MAYBE’. Achieving this credit will be dependent on getting 4 of the 7 credits above. This credit also requires that a site master plan for the school be developed. The requirements of the master plan have not yet been discussed with the school.

- **SSc10 – Joint Use of Facilities**: In collaboration with the school board or other decision-making body, ensure that at least 3 spaces included in the school are accessible to and available for shared use by the general public. OPT 2: Engage in a contract with community or other organizations to provide at least 2 dedicated-use spaces in the building. OPT 3: Ensure that at least 2 of the following 6 spaces that are owned by other organizations/agencies are accessible to students.
  - **Status**: Tracking as ‘YES’. This credit will be easy to achieve. The school district plans to share the cafeteria and gym with the community. In addition, a public library will be part of the project.

### Water:

- **WEp1 – Water Use Reduction, 20%**: Employ strategies that use 20% less water than the water use baseline calculated for the building (not including irrigation).
  - **Status**: REQUIRED. Design will use high-efficiency fixtures.

- **WEc1.1 – Water Efficient Landscaping, reduce by 50%**: Reduce potable water consumption for irrigation by 50% from a calculated mid-summer baseline case.
  - **Status**: Tracking as ‘YES’. The current goal is to minimize permanent irrigation. Water collection for irrigating the garden was discussed. This could be a rain barrel that is used on a small scale for educating students. Including playgrounds and athletic fields in this credit is optional.

- **WEc1.2 – Water Efficient Landscaping, no potable**: Use only captured rainwater OR Install landscaping that does not require permanent irrigation systems. Temporary irrigation systems used for plant establishment are allowed only if removed within 18 months of installation.
  - **Status**: Tracking as ‘MAYBE’. Irrigation will be limited. It has not yet been determined if there will be permanent irrigation.

- **WEc2 – Innovative Wastewater Technologies**: Reduce the use of municipally provided potable water for building sewage conveyance by a minimum of 50%, OR, treat 50% of wastewater on site to tertiary standards. Treated water must be infiltrated or used on-site.
  - **Status**: Tracking as ‘NO’. Wastewater technologies to reduce use of municipally provided potable water will not be implemented.
- **WEc3 – Water Use Reduction**: Employ strategies that in aggregate use 30% - 40% less water than the water use baseline calculated for the building after meeting Energy Policy Act of 1992 fixture performance requirements.
  - **Status**: Tracking 2 as ‘YES’ and 2 as ‘MAYBE’. Design will use high-efficiency fixtures.

- **WEc4 – Process Water Use Reduction**: Buildings must have the following: No refrigeration equipment using once-through cooling with potable water; No garbage disposals; At least 4 process items where water use is at or below the levels shown in the WEc4 table.
  - **Status**: Tracking as ‘MAYBE’, pending design decisions. This credit has not been discussed yet.

**Energy:**

- **EAp1 – Fundamental Commissioning**: Engage a commissioning authority (CxA), Owner shall document the Owner's Project Reqs (OPR). Design team shall develop the Basis of Design (BOD). CxA shall review these docs for clarity and completeness. Develop and implement a commissioning plan. Verify the installation and performance of the systems to be commissioned.
  - **Status**: REQUIRED. A commissioning plan will be implemented. MSBA requires commissioning.

  - **Status**: REQUIRED. The project will comply with ANSI/ASHRAE/IESNA Standard 90.1-2007.

- **EAp3 – Fundamental Refrigerant Management**: Zero use of CFC-based refrigerants in new building HVAC&R base building systems. When reusing existing base building HVAC equipment, complete a comprehensive CFC phase-out conversion.
  - **Status**: REQUIRED. No CFC-based refrigerants will be used.

- **EAc1 – Optimize Energy Performance**: Demonstrate a percentage improvement in the proposed building performance rating compared to the baseline building performance rating per ASHRAE 90.1-2007 by a whole building project simulation using the Building Performance Rating Method in App G.
  - **Status**: Tracking 6 as ‘YES’ and 13 as ‘MAYBE’ pending design decisions. The goal is to have a zero net building, which would earn the project 19 points. In addition to on-site renewables, an energy-efficient building envelope is important to achieving a net zero building.

- **EAc2 – On-site Renewable Energy**: Supply 2.5% of the building’s total energy use (as expressed as a fraction of annual energy cost) through the use of on-site renewable energy systems.
  - **Status**: Tracking 2 as ‘YES’ and 5 as ‘MAYBE’ pending design decisions. On-site renewables were discussed. Options under this credit are: photovoltaic systems, wind energy systems, solar thermal systems, biofuel-based electrical systems, geothermal heating and electric systems, and low-impact hydroelectric power systems. Ground-source heat pumps were discussed as a good option, but do not quality for this credit.
- **EAc3 – Enhanced Commissioning**: Implement the following: OPR & BOD design review before construction documents phase, review construction documents near completion, review contractor submittals of commissioned equipment, develop system and energy management manual, verify that the reqs. for training operating personnel and building occupants are completed, assure the involvement by the CxA in reviewing building operation within 10 months after substantial completion with O&M staff and occupants.
  - **Status**: Tracking as ‘YES’. MSBA requires enhanced commissioning.

- **EAc4 – Enhanced Refrigerant Management**: Do not use refrigerants. OR select refrigerants and HVAC&R that minimize or eliminate the emission of compounds that contribute to ozone depletion and global warming. AND Do not install fire suppression systems that contain ozone-depleting substances.
  - **Status**: Tracking as ‘MAYBE’. It is too early to determine if we can achieve this credit.

- **EAc5 – Measurement and Verification**: Develop and implement an M&V Plan consistent with Option D: Calibrated Simulation, or Option B: Energy Conservation Measure Isolation, as specified in the IPMVP. The M&V period shall cover a period of no less than one year of post-construction occupancy.
  - **Status**: Tracking 1 as ‘YES’ and 1 as ‘MAYBE’. The school will register with Energy Star Portfolio Manager. It has not been determined if an M&V plan will be implemented.

- **EAc6 – Green Power**: Provide at least 35% of the building’s electricity from renewable sources by engaging in at least a two-year renewable energy contract.
  - **Status**: Tracking as ‘MAYBE’ pending the Town’s decision.

**Materials:**
- **MRp1 Storage & Collection of Recyclables**: Provide an easily accessible area serving entire building for separation, collection and storage of (at minimum) paper, glass, plastics and metals.
  - **Status**: REQUIRED. Storage areas will be provided.

- **MRc1.1 - Building Reuse, Maintain 75%-95% of Existing Building**: Reuse large portions of existing structures during renovation or redevelopment projects: Maintain at least 75% of existing building structure and shell.
  - **Status**: Tracking as ‘NO’. Most likely, the project will be new construction.

- **MRc1.2 - Building Reuse, Maintain 50% of Interior**: Use existing interior nonstructural elements (e.g., interior walls, doors, floor coverings and ceiling systems) in at least 50% (by area) of the completed building including additions.
  - **Status**: Tracking as ‘NO’. Most likely, the project will be new construction.

- **MRc2.1 – Construction Waste Management – Divert 50%**: Develop and implement a waste management plan, quantifying material diversion by weight. Recycle and/or salvage at least 50% (by weight) of construction, demolition, and land clearing waste.
  - **Status**: Tracking as ‘YES’. The building will divert at least 75% of construction waste from the landfill. 75% is a Massachusetts requirement.
- **MRC2.2 – Construction Waste Management – Divert 75%**: Develop and implement a waste management plan, quantifying material diversion by weight. Recycle and/or salvage an additional 25% (75% total by weight) of the construction, demolition, and land clearing debris.
  - **Status**: Tracking as ‘YES’. The building will divert at least 75% of construction waste from the landfill. 75% is a Massachusetts requirement.

- **MRC3.1 – Materials Reuse, 5%**: Specify salvaged or refurbished materials for 5% of building materials.
  - **Status**: Tracking as ‘MAYBE’. It is too early in the project to determine if we will achieve this credit.

- **MRC3.2 – Materials Reuse, 10%**: Specify salvaged or refurbished materials for 10% of building materials.
  - **Status**: Tracking as ‘MAYBE’. It is too early in the project to determine if we will achieve this credit.

- **MRC4.1 – Recycled Content, 10%**: Specify materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content (by weight) constitutes at least 10% (based on cost) of the total value of the materials in the project.
  - **Status**: Tracking as ‘YES’. Project will specify 10% of materials have recycled content.

- **MRC4.2 – Recycled Content, 20%**: Specify materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content (by weight) constitutes at least 20% (based on cost) of the total value of the materials in the project.
  - **Status**: Tracking as ‘MAYBE’. Project will target 20% of materials with recycled content.

- **MRC5.1 – Regional Materials, 10% Extracted, Processed & Manufactured Regionally**: Use building materials or products that have been extracted, harvested or recovered, as well as manufactured, within 500 miles of the project site for a minimum of 10% (based on cost) of the total materials value.
  - **Status**: Tracking as ‘YES’. Project will specify 10% regional materials.

- **MRC5.2 – Regional Materials, 20% Extracted, Processed & Manufactured Regionally**: Use building materials or products that have been extracted, harvested or recovered, as well as manufactured, within 500 miles of the project site for a minimum of 20% (based on cost) of the total materials value.
  - **Status**: Tracking as ‘MAYBE’. Project will target 20% regional materials.

- **MRC6 – Rapidly Renewable Materials**: Specify rapidly renewable building materials for 2.5% (based on cost) of total building materials.
  - **Status**: Tracking as ‘MAYBE’. It is too early in the project to determine if we will achieve this credit.

- **MRC7 – Certified Wood**: Use a minimum of 50% of wood-based materials certified in accordance with the Forest Stewardship Council guidelines for wood building components.
  - **Status**: Tracking as ‘MAYBE’. It is too early in the project to determine if we will achieve this credit.

*Indoor Environmental Quality:*
IEQp1 – Minimum IAQ Performance: Meet the minimum requirements of Sections 4 through 7 of ASHRAE Standard 62.1-2007. Mechanical ventilation systems shall be designed using the Ventilation Rate Procedure or the applicable local code. Naturally ventilated buildings shall comply with ASHRAE 62.1-2007, paragraph 5.1.

IEQp2 – Environmental Tobacco Smoke Control: Prohibit smoking in building, or locate any exterior designated smoking areas at least 25’ from entries, intakes and operable windows. Provide signage to allow smoking in designated areas, prohibit smoking in designated areas or prohibit smoking on the entire property.
  o Status: REQUIRED. Smoking will be prohibited in the building and signs will be posted.

IEQp3 – Minimum Acoustical Performance: Achieve a max. background noise level from HVAC systems in classrooms and other core learning spaces of 45 dBA. Design classrooms and other core learning spaces to include sound-absorptive finishes to sufficiently limit reverberation.
  o Status: REQUIRED. Classrooms and other core learning spaces will be designed to include sound-absorptive finishes.

IEQc1 – Outdoor Air Delivery Monitoring: Install permanent monitoring systems that provide feedback on ventilation system performance. Configure all monitoring equipment to generate an alarm when the conditions vary by 10% or more from set point. Monitor CO2 within densely occupied spaces.
  o Status: Tracking as ‘YES’. Permanent ventilation monitoring systems will be installed. CO2 will be monitored in densely occupied spaces.

  o Status: Tracking as ‘MAYBE’. It is too early in the project to determine if this credit is achievable.

IEQc3.1 – Construction IAQ Management Plan, During Construction: Develop and implement an IAQ Management Plan for the construction and pre-occupancy phases of the building - meet or exceed the recommended Control Measures of the SMACNA IAQ Guidelines for Occupied Building under Construction. Protect on-site or installed absorptive materials. Use MERV 8 filters at each return air grille as determined by ASHRAE 52.2-1999.
  o Status: Tracking as ‘YES’. IAQ Plan will be developed. MERV 8 filters will be used at each return air grille.

IEQc3.2 – Construction IAQ Management Plan, Before Occupancy: Develop and implement an Indoor Air Quality (IAQ) Management Plan for the pre-occupancy phase that either has a compliant flush-out or performs required air testing.
  o Status: Tracking as ‘YES’. A flush-out or sample air testing will be performed prior to occupancy.
IEQC4.1 – Low-Emitting Materials, Adhesives & Sealants: Comply with SCAQMD Rule #1168 & Green Seal Standard GS-36 OR All adhesives and sealants installed in the building must meet the testing and product requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers.
  o Status: Tracking as ‘YES’. Project will track for low VOC adhesives and sealants.

  o Status: Tracking as ‘YES’. Project will track for low VOC paints and coatings.

  o Status: Tracking as ‘YES’. Project will track for low VOC carpet systems.

IEQC4.4 – Low-Emitting Materials, Composite Wood: Composite wood or agrifiber products contain no added urea-formaldehyde resins, OR California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers.
  o Status: Tracking as ‘YES’. Project will track for composite wood that contains no added urea-formaldehyde resins.

IEQC4.5 – Low-Emitting Materials, Furniture and Furnishings: Furniture and seating must be GREENGUARD Children and Schools Certified.
  o Status: Tracking as ‘MAYBE’. Project may track for low VOC furniture and furnishings. A maximum of 4 points out of 6 credits can be earned for IEQC4.1 to IEQC4.6.

IEQC4.6 – Low-Emitting Materials, Ceilings and Wall Systems: All gypsum board, insulation, acoustical ceiling systems and wall coverings installed in the building interior must meet the testing and product requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers.
  o Status: Tracking as ‘MAYBE’. Project may track for low VOC ceilings and wall systems. A maximum of 4 points out of 6 credits can be earned for IEQC4.1 to IEQC4.6.

IEQC5 – Indoor Chemical & Pollutant Source Control: Provide permanent entryway systems - walk off mats. Mechanically ventilated buildings must have MERV 13 or higher filtration media. Copy room and chemical storage areas must provide self-closing doors and deck-to-deck partitions.
  o Status: Tracking as ‘YES’. Walk off mats will be provided and MERV 13 filters will be installed.

IEQC6.1 – Controllability of Systems, Lighting: Provide individual lighting controls for 90% of the building occupants AND Provide lighting system controllability for all shared multi-occupant spaces to enable lighting adjustment.
- **Status**: Tracking as ‘YES’. The project will provide lighting controls for 90% of building occupants and for all shared multi-occupant spaces.

- **IEQc6.2 – Controllability of Systems, Thermal Comfort**: Provide individual comfort controls for 50% of the building occupants. Operable windows may be used in lieu of comfort controls for occupants - meet requirements of ASHRAE 62.1-2007 paragraph 5.1. Provide comfort system controls for all shared multi-occupant spaces.
  - **Status**: Tracking as ‘YES’. Individual comfort controls will be provided for 50% of the building occupants and for all shared multi-occupant spaces.

- **IEQc7.1 – Thermal Comfort Design**: Design HVAC systems and the building envelope to meet the requirements of ASHRAE Standard 55-2004, Thermal Comfort Conditions for Human Occupancy. Demonstrate design compliance in accordance with the Section 6.1.1 Documentation.
  - **Status**: Tracking as ‘MAYBE’. It is too early in the project to determine this credit.

- **IEQc7.2 – Thermal Comfort Verification**: Agree to implement a thermal comfort survey of building occupants within a period of 6 to 18 months after occupancy and develop a plan for corrective action if the survey results indicate that more than 20% of occupants are dissatisfied.
  - **Status**: Tracking as ‘MAYBE’. The project must be able to achieve IEQc7.1 before this credit can be attempted.

- **IEQc8.1 – Daylight and Views, Daylight 75% of Spaces**: Design space to optimize daylight while avoiding glare. 75% daylighting for 1 point and 90% for 2 points.
  - **Status**: Tracking 1 point as ‘YES’ 2 as ‘MAYBE’. The school will target at least 75% daylighting of regularly occupied spaces.

- **IEQc8.2 – Daylight and Views, Views for 90% of Spaces**: Provide direct line of sight to vision glazing from 90% of all regularly occupied spaces.
  - **Status**: Tracking as ‘YES’. The project will target views for 90% of regularly occupied spaces.

- **IEQc9 – Enhanced Acoustical Performance**: Design the building shell, classroom partitions and other core learning space partitions to meet the Sound Transmission Class (STC) requirements of ANSI Standard S12.60-2002, Acoustical Performance Criteria. Reduce background noise level to 40 dBA or less from HVAC systems.
  - **Status**: Tracking as ‘MAYBE’. It is too early in the project to determine if this credit is achievable.

- **IEQc10 – Mold Prevention**: Comply with IEQ Credit 3.1, IEQ Credit 7.1, IEQ Credit 7.2. Provide heating, ventilating and air conditioning (HVAC) systems & controls designed to limit space relative humidity to 60% or less during all load conditions, both occupied and unoccupied.
  - **Status**: Tracking as ‘MAYBE’. This project must achieve IEQc7.1 and IEQc7.2 to achieve this credit.

**Innovation and Design Process:**

- **IDc1.1 – IDc1.4**: Project will attempt all four ID credits.
- Status: Credits to be determined.

- **IDc2 – LEED Accredited Professional**: The project can obtain 1 point for have a LEED Accredited Professional.
  - **Status**: Tracking as ‘YES’. The project will have a LEED Accredited Professional.

- **IDC3 – School as a Teaching Tool**: Design a curriculum based on the high-performance features of the building, and commit to implementing the curriculum within 10 months of LEED certification.
  - **Status**: Tracking as ‘MAYBE’. The school is interested in sustainable design education.

**Regional Priority Credits:**
- **EAC2, SSC7.2 – On-site Renewable Energy AND Stormwater Design, Quality Control**: Project will obtain a regional priority credit for EAc2 and SSc7.2.
  - **Status**: Tracking as ‘YES’.

- **SSc3, SSC6.1, SSC7.1**: The project may receive a regional priority credit for these credits.
  - **Status**: Tracking as ‘MAYBE’.

- **MRc1.1 – Building Reuse**: The project will not receive a regional priority credit for these credits.
  - **Status**: Tracking as ‘NO’.

**VIII. Next Steps - The Green Engineer**

- Identify the likely energy consumption from a high-efficiency building and determine what amount of renewables is needed to get to net zero.
- How much solar is needed? Determine the amount of solar needed to get to net zero. Calculate solar panels needed in square feet and compare this with the likely roof area.
- How will ground source heat pumps (GSHP) help us get to net zero? Determine if GSHP will get the project to net zero.
**LEED for Schools 2009**

**Nelson Place School Project Scorecard**

Project Name: **Nelson Place School**  
Project Address:  
Date Updated: January 30, 2014

**Targeted LEED Rating:** Silver

### Sustainable Sites

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### Water Efficiency

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### Energy & Atmosphere

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### Materials & Resources

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#### Notes
- **Prereq 1**: Storage & Collection of Recyclables
- **Prereq 2**: Building Reuse
  - Maintain 75% of Existing Walls, Floors & Roof
  - Maintain 95% of Existing Walls, Floors & Roof
- **Prereq 3**: Construction Waste Management
  - Divert 50% from Disposal
  - Divert 75% from Disposal
- **Prereq 4**: Materials Reuse
  - 5%
  - 10%
- **Prereq 5**: Recycled Content
  - 10% (post-consumer + ½ pre-consumer)
  - 20% (post-consumer + ½ pre-consumer)
- **Prereq 6**: Regional Materials
  - 10% Extracted, Processed & Manufactured Regionally
  - 20% Extracted, Processed & Manufactured Regionally
- **Prereq 7**: Rapidly Renewable Materials
- **Prereq 8**: Certified Wood

### Indoor Environmental Quality

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<th>Credit 9</th>
<th>Credit 10</th>
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#### Notes
- **Prereq 1**: Minimum IAQ Performance
- **Prereq 2**: Environmental Tobacco Smoke (ETS) Control
- **Prereq 3**: Minimum Acoustical Performance
- **Prereq 4**: Outdoor Air Delivery Monitoring
- **Prereq 5**: Increased Ventilation
- **Prereq 6**: Construction IAQ Management Plan
  - During Construction
  - Before Occupancy
- **Prereq 7**: Low-Emitting Materials
  - Adhesives & Sealants
  - Paints & Coatings
  - Flooring Systems
  - Composite Wood & Agrifiber Products
  - Furniture and Furnishings
  - Ceilings and Wall Systems
- **Prereq 8**: Indoor Chemical & Pollutant Source Control
- **Prereq 9**: Controllability of Systems
| Credit 6.2 | Controllability of Systems, Thermal Comfort | 1 |
| Credit 7.1 | Thermal Comfort, Design | 1 |
| Credit 7.2 | Thermal Comfort, Verification | 1 |
| Credit 8.1 | Daylight & Views, Daylight 75% of Spaces | 1 to 3 |
| | Daylight 75% of Classroom Spaces | 1 |
| | Daylight 90% of Classroom Spaces | 2 |
| | Daylight 75% of Other Regularly Occupied Spaces | 3 |
| Credit 8.2 | Daylight & Views, Views for 90% of Spaces | 1 |
| Credit 9 | Enhanced Acoustical Performance | 1 |
| Credit 10 | Mold Prevention | 1 |

**Innovation & Design Process**

| Credit 1.1 | Innovation in Design: | 1 |
| Credit 1.2 | Innovation in Design: | 1 |
| Credit 1.3 | Innovation in Design: | 1 |
| Credit 1.4 | Innovation in Design: | 1 |
| Credit 2 | LEED® Accredited Professional | 1 |
| Credit 3 | The School as a Teaching Tool | 1 |

**Regional Priority Credits**

| Worcester: SSc3, SSc6.1, SSc7.1, SSc7.2, EAc2, and MRc1.1 |
| Credit 1.1 | Regional Priority Credit: SSc3, SSc6.1, SSc7.1 | 1 |
| Credit 1.2 | Regional Priority Credit: SSc7.2 | 1 |
| Credit 1.3 | Regional Priority Credit: EAc2 | 1 |
| Credit 1.4 | Regional Priority Credit: MRc1.1 | 1 |

**Project Totals (Certification Estimates)**

Certified: 40-49 points, Silver: 50-59 points, Gold: 60-79 points, Platinum: 80+ points

LEED for Schools Silver certification (50 pts) = 2.0% Financing MSBA
**LEED for Schools 2009**

**Nelson Place School Project Scorecard**

Project Name: **Nelson Place School**

Targeted LEED Rating: **Silver**

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<td>D</td>
<td>1</td>
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<th>Energy &amp; Atmosphere</th>
<th>33</th>
<th>Notes</th>
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<tr>
<td>C</td>
<td>Y</td>
<td>Prereq 1</td>
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<tr>
<td>D</td>
<td>Y</td>
<td>Prereq 2</td>
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<tr>
<td>D</td>
<td>Y</td>
<td>Prereq 3</td>
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<tr>
<td>D</td>
<td>6</td>
<td>Credit 1</td>
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<tr>
<td></td>
<td></td>
<td>12% New Buildings or 8% Existing Building Renovations</td>
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<td>14% New Buildings or 10% Existing Building Renovations</td>
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<td>16% New Buildings or 12% Existing Building Renovations</td>
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<td>18% New Buildings or 14% Existing Building Renovations</td>
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<td>20% New Buildings or 16% Existing Building Renovations</td>
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<td>22% New Buildings or 18% Existing Building Renovations</td>
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<td>24% New Buildings or 20% Existing Building Renovations</td>
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<td>26% New Buildings or 22% Existing Building Renovations</td>
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### On-Site Renewable Energy

<table>
<thead>
<tr>
<th>Credit</th>
<th>Percentage</th>
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<tbody>
<tr>
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<td>1%</td>
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<tr>
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<td>5%</td>
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<td>7%</td>
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<td>5</td>
<td>9%</td>
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<tr>
<td>6</td>
<td>11%</td>
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<tr>
<td>7</td>
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</table>

**1 to 7**

### Enhanced Commissioning

<table>
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<tr>
<th>Credit</th>
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**2**

### Enhanced Refrigerant Management

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<th>Credit</th>
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**1**

### Measurement & Verification

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1</td>
<td></td>
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<tr>
<td>2</td>
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</tbody>
</table>

**2**

### Green Power

<table>
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<th>Credit</th>
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<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**2**

---

### Materials & Resources

**14**

### Storage & Collection of Recyclables

- **Building Reuse**
  - **1 to 2**
  - Maintain 75% of Existing Walls, Floors & Roof
  - Maintain 95% of Existing Walls, Floors & Roof

### Building Reuse: Maintain 50% of Interior Non-Structural Elements

- **1**

### Construction Waste Management, Divert 50% from Disposal

- **1**

### Construction Waste Management, Divert 75% from Disposal

- **1**

### Materials Reuse, 5%

- **1**

### Materials Reuse, 10%

- **1**

### Recycled Content, 10% (post-consumer + ½ pre-consumer)

- **1**

### Recycled Content, 20% (post-consumer + ½ pre-consumer)

- **1**

### Regional Materials, 10% Extracted, Processed & Manufactured Regionally

- **1**

### Regional Materials, 20% Extracted, Processed & Manufactured Regionally

- **1**

### Rapidly Renewable Materials

- **1**

### Certified Wood

- **1**

---

### Indoor Environmental Quality

**19**

### Minimum IAQ Performance

- **Required**

### Environmental Tobacco Smoke (ETS) Control

- **Required**

### Minimum Acoustical Performance

- **Required**

### Outdoor Air Delivery Monitoring

- **1**

### Increased Ventilation

- **1**

### Construction IAQ Management Plan, During Construction

- **1**

### Construction IAQ Management Plan, Before Occupancy

- **1**

### Low-Emitting Materials, Adhesives & Sealants

- **1**

### Low-Emitting Materials, Paints & Coatings

- **1**

### Low-Emitting Materials, Flooring Systems

- **1**

### Low-Emitting Materials, Composite Wood & Agrifiber Products

- **1**

### Low-Emitting Materials, Furniture and Furnishings

- **0**

### Low-Emitting Materials, Ceilings and Wall Systems

- **0**

### Indoor Chemical & Pollutant Source Control

- **1**

### Controllability of Systems, Lighting

- **1**
<table>
<thead>
<tr>
<th>Credit</th>
<th>Points</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.2</td>
<td>1</td>
<td>Controllability of Systems, Thermal Comfort</td>
</tr>
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<td>7.1</td>
<td>1</td>
<td>Thermal Comfort, Design</td>
</tr>
<tr>
<td>7.2</td>
<td>1</td>
<td>Thermal Comfort, Verification</td>
</tr>
<tr>
<td>8.1</td>
<td>1 to 3</td>
<td>Daylight &amp; Views, Daylight 75% of Spaces</td>
</tr>
<tr>
<td>8.2</td>
<td>1</td>
<td>Daylight &amp; Views, Views for 90% of Spaces</td>
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<td>9</td>
<td>1</td>
<td>Enhanced Acoustical Performance</td>
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<td>Mold Prevention</td>
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<td>Innovation in Design:</td>
</tr>
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<td>1.2</td>
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<tr>
<td>1.3</td>
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<td>Innovation in Design:</td>
</tr>
<tr>
<td>1.4</td>
<td>1</td>
<td>Innovation in Design:</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>LEED® Accredited Professional</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>The School as a Teaching Tool</td>
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**Regional Priority Credits**

<table>
<thead>
<tr>
<th>Credit</th>
<th>Points</th>
<th>Description</th>
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<tbody>
<tr>
<td>1.1</td>
<td>1</td>
<td>Regional Priority Credit: SSc3, SSc6.1, SSc7.1</td>
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<tr>
<td>1.2</td>
<td>1</td>
<td>Regional Priority Credit: SSc7.2</td>
</tr>
<tr>
<td>1.3</td>
<td>1</td>
<td>Regional Priority Credit: EAc2</td>
</tr>
<tr>
<td>1.4</td>
<td>1</td>
<td>Regional Priority Credit: MRc1.1</td>
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</tbody>
</table>

**Project Totals (Certification Estimates)**

Certified: 40-49 points, Silver: 50-59 points, Gold: 60-79 points, Platinum: 80+ points

LEED for Schools Silver certification (50 pts) = 2.0% Financing MSBA
3.1.2 EDUCATIONAL PROGRAM

D. Supporting Documents
1. Program Meeting – Central Admin; dated 13 December 2013
2. Program Meeting – Central Admin; dated 10 January 2014
3. Program Meeting – Central Admin; dated 17 January 2014
4. Program Meeting – Facilities; dated 2 January 2014
5. Program Meeting – Facilities; dated 14 January 2014
6. Faculty Questionnaire; dated 5 December 2013
7. Faculty Questionnaire Summary
8. Program Diagrams
**Nelson Place Elementary School**  
35 Nelson Place, Worcester, MA 01605

**Schools Central Administration Meeting**  
13 December 2013

**Meeting Minutes - Program**

**ATTENDANCE:**  
Russ Adams, Assistant Commissioner CoW Public Works  
Julie Lynch, Architectural Services, CoW  
Marco Rodrigues, Chief Academic Adviser  
Mary Meade-Montaque, Quadrant Manager  
Dolores Gribouski, Quadrant Manager  
Kay Seale, Manager of Special Ed. and Intervention Services  
Albert Ganem, Jr., Manager of Professional Development  
Bertha-Elena Rojas, Manager of English Language Learners and Supplemental Support Services  
Monica Poitras, Principal, Nelson Place Elementary School  
Michael Pagano, LPA  
Katie Crockett, LPA

**DISCUSSION AGENDA:** Programming objectives and requirements for the Nelson Place Elementary School project. See attached agenda for more details.

<table>
<thead>
<tr>
<th>ITEM:</th>
<th>DESCRIPTION:</th>
<th>RESPONSIBILITY:</th>
</tr>
</thead>
</table>
| 12.13.13.1   | The overall **project objectives** were reviewed including: MSBA approved 600 student K-grade 6 school and feasibility study process.  
There was some discussion about the Pre-K program that is currently housed at Nelson Place. This program is currently a form of early intervention special education program, not a program that all Nelson Place students are a part of. Julie Lynch to confirm MSBA stance on Pre-K program at Nelson Place.  
Zero net sustainable design objectives are targeted for Nelson Place and will require Central Administration programming input. | Info.           |
| 12.13.13.2   | **Program process/objectives**  
It was discussed that the school should be planned for a 50 year time frame. The program will be developed through discussions with the Central Administration, questionnaire distribution at Nelson Place (faculty and staff), Facilities input (through Jim Bedard), and MSBA requirements.  
All Central Administration team members to review issues list and prepare responses for next programming meeting.  
Any suggestions for successful facilities to visit/reference to be noted by Central Administration team. | Info.           |

**Worcester Public Schools**  
Worcester, MA

**LAMOUREUX-PAGANO**  
ARCHITECTS  
PROJECT MANAGERS
### Program schedule

The current schedule for the Feasibility Study calls for the Preliminary Design Program (PDP) to be submitted to MSBA by March 3, 2014. Since the PDP includes preliminary site analysis, it is important to have the building program completed by January 17. The following meetings were tentatively scheduled (and subsequently confirmed) to finalize the program:

- **Friday, January 10, 2- 4 pm**, Central Administration (to finalize comments on issues agenda)
- **Friday, January 17 8:30 am** (joint meeting with facilities and Central Administration to finalize program decisions)

### Program discussion

The following items were discussed:

- Cafetorium assembly space is generally preferred over a gymnasium space. The layout for Worcester’s Roosevelt Elementary School was mentioned as quite effective for layout and flow.

- Recommendations for Lightspeed amplification system for classrooms.

- Concerns were raised about some student sensitivity to audible fire alarm systems.

- It is currently expected that the entire school will be air conditioned. It was noted that this is a critical programming decision that will affect many items including the sustainable design opportunities and budget comparisons.

### Attachments

- Program Agenda dated 13 December 2013
- MSBA space summary template

### Memo by:

Katie Crockett

### Cc:

- All Attendees
- Eugene Caruso, Tishman
- Rob Para, LPA
**ATTENDANCE:**
Russ Adams, Assistant Commissioner CoW Public Works
Julie Lynch, Architectural Services, CoW
Marco Rodrigues, Chief Academic Adviser
Mary Meade-Montaque, Quadrant Manager
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**DISCUSSION AGENDA:** Programming objectives and requirements for the Nelson Place Elementary School project.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>RESPONSIBILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.10.14.1</td>
<td><strong>Site Requirements</strong>&lt;br&gt;The results of the site program discussion from the January 2, 2014 Facilities program meeting were discussed (see attached). Some edits were made including the requested parking and are represented in italics. These will be finalized at the January 17th program meeting.</td>
<td>Info.</td>
</tr>
<tr>
<td>1.10.14.2</td>
<td><strong>Narrative</strong>&lt;br&gt;As part of the MSBA submission requirements, a narrative describing all programmatic aspects of the school is required as follows. (See Module 3 /3.1.2 for details). Dolores Gribouski and Monica Poitras will spearhead the effort to develop the appropriate narratives.&lt;br&gt;&lt;br&gt;Marco Rodrigues distributed preliminary narrative material based on the last program meeting issues list (see attached).</td>
<td>Central Admin.</td>
</tr>
<tr>
<td>1.10.14.3</td>
<td><strong>Overall Organizational Structure</strong>&lt;br&gt;The general organization of the school is desired to be as follows:&lt;br&gt;• Main Administration suite at main entrance to school&lt;br&gt;• Pre-K through grade two organized as an early childhood center (ECC)&lt;br&gt;• Grades 3 – 6 organized as an intermediate school&lt;br&gt;• Satellite administration positioned to serve ECC and intermediate school (away from main entry)&lt;br&gt;• Gymnasium, Cafetorium, Library positioned for community</td>
<td>Info.</td>
</tr>
</tbody>
</table>
access without access to academic wings

- Due to age groups and high proportion of special education population, it is most desirable to not exceed a two story facility.

<table>
<thead>
<tr>
<th>1.10.14.4</th>
<th>Early Childhood Center (ECC: Pre-K – Grade 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Pre-Kindergarten</strong>: (3) SPED rooms with toilet rooms and changing areas-two inclusion; one substantially separate; 15 students each classroom</td>
</tr>
<tr>
<td></td>
<td><strong>Kindergarten</strong>: (3) classrooms with toilet rooms and changing areas; (1) substantially separate Kindergarten SPED with toilet room, changing area and observation room; 25 students each classroom</td>
</tr>
<tr>
<td></td>
<td><strong>Grades 1 &amp; 2</strong>: (3) classrooms each; (1) substantially separate SPED each with toilet room, changing area and observation room; 25 students each classroom</td>
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<tr>
<td></td>
<td><strong>Safe Room</strong>: 2 @ 75sf each</td>
</tr>
<tr>
<td></td>
<td><strong>OT/PT classroom</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Small Group Resource Room</strong>: one per grade level (teacher, 4-6 students)</td>
</tr>
<tr>
<td></td>
<td><strong>Speech/ELL</strong>: two spaces (teacher, up to 12 students)</td>
</tr>
<tr>
<td></td>
<td><strong>Teacher Planning Room</strong> with toilets, curriculum storage, copier, computers</td>
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<td></td>
<td><strong>Art classroom</strong> and storage</td>
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<td></td>
<td><strong>General Music classroom</strong></td>
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<tr>
<th>1.10.14.5</th>
<th>Intermediate School (Grades 3 – 6)</th>
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<tbody>
<tr>
<td></td>
<td><strong>Grades 3, 4, 5, 6</strong>: (3) classrooms each; (1) substantially separate SPED each with toilet room, changing area and observation room; 25 students each classroom</td>
</tr>
<tr>
<td></td>
<td><strong>Safe Room</strong>: 1 @ 75sf each</td>
</tr>
<tr>
<td></td>
<td><strong>OT/PT classroom</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Small Group Resource Room</strong>: one per grade level (teacher, 4-6 students)</td>
</tr>
<tr>
<td></td>
<td><strong>Speech/ELL</strong>: one spaces (teacher, up to 12 students)</td>
</tr>
<tr>
<td></td>
<td><strong>Teacher Planning Room</strong> with toilets, curriculum storage, copier, computers</td>
</tr>
<tr>
<td></td>
<td><strong>Art classroom</strong> and storage</td>
</tr>
<tr>
<td></td>
<td><strong>General Music classroom</strong></td>
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<td></td>
<td><strong>Science Lab</strong>: centralized to be used by all intermediate classrooms</td>
</tr>
</tbody>
</table>
### 1.10.14.5 Special Education

(most spaces represented in ECC/Intermediate School summaries above; descriptions below are to provide more detailed program info.)

**Autism (SAIL) program:**
- District wide services to be dispersed throughout the school as both an inclusion and substantially separate classroom function. One substantially separate classroom per grade level.
- Observation rooms required to monitor student progress at substantially separate classrooms.
- Adjacent toilet rooms/changing area required at substantially separate classrooms

**Safe Room:** small space for calming/de-escalation, focused testing/study

**Small Group Resource Rooms:** one per grade level large enough for teacher and 4 – 6 students. Used for reading, pull out tutorials, etc.

**Speech/ELL:** 3 spaces total; two at ECC, one at Intermediate. Resource room for teacher and up to 12 students.

**OT/PT:** especially due to the high proportion of autistic students in the Nelson Place population, one space each for the ECC and intermediate levels is required. Adequate space for suspended swing, manipulatives, sensory centers, etc.

**Arena Testing:** district wide testing space to be located near main entrance. Space for play based developmental assessments to determine appropriate program for students.

<table>
<thead>
<tr>
<th>1.10.14.6</th>
<th><strong>Art</strong></th>
<th>One classroom each centrally located in the ECC and Intermediate School.</th>
<th>Info.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.10.14.7</td>
<td><strong>Music</strong></td>
<td>One general music classroom each centrally located in the ECC and Intermediate School. Cafetorium platform to be used for band/chorus (45 students); provide instrument storage.</td>
<td>Info.</td>
</tr>
</tbody>
</table>
| 1.10.14.8 | **Computer Labs**  
One each required for ECC and Intermediate school. If possible, position one to also be adjacent or near the media center. Used for standardized testing, extended day, technology instruction. | Info. |
| 1.10.14.9 | **Gymnasium**  
The 6,000sf gym proposed in the MSBA space summary template is adequate (divisible into two teaching stations). To be used for community recreational purposes as well as physical education; position for after hours use with nearby toilets, etc. | Info. |
| 1.10.14.10 | **Library**  
The Nelson Place library will be incorporated into the Public Library program now a part of several Worcester Public Schools.  
- The intent is for the library to be used solely for school purposes during regular school hours and opened to the public after school.  
- Provide separate entrance, access to toilet rooms, etc. to facilitate after hours use without access to academic areas  
- Include Conference Room for 12.  
- Include Office.  
- Size the media center similar to Roosevelt School facility. | Info. |
| 1.10.14.11 | **Cafetorium**  
- Size for full school assembly (600)  
- Design stage platform to be acoustically separate from the cafeteria to facilitate band/chorus, instrumental instruction on platform.  
- Community use included extended day to be planned for this space; position for after hours access with public toilets, etc.  
- Kitchen to be designed for full service (breakfast and lunch); Food Service to confirm equipment/general layout requirements | Info.  
Food Service |
<table>
<thead>
<tr>
<th>Date</th>
<th>Administration</th>
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<tbody>
<tr>
<td></td>
<td>The majority of the administrative functions to be organized near the main entrance. Smaller satellite administration suite and Teacher Planning Rooms to be situated to support the academic areas.</td>
</tr>
<tr>
<td></td>
<td><strong>Main Administration Suite</strong></td>
</tr>
<tr>
<td></td>
<td>▪ Located at main entry; entry vestibule positioned to direct visitors through the main office area during school</td>
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<tr>
<td></td>
<td>▪ Reception area for 2 secretaries, 6 seat waiting area</td>
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<td></td>
<td>▪ Principal office (desk, table for 4)</td>
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<tr>
<td></td>
<td>▪ Psychologist office (desk, instructional space for 4 – 6)</td>
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<tr>
<td></td>
<td>▪ SPED chairperson (desk, table for 4)</td>
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<td></td>
<td>▪ (2) conference rooms for 12; one for SPED, one for other</td>
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<td></td>
<td>▪ Family Resource Center (500sf) sized to support active PTO organization training and planning, storage for materials, volunteer work space</td>
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<td></td>
<td>▪ Arena Testing room (see SPED for details)</td>
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<td></td>
<td>▪ Records storage in a secure environment</td>
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<td></td>
<td>▪ Nurse suite nearby</td>
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<tr>
<td></td>
<td><strong>Nurse Suite</strong></td>
</tr>
<tr>
<td></td>
<td>▪ Adjacent or nearby main administration suite</td>
</tr>
<tr>
<td></td>
<td>▪ Office for private meetings/phone calls, space for eye and ear testing, medicine distribution and storage; visibility to the rest of the suite.</td>
</tr>
<tr>
<td></td>
<td>▪ Toilet room with shower</td>
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<td></td>
<td>▪ 2 bed rest area</td>
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<td></td>
<td>▪ Exam room with sink, lockable millwork</td>
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<td></td>
<td>▪ Waiting area for 4 with sink</td>
</tr>
<tr>
<td></td>
<td><strong>Satellite Administration</strong></td>
</tr>
<tr>
<td></td>
<td>▪ Located to support both levels of academic areas</td>
</tr>
<tr>
<td></td>
<td>▪ Assistant Principal (desk, 2 side chairs)</td>
</tr>
<tr>
<td></td>
<td>▪ Instructional Coach (desk)</td>
</tr>
<tr>
<td></td>
<td>▪ Professional/curriculum development function; should be near computer lab and/or conference room</td>
</tr>
<tr>
<td></td>
<td>▪ Adjustment Counselor office (desk, instructional space for 4 - 6)</td>
</tr>
<tr>
<td></td>
<td>▪ Conference Room for 12</td>
</tr>
</tbody>
</table>
### Mechanical/Electrical/Plumbing Requirements

**HVAC:** The building will be used year-round, air conditioning required throughout

**Plumbing:** Sink required in each classroom

**Electrical:** Wireless provisions throughout; hardwired capabilities also required in each classroom; tech labs to be hard wired

### Entrances

- One clearly distinguished main entrance for after school use, visitors, etc.
- Possibly second entrance to facilitate separate bus/parent pick up vehicular traffic. This might be located at the gym or cafetorium area.
- Designated separate entrance for special education buses/vans since loading and unloading can be time consuming
- Separate entrance for library

### Next Meeting: Friday, January 17, 8:30 am, Durkin Administration Building

Joint Meeting with Facilities Group to finalize program requirements sufficient for Feasibility Study planning.

### Attachments

- Updated Site Program Issues document from Central Administration

### Memo by:

Katie Crockett

### Cc:

- All Attendees
- Rob Para, LPA
- Jim Bedard, WPS Facilities
ATTENDANCE:
Julie Lynch, Architectural Services, CoW
Marco Rodrigues, Chief Academic Adviser
Mary Meade-Montaque, Quadrant Manager
Dolores Gribouski, Quadrant Manager
Kay Seale, Manager of Special Ed. and Intervention Services
Albert Ganem, Jr., Manager of Professional Development
Bertha-Elena Rojas, Manager of English Language Learners and Supplemental Support Services
Monica Poitras, Principal, Nelson Place Elementary School
Bob Walton, WPS ITO
Donna Lombardi, WPS Food Service
John Hennessey, WPS Transportation
Jim Bedard, WPS Facilities
Michael Pagano, LPA
Katie Crockett, LPA

DISCUSSION AGENDA: Finalize Nelson Place site and building program and discuss associated rationale narrative.

<table>
<thead>
<tr>
<th>ITEM:</th>
<th>DESCRIPTION:</th>
<th>RESPONSIBILITY:</th>
</tr>
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<tbody>
<tr>
<td>1.17.14.1</td>
<td>Site Requirements</td>
<td>Info.</td>
</tr>
<tr>
<td></td>
<td>The attached site program was approved and will be used to analyze the Nelson Place site options.</td>
<td></td>
</tr>
<tr>
<td>1.17.14.2</td>
<td>Space Summary Template</td>
<td>Info.</td>
</tr>
<tr>
<td></td>
<td>The space summary template was discussed and edited. A final draft will be distributed for approval. Spatial bubble diagrams will also be distributed to assist with the illustration of building organization and adjacencies. The final program is approximately 110,000sf and this will be used to analyze the site options</td>
<td></td>
</tr>
<tr>
<td>1.17.14.3</td>
<td>Narrative</td>
<td>CoW/ Facilities/ Central Admin.</td>
</tr>
<tr>
<td></td>
<td>Julie Lynch will collect all required narratives and edit to form a cohesive rationale document. All input due to Julie by end of day January 17th.</td>
<td></td>
</tr>
<tr>
<td>1.17.14.4</td>
<td>Swing Space</td>
<td>Info.</td>
</tr>
<tr>
<td></td>
<td>It was noted that there is a strong desire to not have students on site during construction. Members of the school administration noted that the autism program students typically have difficulty with transition to new surroundings and it would be best to limit the number of times programs are</td>
<td></td>
</tr>
</tbody>
</table>
Marco Rodrigues noted that the entire student population of Nelson Place (500 students) must be relocated as a unit, if required, as splitting the school would lead to prohibitive administrative costs as well as special education regulation limitations.

| 1.17.14.5 | **Pre-Kindergarten Program Vehicles/Entrance**  
A half day pre-kindergarten program is planned (all special education program spaces). An additional mid-day bus pick-up/drop off will be required for (4) half size buses and 8 parent vehicles. It was determined that a separate pre-kindergarten entrance would be advantageous for this purpose. | LPA |
| 1.17.14.6 | **Entrance Use Patterns**  
It was clarified that during the school day, all visitors would be routed through the main administration area with the exception of the mid-day Pre-K drop off/pick up outlined above.  
The separate exterior entrance to the Library would only be used after school hours. | Info. |
| 1.17.14.7 | **Arena Testing**  
This space will be identified as the Early Childhood Assessment Center on the space summary template. The total area will be increased to a 1200sf place to incorporate toilet, office space for 3-4 staff, observation center, and parent interview area.  
Since this will be a district wide assessment center, it would be best located near the main lobby. | Info. |
| 1.17.14.8 | **Greenhouse**  
To support the wellness program, a 1000sf greenhouse will be added to the Kitchen program. To be adjacent to the cafeteria, the greenhouse will be tended by students, staff, and volunteers to produce food for the school. | Info. |
| 1.17.14.9 | **Potential Site Notification Process**  
Staff at existing schools that are part of the site analysis process will be notified of any studies to be done prior to Design Team arrival. | OPM |
<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
<th>Responsible Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.17.14.10</td>
<td><strong>MSBA/DESE Review of Proposed Program</strong>&lt;br&gt;Once the program documents and associated rationale document are finalized, they will be forwarded to MSBA for a preliminary review prior to the submission of the Preliminary Design Program (due 3/3/14). Marco Rodrigues will contact the appropriate DESE reviewer to discuss the extent of the special education program proposed for Nelson Place.</td>
<td>OPM Cent. Admin.</td>
</tr>
</tbody>
</table>

Attachments<br>Finalized Site Program

Memo by: Katie Crockett

Cc: All Attendees<br>Rob Para, LPA<br>Russ Adams, DPW<br>Eugene Caruso, Tishman
ATTENDANCE:
Jim Bedard, Worcester Public Schools Facilities
Julie Lynch, Architectural Services, CoW
Brian Allen, Worcester Public Schools CFOO
Donna Lombardi, Worcester Public Schools, Nutrition
John Hennessey, Worcester Public Schools, Transportation
Timothy Williams, Worcester Public Schools, Network Administration
Dianne Leduc, Worcester Public Schools, Computer Technology
Bob Walton, Worcester Public Schools, Info. Tech. Officer
Monica Poitras, Principal, Nelson Place Elementary School
Jeffrey Martin, Worcester Public Schools, Facilities
Rob Para, Jr., LPA
Katie Crockett, LPA

DISCUSSION AGENDA: Programming objectives and requirements for the Nelson Place Elementary School project. See attached agenda for more details.

<table>
<thead>
<tr>
<th>ITEM: 1.2.14.1</th>
<th>DESCRIPTION: The overall project objectives were reviewed including: MSBA approved 600 student pre-K-grade 6 school and feasibility study process. MSBA requires planning for a 50-year facility.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All major program information to be filed with MSBA by March 3, 2014. (During the schematic design phase, once a site and building solution are determined, more detailed programming will take place.) Any outstanding facilities program input to be provided by <strong>Friday, January 10</strong> as required for analysis and compilation.</td>
</tr>
<tr>
<td></td>
<td>Zero net sustainable design objectives are targeted for Nelson Place and will require Central Administration programming input.</td>
</tr>
<tr>
<td></td>
<td>All communication to LPA to be transmitted through Julie Lynch.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ITEM: 1.2.14.2</th>
<th>SITE CONSIDERATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Vehicular Circulation</strong></td>
</tr>
<tr>
<td></td>
<td>• Critical to have bus circulation separate from parent pick-up</td>
</tr>
<tr>
<td></td>
<td>• 10 full size buses for general student population</td>
</tr>
<tr>
<td></td>
<td>• Additional 5 vans at dismissal to transport students to after school programs at YMCA, JCC, Guild of St. Agnes, Boys and Girls Club</td>
</tr>
</tbody>
</table>

| RESPONSIBILITY: | Info. | All | Info. | Info. | Info. |
## Facilities

### Meeting Minutes - Program

2 January 2014

<table>
<thead>
<tr>
<th>Facilities</th>
<th>Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nelson Place Elementary School</td>
<td>Facilities Meeting</td>
</tr>
<tr>
<td>35 Nelson Place, Worcester, MA 01605</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 January 2014</td>
</tr>
</tbody>
</table>

- Additional 10 half size buses for district wide SPED program, preferably at a separate entrance (on the same busing schedule as the general population)
- Currently a mid-day bus pick-up for half day Pre-K program (2 classes; Central administration to determine planning for full or half day program.
- 150-200 parent pickup/drop off vehicles
- Approximately 10 walkers
- Depending on the final site location, number of walkers/parent pick up may fluctuate
- Air intakes to be located away from bus queue
- Service yard ideally separate from other vehicular circulation as some deliveries occur during arrival/dismissal periods

### Parking

- 100 faculty/staff (currently only about 40 which is extremely problematic as some staff park on neighboring streets)
- 20 visitor
- 200 additional for large assembly events (up to 6 times per year)
- Nelson Place is not a voting site

### Service Yard

- Loading dock with overhead door positioned for service to kitchen as well as general school deliveries
- Dumpsters: trash, recycling, compost; ideally situated to be filled from top of loading dock
- Primarily tractor trailer and box truck deliveries

### Recreational Facilities

- Multipurpose athletic field for physical education, soccer, lacrosse, practice fields, etc. To be used by community groups as well as the school facility
- No need for specialized baseball or softball field
- Consider irrigation for athletic field, but no site lighting
- Two age appropriate fenced play areas – one for Pre-K to grade 2, one for grades 3-5 – both with rubberized surface and play structures
- At the grade 3-5 play area, provide paved section with basketball hoops
- Position fenced play areas so that they can be used by the community after hours.
<table>
<thead>
<tr>
<th></th>
<th>Facilities Meeting</th>
<th>2 January 2014</th>
</tr>
</thead>
</table>

### 1.2.14.3 Building Systems
- It was noted that current planning is to fully air condition the building.
- It is anticipated that the school will be used at least partially for summer programs.
- Jim Bedard to provide input on any major systems considerations (fuel source, equipment manufacturers, systems configurations, etc.) that would impact the major planning and budget considerations at this time.

*Info.*

**Bedard**

### 1.2.14.4 Technology
- Provide infrastructure to support 1:1 wireless program throughout the facility with additional access points at assembly areas.

*Info.*

**WPS IT**

- Confirm hardwired capabilities requirements for the school.

**WPS IT**

- Provide computer lab for standardized testing. Confirm number of computer stations and whether or not they need to be hardwired.

**WPS IT**

- Short throw wall mounted Eno boards/document readers to be provided for all classroom/meeting spaces. *(Building Committee to vote authorization of proprietary spec.)*

**Bldg. Comm.**

- WPS standards for technology infrastructure: HP network hardware, Dell servers, Mirachi wireless access points. *(Building Committee to vote authorization of proprietary spec.)*

**Bldg. Comm.**

- Point of Sale system in the cafeteria needs to be hardwired.

*Info.*

**WPS IT**

- A description of the technology program vision for Nelson Place to be provided by WPS IT department as a requirement of the MSBA program.

### 1.2.14.5 Security systems
- Intercom buzzers at main entries.

*Info.*
<table>
<thead>
<tr>
<th></th>
<th>Central Administration to provide district security policy.</th>
</tr>
</thead>
</table>
| 1.2.14.6 | **Telephone System**  
Hybrid analog digital phone system (manufactured by Signet) at North High has been well received.  
Provide programming for all-school announcements from any phone. |
| 1.2.14.7 | **Specialized Equipment**  
There is currently no ceramic kiln or digital piano curriculum at Nelson Place and it is not anticipated that the new facility will include these features. |
| 1.2.14.8 | **Emergency Shelter**  
Nearby Forest Grove Middle School is currently an emergency shelter so Nelson Place will not be technically categorized as one.  
Basic emergency power requirements will include: life safety features, boiler radiation pumps (to keep building above freezing temps), kitchen cooler and freezer, server and associated air conditioning.  
Jim Bedard to confirm any additional emergency power requirements. |
| 1.2.14.9 | **Construction Period Swing Space**  
It has been determined that there is no additional capacity within the WPS facilities to absorb the current 500 Nelson Place students during construction.  
Owner to provide narrative detailing this case.  
Consideration of a temporary modular school might be possible as there would be opportunities to reuse the modular throughout the district post construction, though it is recognized that the initial investment would be large (and not part of MSBA’s reimbursement structure). |
| 1.2.14.3 | **Program schedule**  
The current schedule for the Feasibility Study calls for the Preliminary Design Program (PDP) to be submitted to MSBA by March 3, 2014.  
Since the PDP includes preliminary site analysis, it is important to have the building and site program completed by January 17.  
The following meetings are scheduled to finalize the program: |
## Facilities Meeting
### 2 January 2014

<table>
<thead>
<tr>
<th>Time</th>
<th>Details</th>
<th>Central Admin/LPA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Friday, January 10, 2-4 pm</strong></td>
<td>Central Administration (to finalize comments on issues agenda)</td>
<td></td>
</tr>
<tr>
<td><strong>Friday, January 17 8:30 am</strong></td>
<td>(joint meeting with facilities and Central Administration to finalize program decisions)</td>
<td></td>
</tr>
</tbody>
</table>

### Attachments
- Facilities Program Agenda

### Memo by:
- Katie Crockett

### Cc:
- All Attendees
- Eugene Caruso, Tishman
- Michael Pagano, LPA
- Azim Rawji, ART Engineering
ATTENDANCE:
Julie Lynch, Architectural Services, CoW
Jim Bedard, WPS Facilities
John Hennessey, WPS Transportation
Bob Walton, WPS IT
Tim Williams, WPS IT
Rob Pezzella, Security
Donna Lombardi, WPS Food Service
Tony Kachadoorian, ART Engineering (electrical engineer)
Katie Crockett, LPA

DISCUSSION AGENDA: Programming objectives and requirements for the Nelson Place Elementary School project especially as it relates to the required supporting narrative for the MSBA submission.

<table>
<thead>
<tr>
<th>ITEM:</th>
<th>DESCRIPTION:</th>
<th>RESPONSIBILITY:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.14.14.1</td>
<td><strong>Site Considerations</strong></td>
<td>Info.</td>
</tr>
<tr>
<td></td>
<td>It was noted that moving the Nelson School population to another location during construction would most likely incur additional transportation costs.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The school’s current emergency evacuation plan is to relocate students to either Forest Grove Middle School or Assumption College. A similar type of facility should be nearby any selected site if a new Nelson Place location is identified.</td>
<td></td>
</tr>
<tr>
<td>1.14.14.2</td>
<td><strong>IT Requirements</strong></td>
<td>Info.</td>
</tr>
<tr>
<td></td>
<td>The following items were confirmed:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Wireless with one access point per classroom, more at assembly areas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Hardwired computer labs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- (4) hardwired computer connections per classroom</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Wall mounted short throw projector in each instructional space and conference room</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- VOIP telephone system with analog phone connection (Vertical Ware system was used at North High; Julie to forward spec.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Call assurance button in each classroom to connect to main administration PA system</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The following items were confirmed:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1.14.14.4 Food Service Requirements

- For planning purposes, it was agreed that a kitchen the size of Roosevelt Schools’s with an additional serving line and 30% more storage would be appropriate (3249sf vs. 1900sf recommended by MSBA).
- 6’ opening required to facilitate deliveries
- The manager’s office should be all glass (three sides at least) and positioned to overlook receiving, storage, production, and serving
- A wellness program has been endorsed by the superintendent which calls for a significant amount of on site preparation of a variety of foods, so adequate storage and prep space are required.
- Details of the design requirements, including the cooking line layout, will be refined in a future meeting with the food service consultant
- Breakfast and lunch to be served year round
- For two lunch seatings for 600 students, three serving lines would be desirable.

1.14.14.5 Narrative

All supporting narratives to be submitted to Julie Lynch in Word document form for final compilation by Friday, January 17th.

Next Meeting: Friday, January 17, 8:30 am, Durkin Administration Building
Joint Meeting with Facilities Group and Central Administration to finalize program requirements sufficient for Feasibility Study planning.
### Meeting Minutes - Program

**Facilities Meeting**

**14 January 2014**

<table>
<thead>
<tr>
<th>Memo by:</th>
<th>Katie Crockett</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cc:</td>
<td>All Attendees</td>
</tr>
<tr>
<td></td>
<td>Russ Adams, DPW</td>
</tr>
<tr>
<td></td>
<td>Rob Para, LPA</td>
</tr>
<tr>
<td></td>
<td>Jim Bedard, WPS Facilities</td>
</tr>
<tr>
<td></td>
<td>Eugene Caruso, Tishman</td>
</tr>
</tbody>
</table>

1327\Minutes\Owner\1327MO—Facilities Programming 1.14.14.doc
**INTRODUCTION**

The purpose of this questionnaire is to gather your input as we develop the Building Program. Please feel free to attach additional pages as necessary to address additional issues.

**IDENTIFICATION**

Name: ____________________________

Subject/Classes Taught: ____________________________

<table>
<thead>
<tr>
<th>RESPONSE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GENERAL</strong></td>
</tr>
<tr>
<td>• Number of students in class</td>
</tr>
<tr>
<td>• Any specific curriculum needs to consider in your classroom</td>
</tr>
<tr>
<td>• Are there special requirements (i.e. limited access, off hours, etc.) for accessing this space?</td>
</tr>
<tr>
<td><strong>STORAGE</strong></td>
</tr>
<tr>
<td>• Describe any special storage needs or desires</td>
</tr>
<tr>
<td><strong>FINISHES</strong></td>
</tr>
<tr>
<td>• Describe any particular floor, wall and ceiling finish material requirements</td>
</tr>
<tr>
<td><strong>SPECIALTIES</strong></td>
</tr>
<tr>
<td>• Describe any marker board, tack board or display requirements or suggestions</td>
</tr>
<tr>
<td><strong>EQUIPMENT</strong></td>
</tr>
<tr>
<td>• Describe any special requirements for interactive displays, television/monitor, projection screens or other equipment</td>
</tr>
</tbody>
</table>
**QUESTIONS** | **ANSWERS**
--- | ---

**FURNISHINGS**
- Workstations: check all applicable and indicate desired type and quantity
  - student desks #______ type___________________________
  - teacher desks #______ type___________________________
  - tables #______ type___________________________
  - computers #______ type___________________________
  - stools #______ type___________________________
  - other (describe special requirements) #______ type___________________________

**MECHANICAL**
- Plumbing: describe any special requirements for plumbing fixtures or systems (i.e. sinks, showers, washing machine hook-ups, drinking fountains, solids interceptor, etc.)
- HVAC: describe any special requirements for heating and ventilation (i.e. equipment exhaust, special air change requirements, etc.)

**ELECTRICAL**
- Power: describe any special power requirements (i.e. dryers, kilns, and other special equipment, floor outlets, etc.)
- Data Communications: describe the use of computers and media distribution in your space including ideal locations and quantities

**EXISTING CONDITIONS**
- What teaching/learning strategies do you use, or would like to use, that are not supported by your existing conditions?

**FUTURE CONSIDERATIONS**
- Describe any future trends you anticipate that might affect the design of your space

Thank you for your input.
FACULTY QUESTIONAIRE SUMMARY

General - 33 Responses
- Assembly space to accommodate the entire school population
- Walk-in closets and built-in storage
- Control over individual room temperature and HVAC
- Consideration of security in case of emergency
- Integration of computer labs and mobile technology
- Future after-school program is anticipated

Classrooms - 12 Responses
- 20-25 students per classroom,
- Teachers request 5-8 computers per classroom, separated in “back” of class
- Sufficient electrical outlets throughout classroom
- Bulletin boards and magnetic white boards in classroom, large display board in hallway
- Desks with lockable drawers for teacher, desks with storage for students.
- Complete setup for ELMO (document reader) or smart board in each classroom with networked projector
- Intercom/Telephone for communication with office
- Storage and charging for iPads/mobile technology
- Sink and bathroom requested in K-2 classrooms, 5 teachers request drinking fountains
- Several teachers request Kidney-shaped or U-shaped tables
- Majority of teachers request non-carpeted floor.
- Screens and shades for windows
- Separate space for partner/group activities, flexibility of layout
- Various options to hang or display student work and teaching materials, e.g. magnetic walls

Kindergarten - 2 Responses
- 20-25 students per classroom
- Area rugs for circle time
- Circular tables requested

SPED - 4 Responses
- Individual instruction or groups up to 12 students
- Quiet, soundproof spaces for separate groups to work simultaneously
- U-shaped tables
- Integration of technology; iPads, computers and printers

SPED Structured Applied Instructional Learning (SAIL) - 5 Responses
- Maximum 12 in Autism Spectrum Disorder (ASD) classrooms
- 50+ Students in SAIL program
- Office space for 3+ Applied Behavior Analysis (ABA) coordinators with secure file storage
- Request smart board, ELMO (document reader) and 4-6 computers per classroom
3.1.2 EDUCATIONAL PROGRAM

C. Supporting Documents

FEASIBILITY STUDY

- Multiple stations for distraction-free, individual instruction
- U-shaped tables
- All teachers request sound absorbing finishes and soft lighting
- Adjacent sensory or “large motor” room with mats on floor
- Safe, quiet area for de-escalation attached to classrooms
- Safety covers on electrical outlets
- Bathroom with 2-4 private stalls and changing room attached to each sub-separate classroom
- Top opening windows, out of reach
- Filter for allergens
- For future, consider separate room for teaching life skills (kitchen, laundry, bathroom)
- Consider opportunities for observation
- Enclosed playground

Art Room - 1 Response

- 25-30 chairs for use at art tables, and 25-30 elementary sized stations
- Humidity control
- Consider equipment for potential ceramics program
- Multiple sinks and cleaning areas

Music - 1 Response

- 26 Students at 6 tables
- Separation from other classrooms
- Sound proof room for instrument practice / instruction
- Storage for music equipment/instruments
- Stereo system, ELMO/smart board and 10 computer stations
- Carpet and acoustic finishes

Gym - 1 Response

- Divider to separate two classes at a time
- Space for OT/PT/Adaptive PE teachers
- Sensory room for Autistic students
- Large white board, media presentation capabilities
- Nearby water fountain
- Air Conditioning requested

Main Office - 5 Responses

- De-escalation area
- Secure storage area for student records
- Mailboxes for teachers
- Touch screen for visitor sign in
- Bathrooms for administration only
- Private spaces for testing / school psychologist
- Meeting area with projector for faculty meetings/ training

Health Room - 1 Response
3.1.2 EDUCATIONAL PROGRAM
C. Supporting Documents

FEASIBILITY STUDY

- Secure storage for records and supplies
- Adequate power for equipment; vision, hearing, scale, refrigerator
- Areas for waiting, assessment, resting, and treatment—easily monitored by nurse

Maintenance - 1 Response

- Custodian storage and slop sink on each floor
- Loading dock near cafeteria
- Finishes that are durable and easy to clean
- Washer/dryer
- Storage shed for outdoor equipment
 Proposed Conditions Diagram - Administration

Nelson Place Elementary School
35 Nelson Place, Worcester, MA 01605

3.1.2 EDUCATIONAL PROGRAM

D. Supporting Documents

Worcester Public Schools
Worcester, MA
3.1.3 INITIAL SPACE SUMMARY

A. Floor Plans of Existing Facility
B. MSBA Space Summary Template
C. Narrative for Variances
3.1.3 INITIAL SPACE SUMMARY

A. Floor Plans of Existing Facility
BASEMENT FLOOR PLAN OF EXISTING FACILITY
FIRST FLOOR PLAN OF EXISTING FACILITY
SECOND FLOOR PLAN OF EXISTING FACILITY
3.1.3 INITIAL SPACE SUMMARY

B. MSBA Space Summary Template
### Proposed Space Summary - Elementary Schools

#### Nelson Place Elementary

<table>
<thead>
<tr>
<th>ROOM TYPE</th>
<th>ROOM NFA</th>
<th># OF RMS</th>
<th>area totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>CORE ACADEMIC SPACES</td>
<td>23</td>
<td>19,903</td>
<td></td>
</tr>
<tr>
<td>Pre-Kindergarten w/ toilet</td>
<td>1,272</td>
<td>1</td>
<td>1,272</td>
</tr>
<tr>
<td>Kindergarten w/ toilet</td>
<td>1,255</td>
<td>1</td>
<td>1,255</td>
</tr>
<tr>
<td>K Classroom 14</td>
<td>1,266</td>
<td>1</td>
<td>1,266</td>
</tr>
<tr>
<td>K Classroom 20 (No toilet)</td>
<td>972</td>
<td>1</td>
<td>972</td>
</tr>
<tr>
<td>General Classrooms - Grade 1-6</td>
<td>950</td>
<td>18</td>
<td>17,100</td>
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<td>Classroom z</td>
<td>722</td>
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<td>Classroom 3, 7</td>
<td>727</td>
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<td>1,454</td>
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<td>711</td>
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<td>Classrooms 6, 11</td>
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<td>Classrooms 19, 20</td>
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<td>Classroom 24</td>
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<tr>
<td>Science Lab</td>
<td>1,200</td>
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<td>SPECIAL EDUCATION</td>
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<td>3,398</td>
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<tr>
<td>Self-Contained SPED</td>
<td>950</td>
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<td>5,700</td>
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<tr>
<td>Pre-K w/ toilet</td>
<td>1,200</td>
<td>3</td>
<td>3,600</td>
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<tr>
<td>Kindergarten w/ toilet</td>
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#### MSBA Guidelines

(refer to MSBA Educational Program & Space Standard Guidelines)

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#### Version

11.24.2010

Elementary School Space Summary
## Proposed Space Summary - Elementary Schools

### Nelson Place Elementary

#### Existing Conditions

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<td>ADMINISTRATION &amp; GUIDANCE</td>
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<tr>
<td>Teacher / Mat and Time Room</td>
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<td>Principal's Secretary / Waiting</td>
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<td>Assistant Principal's Office</td>
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<tr>
<td>Supervisor / Supt Office</td>
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<td>Guidance Office</td>
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<td>Guidance Storeroom</td>
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<td>Teachers' Planning Room</td>
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### New

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### Total

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### MSBA Guidelines

(Refer to MSBA Educational Program & Space Standard Guidelines)
### Proposed Space Summary - Elementary Schools

#### Existing Conditions

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<td>Basement Storage</td>
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<tr>
<td>Basement Storage</td>
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<tr>
<td>Recycling Room / Trash</td>
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<tr>
<td>Receiving and General Supply</td>
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<td>Storeroom</td>
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#### Proposed

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<tr>
<td>Network / Telecom Room</td>
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<td>200</td>
</tr>
<tr>
<td>Electrical room</td>
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</tr>
<tr>
<td>Computer Lab</td>
<td>950</td>
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<td>1,900</td>
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<tr>
<td>Greenhouse</td>
<td>1,000</td>
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<tr>
<td>Total Building Gross Floor Area (GFA)</td>
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#### Total

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<tbody>
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<tr>
<td>Grossing factor (GFA/NFA)</td>
<td>1.48</td>
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#### Notes

1. **Individual Room Net Floor Area (NFA)** includes the net square footage measured from the inside face of the perimeter walls and includes all specific spaces assigned to a particular program area including such spaces as non-communal toilets and storage rooms.

2. **Total Building Gross Floor Area (GFA)** includes the entire building gross square footage measured from the outside face of exterior walls.

---

### Architect Certification

I hereby certify that all of the information provided in this "Proposed Space Summary" is true, complete and accurate and, except as agreed to in writing by the Massachusetts School Building Authority, in accordance with the guidelines, rules, regulations and policies of the Massachusetts School Building Authority to the best of my knowledge and belief. A true statement, made under the penalties of perjury.

Name of Architect Firm: Lamoureux Pagano Associates

Name of Principal Architect: Robert Pagano Jr.

Signature of Principal Architect: [Signature]

Date: 21 February 2014

---

Version 11.24.2010

Elementary School Space Summary
3.1.3 INITIAL SPACE SUMMARY

C. Narrative for Variances
   1. Narrative for Variances
   2. Program Sizes-Existing vs. Proposed
   3. Program Sizes-Existing vs. MSBA
   4. Program Sizes-Existing vs. MSBA vs. Proposed
The following is a summary of the variances between the proposed and MSBA recommended areas for the major Space Summary Template categories based on a 600 student pre-K through Grade 6 facility. See Section 3.1.2.B for greater detail regarding the spatial requirements to support the Nelson Place Elementary School program.

**General Classrooms:** (MSBA: 25,950 sq. ft.; Proposed: 21,900 sq. ft.)
Three general classrooms per grade level, in addition to an intermediate level science classroom, are expected to meet the needs of the general population K-6 classrooms including the inclusion special education program.

**Special Education:** (MSBA: 6,540 sq. ft.; Proposed: 19,785 sq. ft.)
As described in the Teaching Philosophy Narrative, the Nelson Place Elementary School supports a district wide special education program, the largest population of which comes from the expanding number of autism spectrum students. The expanded proposed area to support this program includes: (3) pre-kindergarten classrooms, (1) classroom per grade level, additional occupational and physical therapy spaces, speech and language resources rooms, and related specialty testing and administrative areas.

**Art and Music:** (MSBA: 5,000 sq. ft.; Proposed: 5,000 sq. ft.)
No variance

**Health and Physical Education:** (MSBA: 3,370 sf; Proposed: 3,370 sf)
No variance

**Dining and Food Service:** (MSBA: 8,050 sq. ft.; Proposed: 8,950 sq. ft.)
The proposed kitchen includes a full service kitchen with supporting preparation, storage, receiving, and administrative spaces. In addition, 3 serving lines are needed to serve 300 students per lunch period. See attached Food Service consultant report for additional information regarding adequate space to support a full service kitchen.

**Medical:** (MSBA: 840 sq. ft.; Proposed: 610 sq. ft.)
The proposed area includes adequate space for the required confidentiality and testing for the health suite to service a 600 student population with a high proportion of special education students. The planned features include: Office suitably sized and secured for medicine distribution, confidential phone calls and meetings; toilet room with shower; examination room; rest area with 3 beds, waiting area for 4 people; and testing space.
3.1.3 SPACE SUMMARY
C. Narrative for Variances

Administration and Guidance:  (MSBA: 2,585 sq. ft.; Proposed: 2,970 sq. ft.)
A main administration area, as well as a satellite administration area for the vice-principal, is included in the program. With one administration area per cluster, each will be supported by a conference room, deviating from the MSBA recommendation of one conference room. In addition, a teacher planning room is programmed to support both the primary and intermediate level clusters. Since these rooms are planned to support the networked multifunction copier and printer stations, as well as the central curriculum storage areas, the square footage is slightly larger than the MSBA recommends.

Other:  (MSBA: 0sf; Proposed: 2,900sf)
This category includes a greenhouse and one computer lab each for the primary and intermediate grade level clusters. The greenhouse, adjacent to the cafetorium, would support the Worcester Public School wellness and educational programs for healthy living, and will serve to directly support the Federal Government’s nutritional guidelines, all of which are described in greater detail in the attached Teaching Philosophy Narrative. The computer labs, which are required for standardized testing, as well as multipurpose instructional spaces supporting both general and special education, are also described in greater detail in the attached Teaching Philosophy Narrative.

Gross Square Footage Factor:  (MSBA: 1.44; Proposed: 1.48)
Due to anticipated additional circulation as a result of designated special education and pre-kindergarten pick up and drop off; as well as special education toilet room requirements, the program has factored in a proposed gross square footage factor of 1.48.
3.1.4 EVALUATION OF EXISTING CONDITIONS

A. Legal Title to the Property
B. Determination of Historical Registrations
C. Determination of Development Restrictions
D. Evaluation of Building Code Compliance
E. Evaluation of AAB Rules & Regulations
F. Evaluation of Significant Structural, Environmental, Geotechnical or other Physical Conditions
G. Determination for Need and Schedule for Soils Exploration & Geotechnical Evaluation
H. Environmental Site Assessments
I. Assessment of the Facility for the Presence of Hazardous Materials
J. Supporting Documents
3.1.4 EVALUATION OF EXISTING CONDITIONS

A. Legal Title to the Property
   1. Cover Page
   2. Nelson Place School
   4. Ararat St Park Land dated 16 January 2014
   5. City Manager letter dated 20 December 2005
3.1.4 EVALUATION OF EXISTING CONDITIONS

FEASIBILITY STUDY

A. Legal Title to the Property

The following documents are included in this section:

1. Legal Title to the Property of the Nelson Place Elementary School
2. Nelson Place Elementary School 2014 Assessment
3. Legal Title to the Property of the Ararat Street Park Land
4. Letter from the Worcester City Manager requesting jurisdictional transfer the Ararat St. Park Land
Morton

City of
Worcester

I, Albert A. Morton of Worcester, Worcester County, Massachusetts for consideration paid, grant to City of Worcester, a municipal corporation, of Worcester, Massachusetts with W A R R A N T Y covenants the land in said WORCESTER, bounded and described as follows:

Tract 1. Beginning at a point on the southeasterly line of Nelson Place at land of City of Worcester; thence south 39° 00' west, by land of said City of Worcester, three hundred twenty-two and sixty-nine hundredths (322.69) feet to a point; thence north 87° 00' west by other land of grantor thirty-five (35) feet to a point; thence north 5° 00' east, still by land of said grantor, three hundred five and sixty-two hundredths (305.62) feet to a point on the southeasterly line of Nelson Place; thence north 87° 00' east, by the said southeasterly line of Nelson Place, thirty-eight and ninety-four hundredths (38.94) feet to the place of beginning, containing ten thousand nine hundred ninety-five (10,995) square feet.

Tract 2. Beginning at a point on the southeasterly line of Nelson Place at land formerly of grantor, now City of Worcester; thence south 5° 00' west by land of said grantor, now City of Worcester, three hundred five and sixty-two hundredths (305.62) feet; thence south 87° 00' east by land formerly of grantor, now City of Worcester, thirty-five (35) feet to land now or formerly of Fred E. Whittum; thence south 5° 00' west by land now or formerly of Fred E. Whittum and now or formerly of John H. Brooks, two hundred seventy-three and fifteen hundredths (273.15) feet; thence south 5° 00' east by land now or formerly of John H. Brooks ninety (90) feet; thence south 20° 27' west by land now or formerly of John H. Brooks, two hundred forty-nine and fifty-three hundredths (249.53) feet; thence north 88° 55' west by land now or formerly of John H. Brooks five hundred forty-two and fifty-six hundredths (542.56) feet to land now or formerly of Ida M. Gleason; thence north 7° 00' east by land now or formerly of Ida M. Gleason three hundred thirty-seven and four hundredths (337.04) feet; thence south 81° 10' east by land now or formerly of Ida M. Gleason, one hundred forty-five and forty-seven hundredths (145.47) feet; thence north 11° 44' east by land now or formerly of Ida M. Gleason and now or formerly of Dorothy R. Martin, four hundred fourteen and nineteen hundredths (414.19) feet to the southeasterly line of Nelson Place; thence north 65° 45' east by the southeasterly line of Nelson Place, twenty-two and fifty-five hundredths (22.55) feet; thence north 87° 00' east by the southeasterly line of Nelson Place, two hundred seventy-two and eighty-four hundredths (272.84) feet to the place of beginning, containing (7.418) acres.

Exempting and reserving from the above conveyance the use of the house and barn, and so much of the land as is not necessary for construction work until May 15, 1926 without rent. This conveyance is made subject to taxes of 1926, which the grantee hereby assumes and agrees to pay, and right to take water from a spring if any now exists.

L. Morton A. Morton wife of said grantor release to said grantee all rights of DOWER and HOMESTEAD and other interests therein.

We, Irving R. Phelps and Gertrude B. Phelps (husband and wife) of Clinton, Worcester County, Massachusetts for consideration paid, grant to W. A. Fuller & Son incorporated of said Clinton with MORTGAGE covenants to secure the payment of Twenty-five Hundred Dollars on demand with six per centum interest per annum payable quarterly as provided in our note of even date, a certain parcel of land with the buildings thereon situated in said CLINTON, on View Street, being lot 52, plus twenty (20) feet on plan of lots on View Street, owned by William A. Fuller, drawn by Becker, Backman & Chase, C. E., dated July 1824, said lot being bounded and described as follows—Beginning at the northwesterly corner thereof at a bound in the southerly side of said View Street; and running thence south 19° 47' east one hundred twenty (120) feet to a bound in the southerly corner of said property south 19° 47' east one hundred twenty (120) feet to a point at the southeasterly corner of lot 52 on said plan; thence north 19° 47' west one hundred twenty (120) feet by said lot 52 to a point in the southerly line of View Street; thence south 70° 13' west along said southerly line of View Street, sixty-five (65) feet to the point of beginning. Containing, 6,500 square feet more or less.
Whittum

To the City of Worcester

I, Fred E. Whittum, widower, of Worcester, Worcester County, Massachusetts, for consideration paid, grant to City of Worcester, a municipal corporation, with WARRANTY covenants a certain tract or parcel of land situated on the southeasterly side of Nelson Place in the City of Worcester, bounded and described as follows: Beginning at a point on the southeasterly line of Nelson Place at land of Albert A. Morton; thence N. 87° 00' E. by the southeasterly line of Nelson Place two hundred fifty-five and nine tenths (255.9) feet to other land of Fred E. Whittum; thence S. 5° 00' W. by other land of Fred E. Whittum four hundred thirty-four and eighty-seven hundredths (434.87) feet; thence N. 87° 00' W. by other land of Fred E. Whittum two hundred thirty (320) feet to land of Albert A. Morton; thence N. 5° 00' E. by land of Albert A. Morton, three hundred twenty-two and sixty-nine hundredths (322.69) feet to the place of beginning. Containing 2 acres.

Also a second tract of land on the southeasterly side of said Nelson Place, bounded and described as follows: Beginning at a point on the southeasterly line of Nelson Place at land of the City of Worcester; thence N. 5° 00' E. by the said southeasterly line of Nelson Place, sixteen and sixty-nine hundredths (16.69) feet to a point; thence S. 3° 00' W. by other land of Fred E. Whittum four hundred forty-two and nineteen hundredths (442.19) feet to a point; thence N. 87° 00' W. still by other land of grantor fifteen (15) feet to a point at land of the City of Worcester; thence N. 5° 00' W. by said land of the City of Worcester, four hundred thirty-four and eighty-seven hundredths (434.87) feet to the place of beginning. Containing 6576 square feet. Said two tracts being the same described in two takeings by the City of Worcester dated June 15, 1926 and April 12, 1926.

WITNESS my hand and seal this third day of January 1927.

Fred E Whittum

Commonwealth of Massachusetts

Worcester, ss. January 3, 1927. Then personally appeared the above-named Fred E. Whittum and acknowledged the foregoing instrument to be his free act and deed, before me,

Charles S. Sibley Justice of the Peace

Rec'd Jan. 24, 1927, at 1h. 34m. P. M. Ent'd & Ex'd

Hoffman et ux.

To Home Co-op. Bank

KNOW ALL MENS BY THESE PRESENTS, that we, Louie F. Hoffman and Clara E. Hoffman, husband and wife, of Worcester, in the County of Worcester and Commonwealth of Massachusetts, as tenants in common, for consideration paid, grant to the Home Co-op. Bank, a corporation duly established by law, in Worcester, in the County of Worcester and Commonwealth of Massachusetts, with MORTGAGE covenants, to secure the payment of Twenty-five hundred (2500) Dollars, and interest and fines as provided in our note of even date, the land and the buildings on the same, in said Worcester, bounded and described as follows: Situated on the northerly side of Darling Street in the northerly part of said Worcester, being lots numbered 376 and 377 on plan of Bancroft Park, so called, made for Clinton W. Tyler by Samuel H. Fitcher Company, recorded with Worcester District Deeds. Beginning at a point in said northerly line of Darling Street distant easterly, at a point in said northerly line of Darling Street distant easterly, one hundred (100) feet from its intersection with the easterly line of Beverly Road (formerly Bancroft Avenue) and running northerly one hundred ten (110) feet to the lot numbered 379 on said plan; thence easterly by said lot #379 fifty (50) feet to lot #375 on said plan; thence southerly by said lot #375, one hundred ten (110) feet to said line of Darling Street; thence westerly by said street line fifty (50) feet to the point of beginning. Containing by estimation 5500 square feet. Together with all my right and title in abutting portions of said
35 NELSON PL

Location: 35 NELSON PL
Mblu: 21/002/00002/
Acct#: 21-002-00002
Owner: CITY OF WORCESTER SCHOOL DEPT

Assessment: $3,729,700
PID: 54906
Building Count: 1

Current Value

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Owner of Record

Owner: CITY OF WORCESTER SCHOOL DEPT
Sale Price: $0
Book & Page: 00000/
Sale Date: 01/01/1988

Address: 20 IRVING ST
Worcester, MA 01609

Ownership History

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Building Information

Building 1: Section 1

Year Built: 1940
Living Area: 46937
Replacement Cost: $4,618,263
Building Percent: 55
Good: Replacement Cost: $2,540,000

Building Attributes

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<td>Educational Facility</td>
</tr>
<tr>
<td>MODEL</td>
<td>Commercial</td>
</tr>
<tr>
<td>Grade</td>
<td>AVE MASONRY</td>
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<tr>
<td>Stories:</td>
<td>2</td>
</tr>
<tr>
<td>Occupancy</td>
<td></td>
</tr>
<tr>
<td>Exterior Wall 1</td>
<td>Brick/Stone</td>
</tr>
<tr>
<td>Exterior Wall 2</td>
<td>Concrete Block</td>
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Building Photo

(http://gis.vgsi.com/photos/WorcesterMAPhotos/?00/07\11/45.jpg)

Building Layout
<table>
<thead>
<tr>
<th>Building Sub-Areas</th>
<th>Legend</th>
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<tbody>
<tr>
<td>GLA</td>
<td>Gross Leasable Area</td>
</tr>
<tr>
<td>GLU</td>
<td>GLA - Upper Story</td>
</tr>
<tr>
<td>CAN</td>
<td>Canopy</td>
</tr>
<tr>
<td>UBM</td>
<td>Basement, Unfinished</td>
</tr>
</tbody>
</table>

### GLA Gross Leasable Area
- GLA: 29837
- Living Area: 29837

### GLU GLA - Upper Story
- GLU: 17100
- Living Area: 17100

### CAN Canopy
- Size: 2278
- Value: 0

### UBM Basement, Unfinished
- Size: 6820
- Value: 0

**Total:** 56035

### Extra Features

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<tr>
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### Land

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<tr>
<th>Land Use</th>
<th>Land Line Valuation</th>
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<tbody>
<tr>
<td>Use Code</td>
<td>Code Description</td>
</tr>
<tr>
<td>9340</td>
<td>CHARTER SCHL</td>
</tr>
<tr>
<td>Description</td>
<td>Size (Sqr Feet)</td>
</tr>
<tr>
<td>Zone</td>
<td>RS-7</td>
</tr>
<tr>
<td>Neighborhood</td>
<td>2</td>
</tr>
<tr>
<td>Alt Land Appr</td>
<td>No</td>
</tr>
<tr>
<td>Category</td>
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<td>Size (Sqr Feet)</td>
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<td>Depth</td>
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<tr>
<td>Assessed Value</td>
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### Outbuildings

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<tr>
<td>Code</td>
<td>Description</td>
</tr>
<tr>
<td>PAV1</td>
<td>PAVING-ASPHALT</td>
</tr>
<tr>
<td>Size</td>
<td>Value</td>
</tr>
<tr>
<td>55000 S.F.</td>
<td>$74,300</td>
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<tr>
<td>Bldg #</td>
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### Valuation History

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<tr>
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<tr>
<td>Valuation Year</td>
<td>Improvements</td>
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<tr>
<td>2013</td>
<td>$2,614,300</td>
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<tr>
<td>2012</td>
<td>$2,770,700</td>
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### Land Use

- Use Code: 9340
- Description: CHARTER SCHL
- Zone: RS-7
- Neighborhood: 2
- Alt Land Appr: No
- Category: |

### Outbuildings

- Code: PAV1
- Description: PAVING-ASPHALT
- Size: 55000 S.F.
- Value: $74,300
- Bldg #: 1

### Valuation History

- Valuation Year: 2013
- Improvements: $2,614,300
- Land: $1,115,400
- Total: $3,729,700

- Valuation Year: 2012
- Improvements: $2,770,700
- Land: $1,115,400
- Total: $3,886,100
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<td>2011</td>
<td>$2,939,800</td>
<td>$843,000</td>
<td>$3,782,800</td>
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The Commonwealth of Massachusetts

Worcester

Oct. 28, 1952

Then personally appeared the above-named Alfred L. Tiralli and Mary E. Tiralli

and acknowledged the foregoing instrument to be their free act and deed, before me,

Erial Stockpol

Notary Public

My commission expires July 6, 1956.

Recorded Nov. 6, 1952 at 9h. 56m. A.M.

END OF INSTRUMENT

NORTON COMPANY, a corporation duly established under the laws of
the State of Massachusetts, and having its usual place of business
at Worcester,

Worcester...County, Massachusetts,

for consideration paid, grant to the CITY OF WORCESTER, a municipal
corporation,

of Worcester, for school purposes,

the land in said Worcester located on the southerly side of Ararat Street
(Description and encumbrances, if any)
and bounded and described as follows:

BEGINNING at a point on the southerly side of Ararat Street at other land of the City of Worcester;

THEREFROM north 78° 15' 30" by the southerly line of said Ararat Street nineteen and forty-two hundredths (19.42) feet to a point;

THEREFROM by a curve to the right having a radius of six hundred (600) feet and by the southerly line of said Ararat Street one hundred fifty-four and eighty-one hundredths (154.81) feet to a point;

THEREFROM north 58° 14' 00" west by the southerly line of Ararat Street four hundred sixty-five and ninety-seven hundredths (465.97) feet to a point at land now or formerly of H.A. Libby;

THEREFROM south 26° 17' 25" west by said Libby land one hundred eighty-one and sixteen hundredths (181.16) feet to the Boston and Maine railroad location;

THEREFROM by a regular curve to the right having a radius of one thousand one hundred eighty-six and ninety-seven hundredths (1,186.97) feet, and by the Boston and Maine railroad location five hundred ninety-one and five hundredths (591.05) feet to a point at other land of the grantees;

THEREFROM south 78° 15' 30" east by other land of the grantor one hundred thirty-three and eighteen hundredths (133.18) feet to a point at other land of the City of Worcester;

THEREFROM north 25° 21' 20" east by said other land of the City of Worcester three hundred eighty-four and twelve hundredths (384.12) feet to the point of beginning;

CONTAINING four and twenty-eight hundredths (4.28) acres, as shown on Plan of Land Ararat St. Worcester To Be Conveyed To City of Worcester By Norton Co. For School Purposes Said Plan being dated July 1951 and prepared by the Robinson Engineering, Inc.
IN WITNESS WHEREOF the said Norton Company has caused its corporate seal to be hereeto affixed and these presents to be signed, acknowledged and delivered in its name and behalf by Milton P. Higgins, its President, duly authorized this 1st day of August in the year one thousand nine hundred and fifty-two.

Signed and sealed in presence of

[Signature]

NORTON COMPANY

by

Milton P. Higgins
President

William Frazier
Treasurer

The Commonwealth of Massachusetts

Worcester August 1, 1952

Then personally appeared the above named Milton P. Higgins.
and acknowledged the foregoing instrument to be the free act and deed of the

Worcester, Massachusetts
August 1, 1952

At a meeting of the Directors of Norton Company, held at
Worcester, Massachusetts on the 2nd day of June, 1952, it was voted:

To authorize Milton P. Higgins, President, and William J. Magee, Treasurer, to execute on behalf of the Norton Company a deed to the City of Worcester for 4.28 acres of land located on Ararat Street, said Worcester.

True Copy Attest:

Secretary

City of Worcester

In City Council August 26, 1952

Ordered: That the City Manager be and he is hereby authorized, empowered

and requested to accept on behalf of the City of Worcester a deed from the Norton Company for the transfer of 4.28 acres of land on the southerly side of Ararat Street abutting the Indian Hill School for school purposes. The consideration of said conveyance in the amount of Nineteen Hundred ($1900.00) Dollars to be charged to the account of D P W Bureau of Public Buildings-Land Usage-Indian Hill School and said sum being now available. The land is bounded and described as follows:

BEGINNING at a point on the southerly side of Ararat Street at other land of the City of Worcester;

west 0
THENCE north 75° 15' 30" south by the southerly line of said Ararat Street nineteen and forty-two hundredths (19.42) feet to a point;

THENCE by a curve to the right having a radius of six hundred (600) feet and by the southerly line of said Ararat Street one hundred fifty-four and eighty-one hundredths (154.81) feet to a point;

THENCE north 56° 17' 25" west by the southerly line of Ararat Street four hundred sixty-five and ninety-seven hundredths (465.97) feet to a point at land now or formerly of H A Libby;

THENCE south 26° 17' 25" west by said Libby land one hundred eighty-one and sixteen hundredths (181.16) feet to the Boston and Maine Railroad location;

THENCE southeasterly by a regular curve to the right having a radius of one thousand one hundred eighty-six and ninety-seven hundredths (1,186.97) feet, and by the Boston and Maine railroad location five hundred ninety-one and five hundredths (591.05) feet to a point at other land of the grantor;

THENCE south 75° 10' 30" east by other land of the grantor one hundred thirty-three and eighteen hundredths (133.18) feet to a point at other land of the City of Worcester;
THENCE north 25° 31' 20" east by said other land of the City of Worcester three hundred eighty-four and twelve hundredths (384.12) feet to the point of beginning.
CONTAINING four and twenty-eight hundredths (.28) acres, as shown on "Plan of Land between St. Anez and St. Mary's Sts. Worcester" conveyed to City of Worcester by Norton Co. For School Purposes, being dated July 1951 and prepared by the Robinson Eng.

A Copy. Attest: 

Recorded Nov. 6, 1952 at 10h. 9m. A. M.

END OF INSTRUMENT

I, ANDREW ZISK, also known as ANDREW ZISK,
of Worcester, County, Massachusetts,

being unmarried, for consideration paid, grant to 
PETER L. BELL

of WORCESTER

with warranty covenants

the land in Worcester bound and described as follows:

A CERTAIN tract or parcel of land with the buildings thereon, situated at the corner of Southbridge Street and Hermon Street Extension, and bounded and described as follows, to wit:-

BEGINNING at a point at the intersection of the easterly line of Southbridge Street with the southerly line of said Hermon Street Extension;

THENCE southerly by said Southbridge Street fifty-five and eighty-eight one hundredths (55.88') feet to land now or formerly of Michael F. Mee;

Thence easterly making an angle of 89° 29' with the easterly line of said Southbridge Street by land of said Mee seventy-two and eight tenths (72.8') feet to land of the New York, New Haven and Hartford Railroad Company;

THENCE northeasterly by land of said Railroad Company fifty-nine (59') feet to said Hermon Street Extension;

THENCE westerly by said Hermon Street Extension to the point of beginning.

BEING the same premises conveyed to Peter Vasil and Andrew Zisk by deed of Eva L. Benson, dated December 6th, 1922, and recorded with the Worcester District Registry of Deeds, Book 2286, Page 364.

Consideration for this conveyance is less than $100.00
December 20, 2005

TO WORCESTER CITY COUNCIL

COUNCILORS:

I respectfully request the adoption of the attached order relative to the jurisdictional transfer of land on Ararat Street adjacent to the Salter School. This action will transfer jurisdiction from the Executive Office of the City Manager to the Department of Public Works and Parks with the land to be used for park and playground purposes. Specifying such a use places the land under the protection of Article 97 of the Massachusetts Constitution.

The entire former Indian Hill School site was declared surplus by the School Committee in October, 1981. Subsequently, a portion of the land including the former school building was conveyed to the Slater School with the authorization of the City Council. The remaining portion of the site, approximately 4.28 acres, remained property of the City of Worcester but was never formally transferred to another city department, instead remaining under the jurisdiction of the City Manager. Adoption of this order will complete the process while adding the land to the City’s parks system and preserving it as recreational space protected by the state constitution.

Respectfully submitted,

Michael V. O’Brian
City Manager
ORDERED: that the parcel of land on Ararat Street shown as Assessor’s Map 37 Block 29 Lot 1B, previously declared to be no longer needed for the purpose for which it was acquired by vote of the School Committee on October 1, 1981, is hereby transferred from the care, custody, management and control of the City Manager to the care, custody management and control of the Department of Public Works and Parks to be used for park and playground purposes.

In City Council

December 20, 2005

Order adopted by a Yea and Nay vote of 11 Yeas and 0 Nays

A Copy. Attest:

David J. Rushford
David J. Rushford
City Clerk
3.1.4 EVALUATION OF EXISTING CONDITIONS

B. Determination of Historical Registrations
   1. Historical Registrations Narrative
   2. MACRIS
      a. Nelson Place
      b. Indian Hill School House
Nelson Place Elementary School
35 Nelson Place, Worcester, MA 01605

3.1.4 EVALUATION OF EXISTING CONDITIONS

FEASIBILITY STUDY

B. Historical Registrations

BASE SITE
NELSON PLACE SCHOOL AND SITE

Nelson Place School is on the MACRIS list, inventory # WOR.2292

Per M.G.L. c. 9, §§ 26 through 27C a project notification form must be filled with MHC. Nelson Place is listed individually on the MACRIS. Any property listed on the MACRIS that will receive State or Federal money must file a project notification.

Although Nelson Place is on the MACRIS it has been deemed ineligible for the National Register by MHC due to multiple additions and the loss of historic features such as changes to the main entrance. I did ask the question at the MHC meeting last Friday afternoon explaining the structure had been deemed ineligible but there are no exceptions to the law at this time.

The City of Worcester Historic Commission has a demolition delay ordinance; the City would need to file with the commission a demolition delay waiver application, when any work is being done on the project, or if the project is planned for demolition, outlining the work, and or alternates.

It has been reported that the 1926 building has been completely altered from the original design, due to the emergency re-building of the attic parapet, and front entrance. Complete re-building of the front and rear window system is required due to structural failure of the steel lintels and spandrel masonry. Generally it is seen that with rational research, presentation and findings, the Commission generally agrees with the applicant, particularly when the alterations/demolition are the result of Code or structural causes of the demolition.

The results forthcoming in the PSR/PDP should be sufficient for presentation to the City’s Historic Commission for ruling. Should the Commission disagree, then the project is subject to a one year delay for demolition or alterations, however, and at that point the Owner can proceed (there is no appeal to further delay). We would recommend filing with the commission at the schematic design phase, as well as with Mass Historic Commission.
3.1.4 EVALUATION OF EXISTING CONDITIONS

FEASIBILITY STUDY

B. Historical Registrations

ALTERNATIVE SITES

SALTER SCHOOL AND ADJACENT SITE
The Salter School is on the MACRIS list, Identified as the Indian Hill Schoolhouse, inventory # WOR.24

Filing with the MHC and The City historic Commission will be required as outlined above. Should demolition of the building be proposed, in our opinion, we would assume that there will be opposition from the commission, and salient arguments would need to be made, as well as any alternatives

The adjacent field and land are under Article 97 (Conservation land) any development of this land is very restricted and is reported on under that site’s analysis

FOREST GROVE/McGRATH SCHOOL AND SITES
These buildings or sites are not on the MACRIS list, there would be no filings required regarding any historic issues
<table>
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<th>Inventory No:</th>
<th>WOR.2292</th>
</tr>
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<tbody>
<tr>
<td>Historic Name:</td>
<td>Nelson Place Grade School</td>
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<tr>
<td>Common Name:</td>
<td></td>
</tr>
<tr>
<td>Address:</td>
<td>35 Nelson Pl</td>
</tr>
<tr>
<td>City/Town:</td>
<td>Worcester</td>
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<tr>
<td>Village/Neighborhood:</td>
<td>Chadwick</td>
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<tr>
<td>Local No:</td>
<td>21-2-2</td>
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<tr>
<td>Year Constructed:</td>
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<tr>
<td>Architect(s):</td>
<td>Bilzerian, John S.; Rustigian, Jasper</td>
</tr>
<tr>
<td>Architectural Style(s):</td>
<td>Classical Revival</td>
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<tr>
<td>Use(s):</td>
<td>Public School</td>
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<tr>
<td>Significance:</td>
<td>Architecture; Community Planning; Education</td>
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The Massachusetts Historical Commission (MHC) has converted this paper record to digital format as part of ongoing projects to scan records of the Inventory of Historic Assets of the Commonwealth and National Register of Historic Places nominations for Massachusetts. Efforts are ongoing and not all inventory or National Register records related to this resource may be available in digital format at this time.

The MACRIS database and scanned files are highly dynamic; new information is added daily and both database records and related scanned files may be updated as new information is incorporated into MHC files. Users should note that there may be a considerable lag time between the receipt of new or updated records by MHC and the appearance of related information in MACRIS. Users should also note that not all source materials for the MACRIS database are made available as scanned images. Users may consult the records, files and maps available in MHC's public research area at its offices at the State Archives Building, 220 Morrissey Boulevard, Boston, open M-F, 9-5.

Users of this digital material acknowledge that they have read and understood the MACRIS Information and Disclaimer (http://mhc-macris.net/macrisdisclaimer.htm)

Data available via the MACRIS web interface, and associated scanned files are for information purposes only. THE ACT OF CHECKING THIS DATABASE AND ASSOCIATED SCANNED FILES DOES NOT SUBSTITUTE FOR COMPLIANCE WITH APPLICABLE LOCAL, STATE OR FEDERAL LAWS AND REGULATIONS. IF YOU ARE REPRESENTING A DEVELOPER AND/OR A PROPOSED PROJECT THAT WILL REQUIRE A PERMIT, LICENSE OR FUNDING FROM ANY STATE OR FEDERAL AGENCY YOU MUST SUBMIT A PROJECT NOTIFICATION FORM TO MHC FOR MHC'S REVIEW AND COMMENT. You can obtain a copy of a PNF through the MHC web site (www.sec.state.ma.us/mhc) under the subject heading "MHC Forms."

Commonwealth of Massachusetts
Massachusetts Historical Commission
220 Morrissey Boulevard, Boston, Massachusetts 02125
www.sec.state.ma.us/mhc

This file was accessed on: Wednesday, January 08, 2014 at 6:50: PM
FORM B – BUILDING

Massachusetts Historical Commission
Massachusetts Archives Building
220 Morrissey Boulevard
Boston, Massachusetts 02125

Assessor's Number: 21/2/2
USGS Quad: W
Area(s): Z292

Town: Worcester
Place (neighborhood/village): N/A

35 Nelson Place
Nelson Place School
School
School

Construction: 1927
Worcester Annual Reports
Classical Revival

Iorer: Jasper Rustigian
Material: Cast stone

Wall Trim: Brick/cast stone
Roof: Not visible

Outbuildings/Secondary Structures: None

Major Alterations (with dates): 1952 one-story, two-part addition, and a 1968 addition consisting of a large, two-story building and a smaller one-story building

Condition: Good

Moved: [x] no [ ] yes

Date: 

Acreage: 9.45 acres

Setting: Set back from the street on a long narrow lot in a residential neighborhood located in an outlying area of Worcester.

Recorded by: Lisa Hartmann, Candace Jenkins
Organization: City of Worcester
Date (month/year): February 1996

Follow Massachusetts Historical Commission Survey Manual instructions for completing this form.
ARCHITECTURAL DESCRIPTION

Describe architectural features. Evaluate the characteristics of this building in terms of other buildings within the community.

The Nelson Street School is composed of a sprawling linear complex of connected buildings forming an irregular footprint. The complex includes the original 1927 brick school building, which is rectangular in plan and rises 2 1/2 stories to a flat roof. It is flanked by a square, one-story brick building (1968) on its east side facade and a group of three brick buildings on its west side facade. The group is composed (moving east to west) of a rectangular one-story building (1954), a square one-story building (1954), and a large two-story building (1968).

In 1992 a major rehabilitation resulted in a significant alteration in the appearance of the 1927 building. The alterations include a replacement entrance pavilion of cast stone block, 1/1 sash windows, belt course of cast stone block above the second floor, and vents in the brick parapet replacing original decorative panels.

The 1927 school's front facade is five-part with a central entrance pavilion and two projecting end blocks. Extant original details on the building include a segmental arched opening on the entrance pavilion with a simple molded cast stone door surround. This leads to double doors with botanically-inspired decorative tracings in the door, transom, and side lights. The end blocks each have an entrance with segmental arches surmounted by 9/9.

HISTORICAL NARRATIVE

Discuss the history of the building. Explain its associations with local (or state) history. Include uses of the building, and the role(s) the owners/occupants played within the community.

The Nelson Place School is one of the many grade schools built by the city in the early part of the 20th century to serve its expanding population. Constructed as part of the Worcester School Building Program (1923–1932), the school was one of ten new grammar schools and ten school additions built during the decade-long program. The program resulted in significant growth in the number of classrooms in the district, and effectively resolved an acute shortage of student space.

The new schools and additions built during this period reflect the city's goal to achieve economies of scale by constructing larger schools to serve a wide geographic area, moving away from the old policy of building small neighborhood schools. As in earlier periods, the plans reflect state and national standards. Modern features were introduced in almost all the buildings; these features include electricity, gymnasiums, medical examiners room, large playground, and first-floor lavatories.

The Nelson Place School was built to replace the 1890 North Pond School, and to relieve congestion in three other schools. The building was completed in 1927 at a cost of $195,142. Students in grades K–VI first occupied the eight room building in October of 1927 under the direction of principal Mary E. Lewis.

BIBLIOGRAPHY and/or REFERENCES

Telegram & Gazette, June 5, 1927; Sept. 5, 1954.
Worcester Annual Report 1927/City Document #82.

Recommended for listing in the National Register of Historic Places. If checked, you must attach a completed National Register Criteria Statement form.
ARCHITECTURAL DESCRIPTION (cont.)

Sash stairwell windows. Cast stone keystones delineate these end block entrances and windows. The grouped replacement windows are framed with cast stone lintels, sill, and side keystones. A brick parapet is present with replacement metal coping.

Located on a large narrow lot at the southeast corner of Nelson Place and Red Wing Lane in a residential neighborhood of outlying Worcester, the school is sited back from the curve of Nelson Place. Its lot is defined at the front by a short retaining wall of coursed granite blocks topped with a rough-faced granite slab. The plot is maintained in turf on its front (N) and paved on its rear (S) where it borders a steep, wooded area.

The original 1927 Nelson Street School is one of the many Classical Revival grammar schools built during the first three decades of the 20th century. It was designed by Jasper Rustigian who was also responsible for the the 1920 and 1927 additions to the Adams Street School and the 1925 Middlesex Avenue School. The design of Nelson Place School and Middlesex Avenue School were very similar, representing the maturation of the Classical Revival school building in Worcester. The Nelson Street School’s appearance was significantly altered in a 1992 rehabilitation. In addition, the original building and the highly visible later additions, lack a cohesive design element.

HISTORICAL SIGNIFICANCE (cont.)

In response to increasing enrollment, two additions containing four classrooms and an all-purpose room were constructed in 1954. After considerable discussion regarding whether to build single- or multiple-story additions, one-story additions were constructed. These provided a prototype for additions to the Thorndyke and Tatnuck Schools. The additions were one of four additions and five new schools erected to serve the children born during the postwar baby boom years in Worcester's burgeoning outlying areas.

The school was again expanded in 1968 when two more additions were constructed. In 1992 the school underwent major rehabilitation.

The school continues to operate as the Nelson Place School. As a continuously operating public school since 1927, the school has played a significant part in the education history of the community.
MHC OPINION: ELIGIBILITY FOR NATIONAL REGISTER

Date Received: July 9, 1989          Date Due: August 9, 1998          Date Reviewed: 7/29/98
Type:   x Individual
        _District (Attach map indicating boundaries)
Name: Nelson Place School
Address: 35 Nelson Place
Requested by: KAP
Action:   _Honor   _ITC   _Grant   x R & C   _Other:
Agency:     Staff in charge of Review: KAP

INDIVIDUAL PROPERTIES

_ Eligible
_ Eligible, also in district
_ Eligible only in district
x Ineligible
_ More information needed

DISTRICTS

_ Eligible
_ Ineligible
_ More information needed

CRITERIA:   _A   _B   _C   _D
LEVEL:   _Local   _State   _National

STATEMENT OF SIGNIFICANCE by Ann Lattinville

This school was constructed in 1927 with subsequent additions added in 1952 and 1968. The addition in 1952 consisted of a 1 story, 2 part building while the 1968 addition was a large, 2 story building and a smaller 1 story building. The school also underwent renovations in 1992, the extent of which are unclear. It is known, however, that the 1992 renovation altered the 1927 school's front entrance. Again, the extent of the modifications is unclear. Nelson Place School is one of the many grade schools built by the city in the early part of the 20th century, and more specifically, it is one of the ten new grammar schools constructed as part of the Worcester School Building Program of 1923-1932. Although the building has played an important role in the history of education in Worcester as a continuously operating school, the school is not individually eligible for listing in the National Register of Historic Places because of the size and location of the later additions.
DEPARTMENT OF PUBLIC SAFETY
DIVISION OF INSPECTION
RECORD OF PLANS FILED

CITY OR TOWN: Worcester
BUILDING: Nelson Place School
TO BE USED FOR: School
OWNER: The City of Worcester
ARCHITECT: John S. Bilzerian
INSPECTOR: Hathaway

DATE: 9/24/53
CERTIFICATE ISSUED:

DEPARTMENT OF PUBLIC SAFETY
DIVISION OF INSPECTION
PLAN RECORD

CASE: B
RACK: 6
APART: 11
NO. 39223

CITY OR TOWN: Worcester
BUILDING: Nelson Place School
TO BE USED FOR: School
OWNER: John S. Bilzerian, 340 Main St., Worcester, Mass.
ARCHITECT: John S. Bilzerian
CERTIFICATE APPROVAL:
SPECIFICATION REQUIREMENTS REFERRED:
DATE: June 12, 1967
INSPECTOR: Paul Fredette, Jr.

DEPARTMENT OF PUBLIC SAFETY
DIVISION OF INSPECTION
PLAN RECORD

CASE: Y
RACK: 1
APART: 18
NO. 81696

CITY OR TOWN: Worcester
BUILDING: Nelson Place School
TO BE USED FOR:
OWNER:
ARCHITECT: John S. Bilzerian, 340 Main St., Worcester, Mass.
CERTIFICATE APPROVAL:
SPECIFICATION REQUIREMENTS REFERRED:
DATE: June 12, 1967
INSPECTOR: Paul Fredette, Jr.
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<td>Indian Hill Schoolhouse</td>
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<tr>
<td>Common Name:</td>
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</tr>
<tr>
<td>Address:</td>
<td>155 Ararat St</td>
</tr>
<tr>
<td>City/Town:</td>
<td>Worcester</td>
</tr>
<tr>
<td>Village/Neighborhood:</td>
<td>Summit</td>
</tr>
<tr>
<td>Local No:</td>
<td>24-D</td>
</tr>
<tr>
<td>Year Constructed:</td>
<td>1925</td>
</tr>
<tr>
<td>Architect(s):</td>
<td>Fuller and Delano</td>
</tr>
<tr>
<td>Architectural Style(s):</td>
<td>English Revival</td>
</tr>
<tr>
<td>Use(s):</td>
<td>Public School</td>
</tr>
<tr>
<td>Significance:</td>
<td>Architecture; Education</td>
</tr>
</tbody>
</table>

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Commonwealth of Massachusetts
Massachusetts Historical Commission
220 Morrissey Boulevard, Boston, Massachusetts 02125
www.sec.state.ma.us/mhc

This file was accessed on: Monday, January 27, 2014 at 12:48 PM
<table>
<thead>
<tr>
<th>Town</th>
<th>Worcester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>155 Ararat Street</td>
</tr>
<tr>
<td>Name</td>
<td>Indian Hill Schoolhouse</td>
</tr>
<tr>
<td>Present use</td>
<td>school</td>
</tr>
<tr>
<td>Present owner</td>
<td>City of Worcester</td>
</tr>
<tr>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>ca. 1925</td>
</tr>
<tr>
<td>Source</td>
<td>city documents</td>
</tr>
<tr>
<td>Architect</td>
<td>Fuller &amp; Delano Co.</td>
</tr>
<tr>
<td>Exterior wall fabric</td>
<td>brick</td>
</tr>
<tr>
<td>Outbuildings (describe)</td>
<td>none</td>
</tr>
<tr>
<td>Other features</td>
<td>half-timbered gables, window quoining (slight)</td>
</tr>
<tr>
<td>Altered</td>
<td>no</td>
</tr>
<tr>
<td>Moved</td>
<td>no</td>
</tr>
<tr>
<td>Date</td>
<td></td>
</tr>
<tr>
<td>Lot size:</td>
<td></td>
</tr>
<tr>
<td>One acre or less</td>
<td>X</td>
</tr>
<tr>
<td>Approximate frontage</td>
<td>200'</td>
</tr>
<tr>
<td>Approximate distance of building from street</td>
<td></td>
</tr>
<tr>
<td>Recorded by</td>
<td>S. Lee</td>
</tr>
<tr>
<td>ed. E. R. Pfeiffer</td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>November 1977</td>
</tr>
</tbody>
</table>

(over)
7. Original owner (if known)  
City of Worcester

Original use  
schoolhouse

Subsequent uses (if any) and dates  
same

8. Themes (check as many as applicable)

<table>
<thead>
<tr>
<th>Theme</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Aboriginal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Architectural</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Arts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commerce</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community development</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conservation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exploration/settlement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Military</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Political</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Religion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Science/invention</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social/humanitarian</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transportation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9. Historical significance (include explanation of themes checked above)

Designed by the local firm of Puller and Delano, the Indian Hill Schoolhouse is a good local example of the late Gothic Revival style which remained popular for schoolbuildings (public and private) in Worcester well into the 1940's. It seems likely that the need for the present Indian Hill Schoolhouse was created by the residential development of Indian Hill by the Norton Company for its employees, around 1917 (see Indian Hill Area Survey).

10. Bibliography and/or references (such as local histories, deeds, assessor's records, early maps, etc.)

3.1.4 EVALUATION OF EXISTING CONDITIONS

C. Determination of Development Restrictions
Determination of Development Restrictions for the Nelson Place Elementary School site and alternative sites are addressed in the Nitsch Engineering reports that are found in sections 3.1.4, F and 3.1.6, E.
3.1.4 EVALUATION OF EXISTING CONDITIONS

D. Evaluation of Building Code Compliance
3.1.4 EVALUATION OF EXISTING CONDITIONS

D. Building Code Compliance

Applicable Codes: Alterations, renovations and additions to the existing Nelson Place Elementary School building are subject to the 8th Edition MA Building Code. The 8th Edition MA Building Code is comprised of the following:

- 2009 International Building Code (IBC)
- 2009 International Existing Building Code (IEBC)
- 780 CMR - MA Amendments to the IBC, IEBC
- 2009 International Energy Conservation Code (IECC)
- 2009 International Mechanical Code (IMC)
- 2009 International Fire Code (IFC)
- 527 CMR - MA Fire Prevention and Electrical Regulations
- 521 CMR - MA accessibility regulations (Reported on under section E)
- 248 CMR – 10.00 Uniform State Plumbing Code
- 524 CMR - MA elevator regulations

Note; we have heard that the adoption of the 9th edition by the BBRS has been postponed, and without certain knowledge of the MA amendments to the 9th edition will be, code reviews will use the current edition, also, there is likely little overall difference between the 2009 IBC and the 2014 IBC. The newer version of the energy code IBC 2012 will be adopted in June 2012 and will be used for future phase reviews.

1. Project Scope

Project consists of reviewing and reporting on the building code requirements for the building renovation, and renovations additions, new construction would be designed to meet the code for new construction, and summary would follow at later stages of the process.

Code summary is a brief overview consistent with the feasibility stage of this study, and covers the overall/broad issues. Code study will be refined and cover greater detail under subsequent phases of the project.

The Nelson Place Elementary School, as it exists today, was built as an elementary school in three phases; 1926, 1953, and 1967, and has continued to operate as a school.

In 1992, serious masonry deterioration required emergency repairs to the exterior of the 1926 building. The repairs, designed by the City’s architect, required replacement of masonry, windows and roofing, and complete reconstruction of the parapets. Later, in 2005, emergency temporary shoring was installed on the first and basement floors of the 1926 Building, and the City code department oversaw the repairs. LPA has heard, but not seen officially that ongoing monitoring or periodic reviews are required.

It is assumed that the school was designed and constructed to the code at the time, and any subsequent work met the code and standards in force at the time.

2. Chapter 34 Requirements (IEBC 2009)
3.1.4 EVALUATION OF EXISTING CONDITIONS

D. Building Code Compliance

Provisions of section 406
406.1 Scope. Changes of occupancy provisions apply where the activity is classified as a change of occupancy as defined in Chapter 2

406.2 Application. Changes of occupancy shall comply with the provisions of Chapter 9

901.2 There are no occupancy changes as part of this projects scope. Certificate of occupancy is required where the building official has determined that the requirements of a change in occupancy have been met.

106.1 Construction documents, Exception, the code official is authorized to waive submission of construction documents, as this report outlines the minor scope required with this tenancy change, the client requests review that the work outlined as the tenants work herein be accepted as the required documents for the work to be implemented.

Refer to consultants reports on the Fire protection, plumbing, Heating and Ventilation, and Electrical Systems

901.2.1 Repair and Alteration work shall meet the provisions of Chapter 4

Note, all new work and alterations must be in accordance with the code for new construction.

901.3 Changes in Occupancy Classification – There are no occupancy changes as part of this projects scope

901.4 Certificate of Occupancy shall be issued where a change of occupancy occurs that results in a change in occupancy classification.

902 Special Use and Occupancy- NA

903 Building Elements and Materials- New work shall be in compliance with the provisions of Cpt 6 or 7 (level 1 and 2 alterations)

904 Fire Protection- Requirements of section 912 are applicable,

905 Means of Egress. Requirements of section 912 are applicable.

906 Accessibility –Subject to the provisions of 521 CMR reported on later in this report, section 3.1.4 E

907.1 Structural-Gravity loads. Refer to Structural Report

907.2 Snow & Wind loads are not applicable; no roof work is required under this scope at this time, Refer to Structural Report

907.3 Seismic buildings with a change of use that would re-classify the building of a higher hazard category as indicated in table 1604.5 Refer to Structural Report

908 Electrical, any new work will have to be done in accordance w/ the electrical code. Refer to Electrical Report
3.1.4 EVALUATION OF EXISTING CONDITIONS

D. Building Code Compliance

909 Mechanical, any new work will have to be done in accordance w/ the mechanical code. Refer to Mechanical Report

910 Plumbing, any new work will have to be done in accordance w/ the plumbing code. Refer to Mechanical Report

3. General Information

AREA AND USE GROUP SUMMARY
(Note: compliance is not required w/ height and area requirements as there is no change in use classification or additions, Information is included here for reference)

<table>
<thead>
<tr>
<th>EXISTING BUILDING</th>
<th>Area Gross</th>
<th>Occupancy</th>
<th>Proposed Use Group/912.5 Hazard</th>
<th>Existing Use Group/912.5 Hazard</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>7,388 sf (gross)</td>
<td>E-Educational -School</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First Floor</td>
<td>30,380 sf (gross)</td>
<td>E-Educational -School</td>
<td>E 3</td>
<td>E 3</td>
<td>No Change</td>
</tr>
<tr>
<td>Second Floor</td>
<td>17,630 sf (gross)</td>
<td>E-Educational -School</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total complex footprint area</td>
<td>55,400 sf (gross)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 503
Height and Area Limitations (base table requirements shown) (4)

<table>
<thead>
<tr>
<th>Use Group</th>
<th>Allowable Height and Area - Construction Type III(3) B masonry walled, ordinary framed</th>
<th>Actual (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-Educational</td>
<td>2 stories 14,500 sf footprint base area 24,940 sf w/ increase for accessible perimeter</td>
<td>2 story Area 55,400 sf</td>
</tr>
<tr>
<td>Existing Un-sprinklered</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-Educational</td>
<td>3 stories 14,500 sf footprint base area 53,940 sf w/ increase for accessible perimeter and sprinklers</td>
<td>2 story Area 55,400 sf</td>
</tr>
<tr>
<td>Existing w/ Sprinklers added</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.1.4 EVALUATION OF EXISTING CONDITIONS

D. Building Code Compliance

Notes

1. Allowable building area increase in accordance w/ Section 506

   E Use Group Calculation-Unsprinklered
   \[ A_a = \{14,500 +[14,500 \times (1135/1135-0.25)(29/30)] + [14,500 \times 0]\} \]
   \[ = \{14,500 +[14,500 \times 0.72] + [0]\} \]
   \[ = 24,940 \text{ sf} \]

   E Use Group Calculation-Sprinklered
   \[ A_a = \{14,500 +[14,500 \times (1135/1135-0.25)(29/30)] + [14,500 \times 2]\} \]
   \[ = \{14,500 +[14,500 \times 0.72] + [29,000]\} \]
   \[ = 53,940 \text{ sf} \]

2. Note, under the No- Build or Renovation option where there are no additions planned or change in use, technically conformance with height and area is not required for Level 1, 2 or 3 alterations.

Review for sprinkler requirements under level 1-3 alterations is covered later in the report, and the addition of sprinklers, as well as the review for additions.

3. Note, observations at the building and review of the earlier referenced contract drawings, the 1926 building is constructed of masonry walls, ordinary wood framed construction. The plaster ceilings potentially might provide fire rating and could be considered to up the classification to protected construction, for this study the construction will be considered as unrated rated type III (3) B construction. The 1953 and 1967 buildings are of steel frame, masonry walls or II (2) B construction, however there are no firewalls between the buildings, the least stringent construction type will be used for the complexes classification.

### Table 601
Fire Resistant Rating Requirements for Building Elements

<table>
<thead>
<tr>
<th>Building Element</th>
<th>Type of Construction</th>
<th>Type III (3) B required Ratings</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural Frame</td>
<td>0 (0 hour supporting roof)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exterior bearing walls</td>
<td>2 hour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interior bearing walls</td>
<td>0 (0 hour supporting roof)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exterior nonbearing walls and partitions</td>
<td>See Table 602 below</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interior nonbearing walls and partitions</td>
<td></td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Floor construction, inc beams and joists</td>
<td></td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Roof construction, inc beams and joists</td>
<td></td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

### Table 602
Fire Resistant Rating Requirements for Exterior Walls

<table>
<thead>
<tr>
<th>Fire Separation Distance, based on III (3)B</th>
<th>Type</th>
<th>Use Group E (most stringent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5</td>
<td>1</td>
<td>NA- no other structures w/in this distance</td>
</tr>
<tr>
<td>Greater than 5 less than 10</td>
<td>1</td>
<td>NA- no other structures w/in this distance</td>
</tr>
<tr>
<td>Greater than 10 less than 30</td>
<td>0</td>
<td>NA- no other structures w/in this distance</td>
</tr>
<tr>
<td>Greater than 30 ft</td>
<td>0</td>
<td>Applicable- Street frontage, sides and rear the building</td>
</tr>
</tbody>
</table>
3.1.4 EVALUATION OF EXISTING CONDITIONS

D. Building Code Compliance

<table>
<thead>
<tr>
<th>Table 508.2.5 Required Separation of Incidental Accessory Occupancies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rooms w/ boilers where the largest piece of equipment is over 15 psi and 10 hp</td>
</tr>
<tr>
<td>Electric Rooms over 1200 Amp (NEC)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 706.4 Fire Wall Fire Resistance Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/E use Group</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 508.4 Required Separation of Occupancies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use group A, E,</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 803 interior Wall and Ceiling Finish Requirements by Occupancy-Non-Sprinklered Buildings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>A3</td>
</tr>
<tr>
<td>E</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 803 interior Wall and Ceiling Finish Requirements by Occupancy-Sprinklered Buildings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>A3</td>
</tr>
<tr>
<td>E</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 1018.1 Corridor Fire-resistance Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupancy</td>
</tr>
<tr>
<td>A/E use group, greater than 30 occupants</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Shafts Section 708</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing, to be reviewed under future phases</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exit Enclosure-rating section 1022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Four (4) stories or less (2)</td>
</tr>
<tr>
<td>Four (4) stories or more</td>
</tr>
</tbody>
</table>

1. Or not less than the rating of the floor assembly penetrated, but not to exceed 2 hours
2. Story count to include basement
3. Refer to section 1015.6.1 for stairs nor requiring separation
3.1.4 EVALUATION OF EXISTING CONDITIONS

D. Building Code Compliance

Building Occupancy and Egress

<table>
<thead>
<tr>
<th>Space</th>
<th>Use</th>
<th>Area sf</th>
<th>Table 1004.1.1 Factor (sq.ft. per occupant)</th>
<th>Occup’t Load</th>
<th>Exit Capacity-occupants</th>
<th>Conform</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Y=yes</td>
</tr>
</tbody>
</table>

Initial review there is no apparent hazards to egress, exits numbers, widths are well within the requirements, and also each classroom has an independent egress door. Such independent exits, are not required by the current building code, (it is assumed that this original feature was based on the old school code, that required communicating doors, secondary exits, or direct outside access). Detailed egress review will be done during later stages of the project.

Further review with the school if these doors are desired to remain, they provide a positive safety element by allowing independent egress, however increases security concerns with multiple exterior openings, while there is no exterior hardware on the doors, they are not considerably different than exterior windows.

4. Requirements for Fire Protection System

There are two direct criteria for fire protection systems, MGL c 148, and the provisions of the State building code. The above summary covered other provisions of the building code, the remaining criteria is chapter 9 of the 2009 IBC Code as amended by the BBRS.

MGL c 148

Required of the General laws in buildings with major alterations or modifications containing more than 7,500 sf (MGL c 148 s 26G effective 1/1/10) (The combined gross floor area is 48,000 sf, therefore sprinklers are required under these provisions for any major renovation)

*General Laws CHAPTER 148, Section 26G.*

[First and second paragraphs applicable as provided by 2008, 508, Sec. 6.] Section 26G. *Every building or structure, including any additions or major alterations thereto, which totals, in the aggregate, more than 7,500 gross square feet in floor area shall be protected throughout with an adequate system of automatic sprinklers in accordance with the provisions of the state building code. No such sprinkler system shall be required unless sufficient water and water pressure exists. For purposes of this section, the gross square footage of a building or structure shall include the sum total of the combined floor areas for all floor levels, basements, sub-basements and additions, in the aggregate, measured from the outside walls, irrespective of the existence of interior fire resistive walls, floors and ceilings. This section shall not apply to buildings used for agricultural purposes as defined in section 1A of chapter 128.*
In such buildings or structures, or in certain areas of such buildings or structures, where the discharge of water would be an actual danger in the event of fire, the head of the fire department shall permit the installation of such other fire suppressant systems as are prescribed by the state building code in lieu of automatic sprinklers. Automatic suppressant or sprinkler systems shall not be required in rooms or areas of a telephone central office equipment building when such rooms or areas are protected with an automatic fire alarm system. Sprinkler systems shall not be required in open-air parking structures, defined as: buildings, structures, or portions thereof, used for parking motor vehicles and having not less than twenty-five per cent of the total wall area open to atmosphere at each level, utilizing at least two sides of the structure. This section shall not apply to buildings or additions used for residential purposes.

The head of the fire department shall enforce the provisions of this section.

Major alterations are defined as including any work, (not repairs) that are major in scope or expenditure, and which result in changes affecting a substantial portion of the building. The fire marshal’s office provided guidelines that, when the work affects 33% of the building area or more, or the cost of the work is equal to or more than 33% of the assessed value. The FY 2013 building assessed value is $4,240,000. 33% is $1,399,200. Any cumulative work over a 5 year period over the 33% value would require that the building be fully sprinklered.

**Building Code Requirements**

The Building Code requirements for sprinklers required to height or area requirements were covered earlier in this summary, the requirements of chapter 9 of the IBC as amended by the BBRS are covered below.

Table 903 outlines thresholds for each use group as follows for the potential groups in this building 903.2.1 through 903.2.10. Replace these subsections with the Table 903.2 of the IBC:

<table>
<thead>
<tr>
<th>Buildings having Occupancy</th>
<th>Building Aggregate area</th>
<th>Building Occupancy Load</th>
<th>Occupancy Located</th>
</tr>
</thead>
<tbody>
<tr>
<td>E- Educational</td>
<td>&gt;12,000 sq. ft.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>E-(below level of exit discharge)-see note d</td>
<td>NA this project</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**5. Zoning and Parking Review**
Reference Development Restrictions report in section 3.1.4.C. City Buildings are exempt from Local Zoning requirements

**6. Access Code Review**
3.1.4 EVALUATION OF EXISTING CONDITIONS

D. Building Code Compliance

521 CMR

7. Conclusion

There overall code issues with the current building noted were that the stair fire doors at the basement at the 1926 building are missing closers, and the structural issues with 1926 building, otherwise, there are no noted issues with the exits, stairs and general egress as it applies to an existing building.

This summary outlines a basic code comparison of the building as it stands compared to the current code, with and is a basis for comparison under other sections of the no build, renovation, renovation and addition, or new building requirements. Under any renovation scheme, the threshold for upgrades to the existing will need to be reviewed, doors, stairs, systems will have to be upgraded to meet the current code standards as they are applicable under article 34.
3.1.4 EVALUATION OF EXISTING CONDITIONS

E. Evaluation of AAB Rules & Regulations
MA Building Code 780 CMR 3404.18 requires that accessibility for persons with disabilities comply with 521 CMR Architectural Access Board (AAB) Regulations. 521 CMR 3.3 Existing Buildings regulates jurisdiction for renovations/alterations to existing buildings, based on 1) the full and fair cash value of the building, and 2) the cost of the work done over a 36-month period.

If the cost of the work is less than 30% of the full and fair cash value of the building, and less than $100,000, only the work being performed must comply with 521 CMR. If the cost of the work is less than 30% of the full and fair cash value of the building, and more than $100,000, the work being performed must comply with 521 CMR; also, an accessible public entrance and an accessible toilet room, telephone, drinking fountain (if toilets, telephones and drinking fountains are provided) must also be provided in compliance with 521 CMR. In either case, the cost of certain types of work (i.e. alteration work consisting solely of mechanical/electrical alterations, hazardous material abatement or retrofit of automatic sprinkler systems not involving alteration of any elements or spaces required to be accessible; roof or window repair/replacement or masonry repair work; septic system repairs, site utility and landscaping work) are exempt from the calculation of cost.

If the cost of the work exceeds 30% of the full and fair cash value of the building, the entire building is required to comply with 521 CMR. The Nelson Place Elementary School (building only) is assessed at $2,614,300 (based on City of Worcester Assessor's data); 30% of $2,614,300 is $784,290. While a Base Repair option may not trigger full compliance, the cost of a Renovation/Addition option would almost certainly exceed $784,290 and the entire building would then be required to comply fully with 521 CMR accessibility regulations for new construction.

If full compliance with 521 CMR is thought to be impracticable, an application for Variance may be made to the AAB. Variances have typically been granted only when the applicant can prove that "the cost of compliance would be excessive without substantial benefit to persons with disabilities". Nevertheless, it is often worthwhile to request a variance when facing substantial modifications and their associated costs. The AAB has, in the past, accepted reasonable compliance alternatives that satisfy the intent of the regulations at much lesser cost than would be incurred for full compliance.

It shall be noted that the City of Worcester Office of Disabilities must review all plans for the proposed scope of work.
521 CMR also addresses other specific sections as follows:

12.00 EDUCATIONAL FACILITIES:

- Administrative spaces, instructional spaces, and areas open to students or the general public shall comply with 521 CMR.
- Amphitheaters, lecture halls and classrooms shall comply with 521 CMR 14.00 PLACES OF ASSEMBLY.
- Libraries: At least 5% (but not less than one) of tables, study carrels, computer workstations and fixed seating must be accessible (clear 36” aisle, clear floor space, 27” h. x 30” w. x 19” d. knee clearance, 28-34” table/counter height).
- Libraries: Checkout areas must comply (36” max. counter height/36” min. length). Card catalogs must comply (36” min. height). The counter height at existing checkout area is 39” and does not comply.
- Libraries: Stack aisles must be min. 36” clear; 42” preferred. Height is unrestricted. Stack aisles were observed to be 36” clear.
- Kitchens in classrooms must comply with 521 CMR 32.00 KITCHENS. No Kitchens were observed in Classrooms.
- Sinks at classrooms and labs: At least 5% (but not less than one) in each classroom or lab must be accessible (clear 36” aisle, clear floor space, 27” h. x 30” w. x 19” d. knee clearance, 28-34”
3.1.4 EVALUATION OF EXISTING CONDITIONS

FEASIBILITY STUDY

E. AAB Evaluation

table/counter height). At least 50% of storage shelf space must be accessible (within forward and side reach). Controls and operating mechanisms must comply with 521 CMR 39.00 CONTROLS. Classrooms in the 1953 and 1967 addition are provided with sinks. However, the sinks do not comply with height, clearance, and control requirements.

- Recreational Facilities must comply with 521 CMR 19.00 RECREATIONAL FACILITIES.

14.00 PLACES OF ASSEMBLY:
- Permanently installed assistive listening systems are required in assembly spaces that 1) accommodate more than 50 persons, or 2) have both an audio-amplification system and fixed seating. These spaces, based on the proposed Educational Program, include the Gymnasium, Cafetorium, and Media Center.
- Other assembly spaces may be provided with a portable assistive listening system (minimum number of receivers equal to at least 4% of the total number of seats).
- Access to performing areas (i.e. stage or platform) must be within the place of assembly. The Cafeteria stage is not accessible.

19.00 RECREATIONAL FACILITIES:
- Gymnasiums, weightlifting rooms, locker rooms and all associated spectator areas must be accessible. The existing 1967 Gymnasium is not accessible from the interior of the building. No weightlifting room or locker rooms are provided.
- Locker rooms must have a 36’ clear accessible route around all lockers.
- At least 5% of lockers must be accessible (operable with a closed fist; mounted no higher than 42” h.).
- If locker benches are provided, there must be a 36’ wide aisle between benches/lockers and a 5’ turning diameter nearby.

20.00 ACCESSIBLE ROUTE:
- Cafeteria stage performing level is not accessible.
- Objects (display cases, public telephones, overhead conduits, stair stringers, etc.) in excess of 4” d., between the heights of 27-80”, are not allowed to protrude into the accessible route. Various items including door closers do not meet this requirement.
3.1.4 EVALUATION OF EXISTING CONDITIONS

FEASIBILITY STUDY

E. AAB Evaluation

21.00 CURB CUTS:
- Slope of curb cuts shall be 1:12 max.; cross slope max. 1:50; transitions (½” max.).
- Curb cuts may not allow accumulating water, ice or debris.
- Existing curb cuts do not meet accessibility requirements for slope and level change.

22.00 WALKWAYS:
- Walks, sidewalks, courts, plazas and other pedestrian walkways must be at least 48” wide excluding curb stones.
- Walkways with running slope in excess of 1:20 (5%) are ramps (except that at sidewalks on streets with natural topography exceeding 1:20 (5%), ramps are not required).
- Cross slope may not exceed 1:50 (2%).
- Level changes greater than ½” require a curb cut, walkway, ramp, elevator or platform lift.
- Parking lot does not appear to meet slope requirements.

23.00 PARKING AND PASSENGER LOADING ZONES:
- Number of required accessible spaces shall be per the table below:

<table>
<thead>
<tr>
<th>Total Parking in Lot</th>
<th>Required Minimum Number of Accessible Spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-25</td>
<td>1</td>
</tr>
<tr>
<td>26-50</td>
<td>2</td>
</tr>
<tr>
<td>51-75</td>
<td>3</td>
</tr>
<tr>
<td>76-100</td>
<td>4</td>
</tr>
<tr>
<td>101-150</td>
<td>5</td>
</tr>
<tr>
<td>151-200</td>
<td>6</td>
</tr>
<tr>
<td>201-300</td>
<td>7</td>
</tr>
<tr>
<td>301-400</td>
<td>8</td>
</tr>
<tr>
<td>401-500</td>
<td>9</td>
</tr>
<tr>
<td>501-1000</td>
<td>2% of total</td>
</tr>
<tr>
<td>1000+</td>
<td>20 plus 1 for each 100 over 1000</td>
</tr>
</tbody>
</table>

- One in every 8 parking spaces, but not less than one, must be van accessible.
- Accessible spaces must be located with 200’ of the closest accessible entrance, or an accessible drop-off area must be provided within 100’ of the entrance.
3.1.4 EVALUATION OF EXISTING CONDITIONS

FEASIBILITY STUDY

- Accessible parking spaces must be at least 8' wide plus a 5' (8' at van-accessible) access aisle. Sidewalks adjacent to accessible parking spaces must have curb cuts at access aisles.
- Accessible parking spaces must be at least the same length as adjacent spaces in accordance with MA Building Code or local zoning.
- Slope shall not exceed 1:50 (2%) in any direction.
- Spaces must be marked by high-contrast painted lines.
- Accessible parking spaces must be identified by signage, located at the head of the space and not more than 10' away. Tops of signs may be between 5' to 8' high.
- Passenger loading zones must provide an access aisle at least 5' x 20', adjacent and parallel to the vehicle pull-up space. At passenger loading zones, a minimum of 9'-6" vertical clearance is required. Slope may not exceed 1:50 (2%) in any direction.
- The existing parking lot does not appear to conform to the table above. There are approximately 40 parking spaces with no designated handicap spaces observed. The remaining parking is provided on the street. All new parking will meet AAB requirements.

24.00 RAMPS:
- Interior ramps at the 1967 addition do not comply; handrails do not provide proper extensions.

25.00 ENTRANCES:
- All public entrances must be accessible. Public entrances are those other than service, loading or employee use only. Not all public entrances are accessible.
- Vestibule doors must have 48" plus door swing width between them. Main entrance vestibule doors are non-compliant.
- Mats ½" or less must be secured (all edges). Mats ½" to ½" must have beveled edges. Mats over ½" must be recessed. A recessed floor area were observed at main entry of 1926 building, but, the mats were removed, leaving ½” recess in floor.
- Grate openings may not exceed ½" space in direction of travel. The floor grating in the main corridor of the 1926 building does not comply as the openings are greater than ½".
- Non-accessible entrances must have signage indicating the location of the accessible entrance. No signage is visible.

26.00 DOORS AND DOORWAYS:
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3.1.4 EVALUATION OF EXISTING CONDITIONS

FEASIBILITY STUDY

E. AAB Evaluation

- Numerous door openings (including most classrooms) have inadequate maneuvering clearances, width, and non-compliant knob-type hardware.

27.00 STAIRS:
- Nosings (particularly at the 1926 building) appear to exceed the dimensional limits required by AAB, and will require modifications.
- Handrails are typically non-compliant in terms of height (less than the 34-38" above nosing required by AAB), extensions (most rails lack proper, if any, extensions at terminations) and continuity (some rails are discontinuous; interrupted by supports). Handrail size/profile appears to be AAB-compliant.
- While not an accessibility issue, guardrail openings exceed the allowable for new construction. Modifications to other stair components will require that guardrails be upgraded to comply with current MA Building Code.

28.00 ELEVATORS:
- The building does not currently have an elevator which makes the entire basement floor and second floor non-accessible.

30.00 PUBLIC TOILET ROOMS:
- Public toilet rooms are typically non-compliant due to inadequate maneuvering clearances, stall size, fixture types, lack of grab bars, controls, etc.
- Showers and other bathing facilities (including toilet rooms) at locker rooms must be accessible. **No showers exist in the building.**

32.00 KITCHENS:
- The Cafeteria Kitchen is not big enough to contain all the required equipment thus requiring the freezer and cooler to be located in the adjacent Cafeteria. The Kitchen itself is not open to the public and therefore is not required to comply with accessibility requirements. Food service lines and transaction areas at the Kitchen/Cafeteria, however, must comply with 17.00 RESTAURANTS.
3.1.4 EVALUATION OF EXISTING CONDITIONS

FEASIBILITY STUDY

36.00 DRINKING FOUNTAINS:
- Drinking fountains are required to have spout height of 36" (max.). The existing drinking fountains throughout the building lack required clearances, spout locations, and controls.

37.00 PUBLIC TELEPHONES:
- If provided, pay phones must be accessible, hearing-aid compatible and be equipped with volume control.
- If three or more public phones are provided together, one must be a text telephone.
- The building does not have any pay phones.

39.00 CONTROLS:
- Controls and operating mechanisms in accessible spaces must be accessible with regard to clear floor space, height, location and operation.

40.00 ALARMS:
- Emergency warning systems, if provided, must have both audible/visual alarms complying with 40.00 Alarms.

41.00 SIGNAGE:
- Permanent rooms/spaces must be designated by signage complying with 41.00 Signage.
3.1.4 EVALUATION OF EXISTING CONDITIONS

F. Evaluation of Significant Structural, Environmental, Geotechnical or other Physical Conditions

1. Architectural Existing Conditions
2. Existing Conditions-Landscape
3. Existing Conditions-Civil
4. Existing Conditions-Wetland Delineation
5. Existing Conditions-Traffic Analysis
6. Existing Conditions Report-Structural
7. Existing Conditions Report-Fire Protection
8. Existing Conditions Report-HVAC & Plumbing
9. Existing Conditions Report-Electrical/TelData/Security/PA
10. Existing Conditions Report-Foodservice
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35 Nelson Place, Worcester, MA 01605

3.1.4 EVALUATION OF EXISTING CONDITIONS  
F. Architectural Evaluation

GENERAL
History: Nelson Place Street Elementary School, as it exists today, was built as an elementary school in three phases; 1926, 1953, and 1967. With exception of repairs made to the 1926 building, the buildings and infrastructure generally remain in their original form. The buildings appear to have been well designed, detailed and constructed, and with exception of the 1926 building, have been maintained to the degree needed for occupancy. Later work included capital investments such as boiler replacement, some asbestos flooring removal replacement, and roof upgrades. The 1926 building had serious masonry deterioration which resulted in complete rebuilding of the parapets, masonry, window replacement and roofing, with later major temporary shoring installed. This will be covered in detail in this report. The plans reviewed for original construction and later work is outlined as follows:

- Original 1926, Two story school building constructed as an elementary school; drawings dated 3/20/1926 prepared by Jasper Rustigian Architect, Worcester MA.
- Addition 1953 One story Classroom and cafeteria/multipurpose room addition drawings dated 9/04/1953 prepared by John Bilzarian Architect, Worcester MA.
- Emergency Repairs, to the 1926 building and roofing, drawings dated 6/19/1992 prepared by Eric G. Twickler Architect, City Architect, Worcester MA.
- Emergency Shoring plans, dated 4/--/2005
- 2006 Boiler replacement

Note that the dates used are the dates on the contract drawings, and are used in this report to refer to these buildings, other documents refer to what is assumed as the completed dates, which are a year or so later.

The supplemental reports listed below have also been referenced by LPA, and along with the above drawings, are available for review upon request.

- Maguire Group Inc. -Existing Conditions Summary dated 4/27/12
3.1.4 EVALUATION OF EXISTING CONDITIONS

F. Architectural Evaluation

- ALG Environmental- AHERA report dated 12/16/11
- COW- AHERA report dated 9/13/89
- Triumvirate “Building Materials Management Report” dated 10/22/12
- Memos from Code Department- “Nelson Place – Condition of the 1927 Building and Recommendations for Repair or Replacement”
- Renovation/Replacement Investigation Study, September 2004, Nault Architects

EXISTING FLOOR AREA SUMMARY:

<table>
<thead>
<tr>
<th>Floor</th>
<th>1926</th>
<th>1953</th>
<th>1967</th>
<th>1967 Gym</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>BASEMENT</td>
<td>7,388</td>
<td></td>
<td></td>
<td></td>
<td>7,388</td>
</tr>
<tr>
<td>FIRST FLOOR</td>
<td>6,844</td>
<td>8,853</td>
<td>9,787</td>
<td>4,895</td>
<td>30,379</td>
</tr>
<tr>
<td>SECOND FLOOR</td>
<td>6,892</td>
<td></td>
<td>10,739</td>
<td></td>
<td>17,631</td>
</tr>
<tr>
<td>TOTAL By Year</td>
<td>21,124</td>
<td>8,853</td>
<td>20,526</td>
<td>4,895</td>
<td>55,398</td>
</tr>
<tr>
<td>TOTAL GROSS AREA:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>55,398</td>
</tr>
</tbody>
</table>

The following report is intended to document and summarize observable existing conditions. Following in the report are discussions on the no-build requirements, Base Repair narrative for required improvements to meet current code and replace obsolete/failing systems and Addition/Renovation Options.
3.1.4 EVALUATION OF EXISTING CONDITIONS

F. Architectural Evaluation

EXTERIOR SHELL - WALLS:

1926 BUILDING w/1992 repairs:

The original style was classical English revival style with Tudor arches and bay windows and cast stone banding, typical of the revival style used in the 20’s, though much of the detailing was removed during the 1992 repairs, and much of the remaining facade not repaired is failing.

This building exterior typically consists of 4” face ribbed brick exterior walls with multiple exterior bands and trim made of “cast limestone” with an 8” backup of clay tile. The attic walls were originally backed up with common brick. The entire attic parapet and front entrance were deteriorated to the point that all were demolished and reconstructed with brick/CMU face and CMU reinforced backup. The character of the building was changed with these “emergency repairs”.

Typical to this vintage construction, there is no air space/cavity between the masonry wyths. The original drawings are detailed with through wall lead flashing, built in steel beam and channel lintels at the window openings, with metal dogs connecting the cast limestone lintels and trim to the beams and backup. The classroom wings and roof are ordinary wood framing, with fire cut joist ends built in to the masonry, with a continuous wood ledger either on the steel beam bottom channel, or built in to the masonry. There appears to be only a minimal of bearing of the joists to the wall, so any movement could be a cause for concern that led to the addition of the temporary shoring. LPA’s assessment is that water penetrated into the clay tile and between the masonry wyths and deterioration of ties and structural members caused the failure.

The window heads at the basement and first floor levels are clearly failing; there is significant displacement of the masonry over the windows to be readily observable. The City conducted a study in September of 2004 that provided detailed review of the building window/spandrel failure, noted that there was significant variation as constructed from the 1926 documents, that the supporting steel installed was smaller in size and severely corroded, that there was no flashing observed, and was recommending complete replacement of the 1926 building. Addressing this report, in 2005 the city added shoring to all the existing windows and floor structure at the front and rear walls, and enclosed the building with chain link fence. The emergency repair information published as part of the RFQ, and outlines the major issues to this building, and the structural report published herein discusses the issues in detail.
In our opinion, this 1926 building should not be considered for repair, and as noted, the City should maintain monitoring the present conditions and effectiveness of the shoring and bracing for the duration of the occupancy.

Further reports should be conducted if there will be any disruptive construction planned near this building, to review if additional bracing is required to offset any vibration to this existing building.

The windows were replaced as part of the 1992 emergency repairs with an aluminum window, and aluminum panning around the existing wood frames. Many of the observed windows do not function, and are reported as not functioning well, being racked and warped due to the wall movement. Additionally, many of the windows were noted as having broken hold open mechanisms, and the teachers have a series of cans and blocks, books, etc. propping the windows open, which is required to control the temperature in the rooms.

Other façade and exterior items were noted, however the structural issues are greater and LPA sees no need to record these issues.

**1953 ADDITION**

This addition is a single story classroom and cafeteria addition, and is in keeping with the style of buildings of that era, with large overhanging roof/soffit, ribbon windows and brick base.

This building exterior typically consists of 4" face brick exterior walls with 8" CMU backup and proper rowlock brick ties between the brick and block.
The wall sections on the 1953 drawings are well detailed and indicate flashing at the window sills, wall bases and at all the typical locations. As was traditional of this period the walls are un-insulated. The structure is steel framed. The brick and mortar is in good overall condition for its age, some minor spalling was observed. The window sills appear to be limestone and have proper lip at the window, are well sloped at the top, and are built in at the jambs. The classrooms have unit ventilators, with the intake louvers at the floor line, with the sloping grade, these louvers are fairly well above the existing grade.

At the main entrance there is no face brick, and the cement masonry block was surfaced with ceramic mosaic tile, which is failing at locations.

The window system is a thin lined aluminum window/wall system, with hopper windows and single glazing. Repairs to the glazing system were reported to be done in 2012. The glass window panels have a bead of sealant around the perimeter, which suggests that the original sealant has failed.

There is a three foot sloping plaster overhang at the perimeter around the building, with significant cracking at the corners, but otherwise in decent shape.

The exterior is generally vintage to the original construction, with minimal repairs required or conducted, in keeping with the year built, this building is un-insulated.

Observations/Deficiencies-Masonry:
- Un-insulated exterior systems
- Minor cracking and spalling at window sills
- Expansion Joint caulking/sealants are beyond their life expectancy
- Cement soffit system has opened up at corners, and is un-insulated

Observations/Deficiencies Windows:
3.1.4 EVALUATION OF EXISTING CONDITIONS

F. Architectural Evaluation

- Aluminum frames are not thermally broken.
- Glazing putty is cracking, in different states of deterioration and in some cases missing. Caulking was over-sealed in 2012.
- Perimeter joint caulking/sealants have lasted beyond their useful life expectancy and are failing.

1967 ADDITION

This addition is a two story classroom addition at the west end and a single story Gymnasium addition at the east end of the complex. The buildings are typical of late 50’s, early 60’s design, with brick and aluminum storefront, windows and panels. These buildings are fairly vernacular in appearance.

This building exterior typically consists of 4” face brick exterior walls with 8” CMU backup and proper rowlock brick ties between the brick and block. Plaster interior walls.

The 1967 drawings are lightly detailed and indicate flashing at the window sills, wall bases and at all the typical locations. As was traditional of this period the walls are un-insulated. The structure is steel framed. The brick and mortar is in good overall condition for its age, some minor spalling of the brick and concrete banding were observed. The window sills appear to be limestone and have proper lip at the window, are well sloped at the top, and are built in at the jambs. There is an exposed concrete band at the first floor level, which was cast in with the floor steel spandrel beam, and has a positive slope, and bottom drip edge. The classrooms have unit ventilators, with the intake louvers at the floor line at the first floor through the masonry with the sloping grade, with some of the louvers close to the existing grade. At the second floor, the louvers are through the window panels. There is one area where there is an exterior play area under the second floor, and the exposed steel
columns are setting on a foundation/short retaining wall, which is exhibiting rusting and spalling. The cement plaster ceiling at this area is in poor condition, with multiple holes cut and not repaired well, seemingly to access piping.

The window system is a thin lined aluminum window/wall system, with hopper windows and single glazing. Repairs to the glazing system were reported to be done in 2012.

Like the 1954 addition, the exterior is generally vintage to the original construction, with minimal repairs required or conducted, in keeping with the year built, this building is un-insulated.

Observations/Deficiencies –Masonry:
- Un-insulated exterior systems
- Minor cracking and spalling at window sills
- Expansion Joint caulking/sealants are beyond their life expectancy
- Cement Plaster soffit system has unrepaired holes and is un-insulated
- Corrosion of the exterior exposed “fireproof” steel columns and shroud

Observations/Deficiencies Windows:
- Aluminum frames are not thermally broken.
- Glazing putty is cracking, in different states of deterioration and in some cases missing. Caulking was over-sealed in 2012.
- Isolated sill damage.
- Perimeter joint caulking/sealants have lasted beyond their useful life expectancy and are failing.
- Metal panels have minimal insulation.
EXTERIOR SHELL – ROOFING SYSTEMS:

General Description: The buildings’ roofs are relatively simple; all of the buildings have minimally sloping flat roofs. The roofing of the 1967 gym and classroom wings and the 1926 building was replaced in 1992 as part of the emergency repairs. The roofing replacement drawings indicate that the existing roofing and insulation was to be completely removed to the deck, with new insulation and an adhered EPDM system installed. Thickness of insulation is not indicated on the drawings but it appears to scale about 3”. Drains and overflow drains were shown to be added as needed. And there was only minimal ponding of water observed at the cafeteria area. The 1953 building has an adhered EPDM (Carlisle) roof of unknown vintage. All the roofs appear to be in good condition, consistent with their age. The perimeter flashing appears also appears to be in good condition for its age, with no signs of damage or deterioration, indicating that a good system was installed when the roof was replaced. No current leaks were reported by the head custodian for the membrane, though there are some leaks associated with the exhaust vent at the cafeteria, due to damaged lover blades, which was reported as repaired. However, the roofs are now 22 years old, and approaching the end of their lifespan, and LPA assumes the roofs are out of, or at the end of the warranty period. None of the buildings have parapets or former chimneys, shafts or other hazards. Exploratory testing may need to be performed for confirmation of roofing construction.

The 1926 roof is ordinary wood framed, with a crawl space type attic, and tie boards in a truss type between the roof rafters and the ceiling joists. The insulation is fiberglass batt insulation at the ceiling level between the ceiling joists, and appears to be about R-19.

Skylights and other roofing penetrations shown on the original drawings have been removed and roofed over as part of the floor replacement work.
The 1926 and 1953 structural drawings do not indicate design loads for roofs. It is assumed that the design roof load at that time would have been 30 lbs/SF. The 1967 structural drawings list the design roof deck live load as 40 lbs/SF, with deflection of L/240. Reference the structural report.

Observations/Deficiencies –Roof Areas:

- The existing roof fans and curbs are relatively close to the roof surface, drifting or heavy melting snow could cause water infiltration though the curb.
- The roof ladder at the 1967 addition, and other ferrous metal items, should be properly prepared, primed and re-painted. The ladder has loose bolts and must be re-secured.
- Sheet metal counter-flashing, at roof-to-masonry wall intersections where the existing counter-flashing was lifted up for installation of the new membrane flashing, was not neatly set down and should be corrected/re-sealed where necessary.
- Masonry and other caulking and sealants are at the end of their lifespan and should be properly prepared and re-sealed.
- Walkway pads were not installed between roof access hatch openings or at rooftop equipment that requires regular maintenance.
- The vintage roof ladder through the attic at the 1926 building is of wood construction, and simple nailed boards, that are set too closely to the wall.
3.1.4 EVALUATION OF EXISTING CONDITIONS

F. Architectural Evaluation

INTERIORS - FINISHES:

1926 BUILDING w/1992 repairs:

General: In the original 1926 building, typical walls are plaster over metal lath. Ceilings throughout are plaster on lath or painted concrete. All finishes are vintage to the original construction, and while having been maintained, are in generally fair/poor condition, in need of complete re-furbishing.

- Classrooms: Walls at the first and second floors are plaster over metal lath, though most of the walls in classrooms are built in closets, slate chalkboards, tackboards or windows. Classroom floors are generally painted plywood at the first floor, and 12” x 12” Vinyl composition tile (VCT) on the second floor, with original painted wood base. The floors are installed over ordinary wood framed construction, and the plywood was installed over hardwood flooring. As several basement rooms were converted from auxiliary playrooms into classrooms, basement classrooms consist of painted concrete floors, with walls of painted brick or concrete, and ceiling of painted concrete structure.

- Corridors: Floors at the corridors are terrazzo with thin bronze dividers, over reinforced concrete substrate, and have a slate stone base. The 1926 ventilation shafts are still installed and functioning at the classrooms, at the basement, fresh air to the shafts are provided by having to manually open the windows, this is an archaic system.

- Stairs: Upper floors and landings are terrazzo with a slate stone base, with walls and ceilings constructed of painted plaster on wire lath. The basement level floors are painted concrete, and walls are either painted concrete or brick. Stairs have painted steel pipe handrails, with painted steel guards, painted steel stringers and risers with terrazzo treads.
Nelson Place Elementary School  
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3.1.4 EVALUATION OF EXISTING CONDITIONS  
F. Architectural Evaluation

### 1953 ADDITION

General: Classroom floors are generally VAT tile at all areas, and walls in spaces other than corridors are typically painted CMU block. All finishes are vintage to the original construction, and have been maintained, however they are in generally fair/good condition, and are in need of complete re-furbishing.

- **Corridors:** Corridors in the 1953 building are VAT with Glazed CMU base. Walls at the corridors are glazed CMU up to 4’-10” A.F.F. and painted CMU above. Ceilings are 2’x4’ ACT, consistent with the rest of the addition.

- **Classrooms:** Ceilings throughout the 1953 classrooms are 2’ x 4’ ACT ceiling tiles which were installed after the original construction, and have a simple unpainted plywood rim board dropping down from the windows. Walls in classrooms are full height painted CMU block with built-in alcoves for coats and storage where the original lockers have been removed.
3.1.4 EVALUATION OF EXISTING CONDITIONS

F. Architectural Evaluation

- Toilet Rooms: The only toilet rooms in the 1953 building are located within the classrooms. These children’s toilet rooms have ceramic tile floors with glazed CMU base and wall up to 4’-10” AFF, with painted CMU above to the metal lath and plaster ceiling.

- Kitchen: The kitchen floor has a combination of VAT and quarry tile, with a 4” tile base. Walls are painted CMU block, and the ceiling above is metal lath and plaster.

- Cafeteria: The Cafetorium has a raised stage with hardwood flooring at one end, and a small area used as the food preparation, distribution, and milk/refrigeration storage along the East wall. The Cafeteria floor is VAT. Walls are painted CMU generally, with oak paneling at the stage and North wall. Ceiling is 12”x12” Perforated concealed spline. This was a nicely finished and designed space; however, being cleaned and maintained, the finishes are in need of complete re-furbishing.

1967 ADDITION

General: The 1967 two story addition on the western side of the school includes the ramped corridor and the men’s and women’s bathrooms adjacent to the Cafeteria. The same renovation included the one story “Physical
3.1.4 EVALUATION OF EXISTING CONDITIONS

FEASIBILITY STUDY

F. Architectural Evaluation

Education Wing” positioned on the east end of the complex. Throughout both wings, ceilings are typically 2’x4’ ACT throughout, except where noted below.

- Classrooms: The classrooms in the 1967 building have VAT floors with a 4” vinyl base. The walls are painted plaster. Kindergarten classrooms have built-in cubbies for storage, and general classrooms have casework along the north and south windows.

- Corridors: Floors in the 1967 corridors are terrazzo with aluminum dividers, and have terrazzo bases. Walls are glazed ceramic tile to 6’-10” above floor level, with painted plaster above. Ramps in the corridors are equipped with wall mounted aluminum hand rails.

- Library: The library finishes are unique in that the floor is carpeted wall to wall with a 4” painted wooden base. The walls are paneled with flush prefinished plywood. The office located within the library has identical finishes.
3.1.4 EVALUATION OF EXISTING CONDITIONS

F. Architectural Evaluation

Toilet Rooms: Toilet Rooms in the 1967 building have 2”x2” tile flooring and 4” tile base. Walls are glazed ceramic tile to approximately 6’-0” above floor level, with painted plaster above. Toilet partitions are a mix of painted steel and solid plastic overhead braced partitions. Urinal screens were not observed. Ceilings are either plaster or 2’x2’ ACT.

Administration/Offices: The majority of the administrative spaces are located in the 1967 building. The offices have VAT flooring with 4” vinyl base and painted plaster walls.

Stair: Floors and landings in the 1967 stairways are terrazzo with aluminum dividers. The stair treads are concrete fill on a steel pan stair assembly, with aluminum hand rails. Walls are unfinished brick full height to the ACT ceiling above.
1967 ADDITION – PHYSICAL EDUCATION WING

- Gymnasium: The Gymnasium has a hardwood flooring system in fair condition. The walls are painted CMU. Steel roof framing/deck are exposed and painted. The finishes are in need of complete re-furbishing. The adjacent storage space is finished identically to gymnasium, however the toilet rooms are currently used for storage, and have ceramic tile walls to a height of 6’-10”, and ACT ceilings.

- Corridor: The corridor from the original 1926 building to the Gymnasium is finished with VCT flooring with a 4” vinyl base. Unlike the corridors in the west addition, the walls are painted CMU.

- Stair: The stairs connecting the Phys-Ed Wing to the 1926 building are poured concrete with aluminum hand rails.

observations/deficiencies – interior finishes:
- Stair railings and guards are not to current code standards
- Gymnasium is acoustically poor
- Buildings are not fully accessible to the current standards
- There is a large vertical crack in the exterior masonry wall of the 1976 Gymnasium
- All wall, ceiling finishes are in fair condition and in need rehabilitation
- VAT flooring is present throughout, and is in fair condition
- Terrazzo corridor floors are generally in good condition, very minor cracking was observed
- Basement classrooms finishes are bright, but still a basement space
## 3.1.4 EVALUATION OF EXISTING CONDITIONS

### F. Architectural Evaluation

### Finish Legend:

<table>
<thead>
<tr>
<th>#</th>
<th>(F) Floor</th>
<th>(W) Walls</th>
<th>(C) Ceiling</th>
<th>(B) Base</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Terrazzo</td>
<td>Painted Plaster</td>
<td>Plaster</td>
<td>Terrazzo</td>
</tr>
<tr>
<td>2</td>
<td>V.C.T.</td>
<td>Glazed tile to 5'-1&quot; A.F.F., painted concrete above.</td>
<td>2x2 A.C.T.</td>
<td>Slate</td>
</tr>
<tr>
<td>3</td>
<td>Painted Plywood</td>
<td>Painted Brick</td>
<td>2X4 A.C.T.</td>
<td>6' Vinyl</td>
</tr>
<tr>
<td>4</td>
<td>Painted Concrete</td>
<td>Glazed CMU to 4'-10&quot; A.F.F., Painted CMU above</td>
<td>Exposed structure; (metal or concrete) Painted</td>
<td>4' Vinyl</td>
</tr>
<tr>
<td>5</td>
<td>V.A.T.</td>
<td>Painted CMU</td>
<td>Perforated Concealed Spline</td>
<td>Glazed Tile</td>
</tr>
<tr>
<td>6</td>
<td>Ceramic Tile</td>
<td>Wood panel</td>
<td>Glazed CMU</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Wood</td>
<td>Glazed Tile to 6'-10&quot; A.F.F., painted plaster above</td>
<td>Painted Wood</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Carpet</td>
<td>Painted plaster to 3' A.F.F., glass above</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Quarry Tile</td>
<td>Exposed Brick</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Unfinished concrete</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Finish Schedule by Building:

#### 1926 Original Building

<table>
<thead>
<tr>
<th>Room Name</th>
<th>Floor</th>
<th>Wall</th>
<th>Ceiling</th>
<th>Base</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vestibule</td>
<td>F1</td>
<td>W1</td>
<td>C1</td>
<td>B2</td>
</tr>
<tr>
<td>Corridors</td>
<td>F1</td>
<td>W1</td>
<td>C1</td>
<td>B2</td>
</tr>
<tr>
<td>Stairs</td>
<td>F1</td>
<td>W1</td>
<td>C1</td>
<td>B2</td>
</tr>
<tr>
<td>Basement classrooms</td>
<td>F4/F7</td>
<td>W3</td>
<td>C4</td>
<td>None</td>
</tr>
<tr>
<td>1st Floor Classrooms</td>
<td>F3</td>
<td>W1</td>
<td>C1</td>
<td>B7</td>
</tr>
<tr>
<td>2nd Floor Classrooms</td>
<td>F2/F3</td>
<td>W1</td>
<td>C1</td>
<td>B7</td>
</tr>
<tr>
<td>Boys Toilet Rooms</td>
<td>F1</td>
<td>W1</td>
<td>C1</td>
<td>B1</td>
</tr>
<tr>
<td>Girls Toilet Rooms</td>
<td>F1</td>
<td>W2</td>
<td>C2/C1</td>
<td>B1</td>
</tr>
<tr>
<td>Nurse</td>
<td>F2</td>
<td>W1</td>
<td>C1</td>
<td>B7</td>
</tr>
<tr>
<td>SPED Resource</td>
<td>F2</td>
<td>W1</td>
<td>C1</td>
<td>B7</td>
</tr>
<tr>
<td>Custodian's Work Rm</td>
<td>F4</td>
<td>W3</td>
<td>C4</td>
<td>None</td>
</tr>
<tr>
<td>Basement Storage</td>
<td>F4</td>
<td>W3</td>
<td>C4</td>
<td>None</td>
</tr>
<tr>
<td>Boiler Room</td>
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<td>W3</td>
<td>C4</td>
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</table>

#### 1953 Addition

<table>
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<th>Room Name</th>
<th>Floor</th>
<th>Wall</th>
<th>Ceiling</th>
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</thead>
<tbody>
<tr>
<td>Lobby</td>
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<td>W4</td>
<td>C3</td>
<td>B6</td>
</tr>
<tr>
<td>Corridor</td>
<td>F5</td>
<td>W4</td>
<td>C3</td>
<td>B6</td>
</tr>
<tr>
<td>Pre-K Classrooms</td>
<td>F5</td>
<td>W5</td>
<td>C3</td>
<td>B3</td>
</tr>
<tr>
<td>General Classrooms</td>
<td>F5</td>
<td>W5</td>
<td>C3</td>
<td>B3</td>
</tr>
<tr>
<td>Toilets</td>
<td>F6</td>
<td>W4</td>
<td>C1</td>
<td>B6</td>
</tr>
<tr>
<td>Kitchen</td>
<td>F5/F9</td>
<td>W5</td>
<td>C1</td>
<td>B5</td>
</tr>
<tr>
<td>Cafetorium</td>
<td>F5</td>
<td>W5/W6</td>
<td>C5</td>
<td>B3</td>
</tr>
<tr>
<td>Stage</td>
<td>F7</td>
<td>W5</td>
<td>C5</td>
<td>None</td>
</tr>
</tbody>
</table>

#### 1967 Addition

<table>
<thead>
<tr>
<th>Room Name</th>
<th>Floor</th>
<th>Wall</th>
<th>Ceiling</th>
<th>Base</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vestibule</td>
<td>F1</td>
<td>W1</td>
<td>C1</td>
<td>B1/B7</td>
</tr>
<tr>
<td>Corridor</td>
<td>F1</td>
<td>W7</td>
<td>C3</td>
<td>B1</td>
</tr>
<tr>
<td>Stair</td>
<td>F1</td>
<td>W9</td>
<td>C3</td>
<td>None</td>
</tr>
<tr>
<td>Library</td>
<td>F8</td>
<td>W6</td>
<td>C3</td>
<td>B7</td>
</tr>
<tr>
<td>Library Offices</td>
<td>F8</td>
<td>W1</td>
<td>C3</td>
<td>B7</td>
</tr>
<tr>
<td>Admin</td>
<td>F5</td>
<td>W1</td>
<td>C3</td>
<td>B4</td>
</tr>
<tr>
<td>Classrooms</td>
<td>F5</td>
<td>W1</td>
<td>C3</td>
<td>B4</td>
</tr>
<tr>
<td>Speech Room</td>
<td>F5</td>
<td>W8</td>
<td>C3</td>
<td>B4</td>
</tr>
<tr>
<td>Student Toilet Rooms</td>
<td>F6</td>
<td>W7</td>
<td>C2</td>
<td>B5</td>
</tr>
<tr>
<td>Adult Toilet Rooms</td>
<td>F6</td>
<td>W7</td>
<td>C2</td>
<td>B5</td>
</tr>
</tbody>
</table>

Worcester Public Schools
Worcester, MA
INTERRIORS/EXTERIOR – DOORS, FRAMES AND HARDWARE:

Doors are a mix of solid core wood with stained or painted finish and painted hollow metal doors and frames at the exterior. The main entrance systems are aluminum doors and frames, similar to the aluminum window system. Interior door hardware varies; most are vintage to the original construction and have knob handles. At the 1926 building, the corridor and stair hall doors are wood framed with wire glass, push/pull function, and closers at most of the doors, except at the basement where the closers were removed at locations and the doors held open. The 1926 entrance doors are wood doors, in the Tudor arched wood frames.

The doors are all in fair/poor condition, the hardware is non-compliant with current codes or standards, and in need of complete replacement.

Observations/Deficiencies:
- Single pane glass.
- No effective weather-stripping was observed; assume none of the doors are insulated.
- Finish material is chalking.
- Exterior doors are beginning to show signs of rust at most frames, doors, glazing beads, frame base, door bottoms.
- The aluminum sills are failing at locations, with spalling concrete under the sills.
- Broken glass noted in a few areas.
- Caulking deterioration at glazing.

INTERRIORS/MILLWORK AND MISCELLANEOUS ITEMS:

Specialties (millwork, toilet partitions, lockers, chalk/marker/tack boards, etc.):
The 1926 building has the original real chalkboards, closets, trim, moldings etc, and are in fair condition, adapted over the years for use.
The 1953 building had a well-designed wood paneling system at the cafeteria and library, and is in fair-good condition. The counters with sinks at the classrooms and other areas are in poor-fair condition. These counters served well, but are well beyond their usable lifespan, as well as not being accessible to current access code standards.
3.1.4 EVALUATION OF EXISTING CONDITIONS
F. Architectural Evaluation

SUMMARY OF FINDINGS:
Major remedial work at the 1926 building is required; the shoring is addressing an emergency situation, and is temporary in nature. It is recommended that the entire 1926 building be replaced, however the minimum repair would be to brace the entire structure and remove the entire front and rear facade from the basement window sills (top of foundation) to the underside of the newer masonry parapet, re-tie all the remaining masonry face brick to the clay tile backup. The entrance system was previously completely replaced, and this altered the look of the building, similarly, the replaced facade will potentially alter the building’s historic aesthetics. The 1926 building systems are antiquated, and will need to be replaced in their entirety. The windows, while newer, are in poor condition and will need to be replaced in their entirety. The roof is also nearing its usable lifespan, and with the potential new systems required, a complete new roof would be recommended. The roof also was designed for a lighter snow load than the present code. As all new equipment would require complete new framing to support the equipment and snow loads, it is assumed that considerable structural work would be required. All the finishes are vintage to the 1926 construction and are in need of complete re-furbishing, and with the installation of new utilities throughout, considerable re-building would be required to accommodate the new systems.
The 1926 doors and hardware need to be replaced in their entirety. Overall, in LPA’s opinion, this building would not be a suitable candidate for rehabilitation.

The 1953, and 1967 buildings are in good structural and envelope condition, though they are wholly un-insulated, except at the roof. All of the systems are outdated, and complete replacement is required, which will require complete removal of these ceilings (which are a low grade 2x4 ACT, in part asbestos containing tile) The windows, roofing, doors, and floor finishes (with the exception of the terrazzo) would also require replacing. Exterior brick pointing and sealants would be required throughout.

Refer to sections 3.1.6 in this report

SITE, STRUCTURAL, FIRE PROTECTION, MECHANICAL ELECTRICAL, and HAZAROUS MATERIALS SURVEY:
Refer to consulting engineer existing conditions reports on the following pages.
Shadley Associates, P.C.
Landscape Architects and Site Planning Consultants
1730 Massachusetts Avenue
Lexington, Massachusetts 02420-5301

Nelson Place Elementary School Site
3.1.4.2 Evaluation of Existing Site Conditions: Landscape Architecture

Shadley Associates has assessed the existing site for four criteria that pertain to landscape architecture: Pedestrian Access and Circulation; Site Furnishings and Amenities; Outdoor Play Spaces; and Site Topography and Vegetation. We have reviewed the existing site for these four topics and are providing preliminary comments on then and their compliance with relevant Federal and State codes. Shadley Associates’ research includes the review of existing aerial and GIS data as well as a comprehensive site visit conducted by SA on January 15, 2014.

A summary of our observations and findings is provided below.

PEDESTRIAN ACCESS AND CIRCULATION

Access from the Public Right Of Way

The site has pedestrian access from the public sidewalk that runs the length of the site along the Nelson Place street edge. A low masonry wall also runs the length of the site at the back of the public sidewalk and there are three pedestrian access points along the wall as well as the vehicular access to the parking lot. Of these access points, the eastern-most access point from the public sidewalk is not universally accessible as it leads to a set of stairs that do not have handrails. The central access point from the public sidewalk appears to also be an unrestricted vehicular access drive and does not have detectable warning tiles with truncated domes to indicate vehicular hazard within the pedestrian circulation. The most western access point, which appears to be accessible, leads to the main door of the facility.

The parking lot does not have the required access aisles, signage and markings for accessible parking spaces. The existing curb ramp lacks the detectable warning tile and level landing required by code and exceeds the maximum allowed slope of 1:10 for the side wings and ½” maximum grade change at the lower edge of the ramp.

Non-compliant ramp at parking lot

Central entrance leading to accessible door. Appears to be a vehicular access point as well
Access to the Building

The walkway to the main entrance of the facility is not universally accessible due to a change of elevation where stairs are provided but a ramp is not provided. A secondary doorway appears to be designated as the accessible door to the facility although there is no site signage to indicate the accessible route. The secondary doorway has a ramp with handrails that appears to be compliant and leads to the doorway landing. Walkways lead to all other doors from the facility but no other door appears to be universally accessible due to a change of elevation at the thresholds that exceeds the maximum change in elevation allowed of ¼” or ½” with a bevel.

Pedestrian Pavements

Throughout the site the cement concrete and bituminous concrete walks and paved play areas show significant heaving and cracking, causing changes in elevation that exceed the maximum change in elevation allowed of ¼” or ½” with a bevel. Much of the paved pedestrian walks and surfaces also exceed maximum slope tolerances required by code either for running slope, cross slope or both. The maximum allowed slopes are 5% for running slopes and 2% for cross slopes, landings or plazas. Some handrail extensions do not comply with current code.

SITE FURNISHINGS AND AMENITIES

Minimal site furnishings are present on the site and include one bike rack near the roadway, one bench and two picnic tables at the paved space to the rear of the building and two players’ benches at the play field. All site furnishings are in worn condition. There does not appear to be
an accessible route to the site furnishings and the picnic tables do not appear to meet accessibility guidelines. No stand-alone pedestrian or site lighting was observed at the site. In general, the fencing on the site is in good condition with some minor components broken, bent, or missing.

OUTDOOR PLAY SPACES

Athletic Field

The athletic/ play field is located on the high point of the site, sloping from the center of the field outward towards the building to the north and all the property lines on all other sides. The field is approximately 30’ higher than the rest of the facility and is connected to the rest of the site by two earthen foot paths which are not universally accessible. The field appears to be primarily designed for baseball or softball use. The infield mix has significant weed growth and does not appear to be a uniform clay mix across the infield which may be contributing to poor drainage in the infield. No standing water was observed on the grass portion of the field which appears to be reasonably well drained. The backstop is showing signs of wear, particularly the fabric which is rusted.

Playground

The playground includes a play structure, stand-alone climbing structure, and fitness equipment that appear to be appropriate for the 5-12 age group. The equipment is in good condition, does not appear to be missing any components, and has a transfer station for accessibility. The engineered wood fiber safety surface is below the required level marked on the playground.
equipment which is required for the fall zones. The playground surface grade, as it currently exists, also exceeds the maximum allowed cross slope of 2% for accessibility around equipment components.

Paved Play Areas

The site has two paved play areas. The lower paved area along the rear of the building includes basketball hoops and game courts painted on the pavement. The lower paved play area is connected to the school by several doors although none appear to be accessible. The upper paved play area sits approximately 5’ higher than the lower paved play area and is connected by a stairway and accessible ramp. The upper paved play includes a U.S. map painted on the pavement and is adjacent to the playground. Both paved play areas have grades that exceed the accessibility requirements of 2% and have extensive pavement cracking.

SITE TOPOGRAPHY AND VEGETATION

The site has a high point roughly in the middle of the site with moderate slopes to the south, east and west. The site falls quickly from the high point to the north with slopes exceeding approximately 2:1 in locations and retaining walls being used in places where slopes are in excess
of 2:1. The northern third of the site contains the building, parking and paved play areas and slopes generally from the southwest to the northeast.

On the lower third of the site where the majority of the development has occurred, existing vegetation is minimal and consists of mown lawn, shrubs and shade trees. The upper portion of the site surrounding the athletic field and the paths to the field is wooded. The paths and field are cleared and mown. Invasive species were not readily identified during the site walk but may be present on the site. The wooded portion of the site does contain thorny species that may be considered hazardous for children’s play areas and may contain other undesirable nuisance species.
Nitsch Engineering has performed research of the existing site conditions and anticipated site permitting requirements for the Nelson Place Elementary School located on Nelson Place in Worcester, Massachusetts. Nitsch Engineering’s research included program information provided by the City of Worcester, as well as information gathered during two site visits conducted by Mr. Steven Ventresca, PE on January 13, 2014. Information included in this report is also based on compiled documents gathered by Nitsch Engineering.

This report lists the existing conditions at the Nelson Place School as a potential location for a new Nelson Place School.

A summary of our observations and findings is summarized below.

**EXISTING SITE UTILITIES**

The Nelson Place figure of this report contains a Geographic Information Systems (GIS) color diagram illustrating the site of the Nelson Place Elementary School. The school is located on Nelson Place and is bound by Hapgood Road to the east and Assumption College to the south and west. Information on the water, sewer and drain lines was provided by the Worcester Department of Public Works and Parks. Based on record documents, and site observations, the summary descriptions below represent the site utility conditions/assumptions as we understand them at this time.

**STORM DRAINAGE**

Based on information gathered on the site visits, the Nelson Place building rooftop appears to collect and convey stormwater internally through the plumbing system – no external downspouts were observed, as shown in the photos below. The roof drainage collection system appears to be conveyed below-grade to connect to either the existing City drain system in Nelson Place or discharges overland into Nelson Place road.

Photos above: Stormwater runoff from the rooftop of the main building is conveyed internally through the building plumbing system.
The site of the Elementary School is generally graded in a northerly direction towards Nelson Place. Only a handful of catch basins were observed in paved or landscape areas immediately surrounding the School. No catch basins were observed at the school driveway or parking lot. An area drain was observed in the sidewalk at the current school entrance and area drains were observed in the landscapes areas in front of the school. The site is mostly paved with a large landscaped area at the front. The majority of stormwater landing on site appears to travel as overland flow into catch basins or mostly into Nelson Place roadway. In general, the landscaped areas appear to be in good condition.

The catch basins observed within the School rear parking lot, driveway and in the landscape around the school had some standing water in the sumps. It is presumed that the sumps are full of sediment and debris. The pavement at the parking lot entrance is broken and un-even and has large pot holes that hold water.
Four catch basins were observed along Nelson Place adjacent to the Elementary School. These catch basins appear to connect to the 24” storm drain main (material unknown) in Nelson Place. The 24” storm drain main in Nelson Place appears to drain in an easterly direction beneath Nelson Place towards Indian Lake.

**WATER**

The water distribution map provided by the City of Worcester DPW indicates a 12-inch water main (material unknown) in Nelson Place. The Elementary School water service (size unknown) also feeds the Elementary School from the 12-inch main in Nelson Place and enters at the front of the building.

No standpipes were observed around the building. A fire hydrant is located across from the school entrance on Nelson Place. There is a fire hydrant off site on Nelson Place at the intersection of Hapgood Rd and appears to be greater than 300-feet from the School. There is another fire hydrant west of the school at the intersection of Nelson Place and Red Wing Lane. The fire hydrant appears to be greater than 300 feet from the School.

Flow test information is not currently available for the water main in Nelson Place.

**SEWER**

An 8” sanitary sewer main (material unknown) is located beneath Nelson Place. The Elementary School sanitary service(s) is assumed to connect to this main. The 8” sanitary sewer main in Nelson Place travels in an easterly direction along Nelson Place toward Holden Street.
UNDERGROUND/ABOVE GROUND TANKS

It does not appear that there are underground tanks within the site based only on site observations. Additional record research is required to determine whether there are underground tanks on site. However, there is an above ground tank on a concrete pad behind the school adjacent to the asphalt play area.

ELECTRICAL/TELECOM

There are overhead wires in Nelson Place on the north side of the street. The school electric service connects to the school by overhead wires. No transformers were observed on the school site.
SITE CONDITIONS AND OPERATIONS

SOILS

Based on the Natural Resources Conservation Service (NRCS) Worcester County Soil Survey (1969), the site of the Elementary School is Paxton fine sandy loam Woodbridge fine sandy loam and Chatfield Hollis Rock. The Paxton fine sandy loam is found around the building site with the Woodbridge fine sandy loam is found off site in the Assumption College area. The Chatfield Hollis Rock soil is found south of the Nelson School near the athletic field and the adjacent parcel south of the athletic field. These areas are associated with a poorly drained soil with a hydrologic soil group of C). There may be a high groundwater level and the Chatfield Hollis Rock may be indicative of rocky soil or shallow bedrock. Additional geotechnical investigation is needed to determine general bedrock areas.

PAVEMENT

The asphalt pavement in the parking lot, service drives, and walkways adjacent to the school were observed to have a high severity of cracking and degradation. The pavement along the east drive is in fair condition and the parking lot is highly degraded, primarily resulting from stormwater wash off and overall wear-and-tear. Asphalt curbing and concrete curbing was observed along the parking lot entrance and the access drive to the back of the school. The bituminous and concrete curbing appears to be in relatively poor condition. Cracking was observed in the cement concrete walkways/plazas immediately surrounding the school, and appeared to be in poor condition overall.
Photos above: Cracking and degradation in asphalt pavement areas surrounding the Elementary School

SNOW REMOVAL

The School Maintenance personnel indicated that snow is not removed from the property; rather, it is moved to the edge of parking lots and walkways into grassy areas. There is currently no salt or sand storage shed located on-site; sand and salt are obtained from the City for use by the School's sanding/salting/plowing equipment.

DUMPSTER

No trash dumpster was observed on the school site.

PRELIMINARY PERMITTING CONSIDERATIONS

WETLANDS PROTECTION ACT (310 CMR 10.00)

The Wetlands Protection Act ensures the protection of Massachusetts' inland and coastal wetlands, tidelands, great ponds, rivers and floodplains. It regulates activities in coastal and wetlands areas, and contributes to the protection of ground and surface water quality, the prevention of flooding, and storm damage and the protection of wildlife and aquatic habitat.
A review of the Massachusetts Department of Environmental Protection (DEP) wetland layers available on the Massachusetts Geographic Information System (MassGIS), dated April 2007, appear to indicate that the Middle School site has a wooded swamp / wetland located on-site in the south western corner of the property south of the school and the athletic fields. There is another wetland area just off the site on private property south east of the site. The buffer zone from this wetland could impact any proposed facility in this area.

**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 sources.

A review of the Massachusetts DEP resource layers available on the MassGIS, appear to indicate the Elementary School is NOT located within a Surface Water Supply Protection Zone.

**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 Forest Grove School site is NOT a Priority Habitat of Rare Species or an Estimated Habitat of Rare Wildlife. No such areas appear within close proximity to the site.

**FLOOD PLAIN**

Based on the Flood Insurance Rate Map (FIRM), Community Panel Number 25027C0612E, dated July 4, 2011 the site is NOT located within a flood zone.

**ZONING**

The Middle School site is located in the RS-10 (Residential) Zoning District and a portion of the site is in the Industrial Zone, IN-S. According to the schedule of permitted uses, schools are considered a permitted principal use in both zones. The zoning requirements for the site are based on information in the City of Worcester Zoning Map dated July 17, 2012, and the City of Worcester Zoning Ordinance, amended through January 7, 2014 include the following:

**Zone RS-10**

- Minimum Lot Area- 10,000 square foot;
- Frontage, min - 80 linear feet;
- Front Setback - 25 feet;
- Side Setback – 20 feet;
- Rear Setback – 50 feet;
- Max Stories 2+ with max height of 35 feet;
- Floor to Area Ration 0.3 to 1
Zone IN-S

- Minimum Lot Area - none;
- Frontage, min - none;
- Front Setback - 15 feet;
- Side/Rear Setback – 10 feet;
- Max Stories - none;
- Floor to Area Ration - none

Nitsch Engineering notes that for any parcel in two zones, the more restrictive zoning would be implemented.

USEPA NPDES

Construction activities that disturb more than one acre are regulated under the United States Environmental Protection Agency’s (EPA) National Pollution Discharge Elimination System (NPDES) Program. In Massachusetts, the USEPA issues NPDES permits to operators of regulated construction sites. Regulated projects are required to develop and implement stormwater pollution prevention plans in order to obtain permit coverage.

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 of > 50,000 gpd must obtain a MassDEP permit before construction

Nitsch Engineering will review the projected sanitary flows for the Elementary School to verify whether the project will exceed the 15,000 gallon per day threshold.
Nelson Place
Existing Conditions
EXISTING SITE CONDITIONS
Nelson Place School and Assumption Property

Land reviewed during a field visit on January 11, 2014 included the 9.9 acre Nelson Place School property, an abutting 8.1 acre parcel owned by Assumption College to the south, and a 1.4 acre parcel to the west (the Site). A north-south oriented ridge lies at the center of the Nelson Place and Assumption parcels. Surface water runoff drains east and west off the ridge then north along the property lines. A potential egress to the school property from Redwing Lane is an elevated dirt road that extends south onto the 1.4 acre parcel. The road lies between a large offsite forested wetland and an isolated wetland along the western edge of the school property. The dirt road clearly separates the two wetlands by approximately 90 feet (Figure 1).

The Nelson Place school building and a playground are situated on the lowest portion of the property at ~elevation 630 feet. Behind the school the land rises. A baseball field is located in the center of the Nelson Place at the highest point in the parcel ~ elevation 662 feet. There is a shallow valley behind and to the south of the ballfield that drains to the east. Continuing south onto the Assumption property the land continues to rise and is 696 feet at the southern extent.

Uplands on the Site include lawn, landscaped areas and woodland. Dominant tree species include northern red oak (*Quercus rubra*), white oak (*Quercus alba*) and shagbark hickory (*Carya ovata*). The areas that have been cutover, such as near the ballfield on the Nelson Place parcel have stands of staghorn sumac (*Rhus typhina*), bittersweet vine (*Celastrus orbiculatus*) and grey birch (*Betula populifolia*). The mature forest has an undergrowth of black huckleberry (*Gaylussacia baccata*) and lowbush blueberry (*Vaccinium angustifolium*).
The northern portion of the Assumption property shows signs of logging and contains sapling trees and colonies of sumac. The southern portion of the Assumption property is mature oak forest, and along the western property line of the Assumption parcel is a dense understory of the invasive species, winged euonymus (*Euonymus alatus*).

There are two forested wetlands on the Nelson Place property. They did not appear to border a regulated stream or connect to a down-gradient wetland resource. A third, much larger forested wetland offsite to the west drains north under Nelson Place by way of an intermittent stream. The wooded wetlands are predominantly red maple (*Acer rubrum*) with some yellow birch (*Betula alleghaniensis*) and black tupelo (*Nyssa sylvatica*). Shrubs included highbush blueberry (*Vaccinium corymbosum*), common winterberry (*Ilex verticillata*), silky dogwood (*Cornus amomum*) and southern arrow-wood (*Viburnum dentatum*). Herbs found in the wetlands included cinnamon fern (*Osmundastrum cinnamomeum*), sensitive fern (*Onoclea sensibilis*), bluejoint grass (*Calamagrostis canadensis*), and poison ivy (*Toxicodendron radicans*). Table 1 is a list of the plants observed during the January site visit.

**SOILS**

The Natural Resources Conservation Service (NRCS) Worcester Northeastern Part Soil Survey report and Site soil series map is attached. The dominant soil series on the northern and eastern sides of the Site is Paxton fine sandy loam with slopes ranging from 3% to 15%. The Paxton series formed in friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till derived from granite and gneiss. The soil surface is approximately 1.6 % cobbles, stone or boulders. This well drained series consists of fine sandy loam soils over gravelly fine sandy loam, and is classified as hydrologic group C. The groundwater is typically located between 10 and 30 inches below the surface.

The second largest soil formation on the property in the central and western portions of the Site is Chatfield Hollis – Rock Outcrop Complex. This includes the area of Redwing Lane. This soil complex is most notable for very shallow soil depths, i.e. 10 to 20 inches over massive bedrock. Slopes range from 8% to 15% and have a surface cover of approximately 9% by bedrock outcrop, cobbles, stone or boulders. This well drained soil consists of muck over fine sandy loam soils on top of bedrock. It is classified with a hydrologic group of B, C, or D depending on the location along the slope. Groundwater is more than 80 inches below the surface, however, there is a restrictive layer at 10 to 20 inches.

Soils in the western and eastern isolated forested wetlands on the Site are mapped as Chatfield Hollis-Rock Outcrop Complex with 3 to 15% slopes. The soil within the larger offsite wetland/intermittent stream complex to the west is mapped as Freetown Muck. Slopes are 0-1% and the water table typically range from 0 to 12 inches below the surface.
A January 2014 site inspection verified the presence of two small forested wetlands on the Site (Figure 1). Wetland limits were estimated from the MassGIS database, aerial photography, and onsite review. The two red maple swamps appeared to function as isolated wetlands. Any ponded surface water would overflow and dissipate into the ground rather than forming a defined channel. Each isolated wetland is estimated to be approximately ¼ acre. A third larger forested wetland bordering on an intermittent stream lies offsite to the west.

The Wetlands Protection Act Regulations (WPA) 310 CMR 10.00 ensures the protection of Massachusetts' inland wetlands, great ponds, rivers and floodplains; 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.

To determine if either of the onsite isolated wetlands would be regulated by the WPA as Isolated Land Subject to Flooding (ILSF) calculations need to be performed to determine if they can hold ¼ acre-feet of water to an average depth of 6 inches annually. Isolated Land Subject to Flooding is defined by the regulations as an isolated depression or a closed basin, which serves as a ponding area for runoff or high ground water which has risen above the ground surface. Such areas are likely to be locally significant to flood control and storm damage prevention. In addition, where such areas are underlain by pervious material they are likely to be significant to public or private water supply and to ground water supply. Below are the regulations for determining if these isolated wetlands are regulated by the WPA regulations as ILSF and if so the method for determining the regulatory boundary of the ILSF.

“10.57: (2) Definitions, Critical Characteristics and Boundaries
(b) Isolated Land Subject to Flooding:
1. Isolated Land Subject to Flooding is an isolated depression or closed basin without an inlet or an outlet. It is an area which at least once a year confines standing water to a volume of at least ¼ acre-feet and to an average depth of at least six inches. Isolated Land Subject to Flooding may be underlain by pervious material, which in turn may be covered by a mat of organic peat or muck.
2. The characteristics specified in the foregoing 310 CMR 10.57(2)(b)1. are critical to the protection of the interests specified in 310 CMR 10.57(1)(b).
3. The boundary of Isolated Land Subject to Flooding is the perimeter of the largest observed or recorded volume of water confined in said area. In the event of a conflict of opinion regarding the extent of water confined in an Isolated Land Subject to Flooding, the applicant may submit an opinion certified by a registered professional engineer, supported by engineering
calculations, as to the probable extent of said water. Said calculations shall be prepared in accordance with the general requirements set forth in 310 CMR 10.57(2)(a)3.a. through c., except that the maximum extent of said water shall be based upon the total volume (rather than peak rate) of run-off from the drainage area contributing to the Isolated Land Subject to Flooding and shall be further based upon the assumption that there is no infiltration of said run-off into the soil within the Isolated Land Subject to Flooding.

4. The only portions of this resource area which shall be presumed to be vernal pool habitat are those determined under procedures established in 310 CMR 10.57(2)(a)5.

5. The boundary of vernal pool habitat is that determined under procedures established in 310 CMR 10.57(2)(a)6.”

Only the eastern isolated wetland was ponded during the site inspection. It is unlikely that the western isolated wetland has the topography to contain the required ¼ acre-feet to be regulated by the WPA.

The City of Worcester's Wetland Protection Ordinance and Wetland Protection Regulations as amended July 1, 2007, define ILSF as an isolated depression or closed basin without an inlet or an outlet which at least once a year confines standing water to a volume of at least 1/8 acre-feet. Therefore, even if not regulated as ILSF by the WPA, the isolated wetlands, and in particular the eastern wetland, may be regulated by the City of Worcester. The US Army Corps of Engineer’s under Section 404 of the Clean Water Act may also take jurisdiction over the isolated wetlands as Isolated Waters of the United States due to their proximity to the larger offsite wetland and stream system to the west.

The eastern isolated wetland had ponded water and potentially could function as a vernal pool. This wetland should be reviewed during the spring amphibian breeding season, typically March to early June). If vernal pool habitat is confirmed a number of regulations apply (310 CMR 10.00 if the area is also a WPA regulated ILSF, 314 CMR 9.00 the MA Water Quality Certification regulations, 314 CMR 4.00 the MA Surface Water Quality Standards, and US Army Corps MA Programmatic General Permit). All the state regulations require no discharge to the vernal pool and potentially some surrounding habitat but only to the limit of the resource area (i.e. ILSF). The ACOE only takes jurisdiction over work in the upland surrounding a vernal pool if the project impacts vegetated wetlands or waters on the Site.

The red maple swamp west of the Site drains north under Nelson Place Road by way of an intermittent stream. The intermittent stream is regulated as Bank. Banks are likely to be significant to public or private water supply, to ground water supply, to flood control, to storm damage prevention, to the prevention of pollution and to the protection of fisheries and wildlife habitat. The forested wetland bordering the intermittent stream is regulated as Bordering Vegetated Wetland (B VW). Bordering Vegetated Wetlands are likely to be significant to public or private water supply, to ground water supply, to flood control, to storm damage prevention, to
prevention of pollution, to the protection of fisheries and to wildlife habitat. The US Army Corps of Engineer’s MA PGP also takes jurisdiction over BVW wetlands as *Waters of the United States*.

A 100-foot Buffer Zone under the WPA regulations (310 CMR 10.00) extends up-gradient from Bank and *Bordering Vegetated Wetlands* but not *ILSF*. The City of Worcester's Wetland Protection Ordinance and Wetland Protection Regulations as amended July 1, 2007, however, takes jurisdiction: “*within one hundred (100) feet of any freshwater wetland*, bordering vegetated wetland, marsh, wet meadow, bog or swamp; *within one hundred (100) feet of any bank*; any lake, river, pond, or stream; *any land under said waters*; any land subject to flooding; or *within one hundred (100) feet of any existing or proposed inlet to any storm drain, catch basin, or other storm drain system component discharging to any lake, pond, river, stream, or wetland."

There is also a 15-foot no disturbance zone and a 30-foot no build zone surrounding any resource area regulated by the City of Worcester. Assuming the western isolated wetland is regulated by the City, any access from Redwing Lane would have to pass between the offsite BVW no build zone and the western onsite isolated wetland no build zone, a narrow area of ~27 feet. If the isolated wetland is not regulated by the City, the Corps takes jurisdiction, but only to the boundary of the wetland vegetation.

**NATURAL HERITAGE & ENDANGERED SPECIES PROGRAM**

A review of the MassGIS NHESP database which references 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 School site is *not* a Priority Habitat of Rare Species or an Estimated Habitat of Rare Wildlife. No such areas appear within close proximity to the site.

**FLOOD PLAIN**

Based on the Flood Insurance Rate Map (FIRM), Community Panel Number 25027C0612E, dated July 4, 2011 the site is *not* located within the 100-year 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 sources.
A review of the Massachusetts DEP resource layers available on the MassGIS, appear to indicate the School is not located within a Surface Water Supply Protection Zone.

**GROUND WATER SUPPLY PROTECTION (310 CMR 22.20)**

The Massachusetts Department of Environmental Protection (DEP) ensures the protection of groundwater used as sources of drinking water supply from contamination by regulating land use and activities within approved Wellhead Protection Areas, Zone II and Interim Wellhead Protection Areas.

A review of the Massachusetts DEP resource layers available on the MassGIS, appear to indicate the School is not located within a Groundwater Supply Protection Zone.
Photographs were taken January 11, 2014

Eastern isolated wetland red maple swamp showing pockets of ponded water.

Overflow drainage may seep along the side of a stone wall at the northern end of the eastern isolated wetland. The drainage was dry during the site inspection and disappears at the top of this frame.
Western isolated red maple swamp.

Larger Bordering Vegetated Wetland offsite to the west.
Dirt drive extending south from Redwing Lane.
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<td><em>Vaccinium angustifolium</em></td>
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Wetland limits were located using MassGIS databases, aerial photography and onsite review.
Custom Soil Resource Report for
Worcester County, Massachusetts, Northeastern Part

NelsonPlace-Assumption Property

January 7, 2014
Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://soils.usda.gov/sqi/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

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<td>306D—Paxton fine sandy loam, 15 to 25 percent slopes, very stony</td>
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</tr>
<tr>
<td>310B—Woodbridge fine sandy loam, 3 to 8 percent slopes</td>
<td>19</td>
</tr>
<tr>
<td>312B—Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony</td>
<td>20</td>
</tr>
<tr>
<td>420B—Canton fine sandy loam, 3 to 8 percent slopes</td>
<td>21</td>
</tr>
<tr>
<td>References</td>
<td>23</td>
</tr>
</tbody>
</table>
How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the
individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.
Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.
The soil surveys that comprise your AOI were mapped at 1:20,000.

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

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

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

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

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

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

Soil Survey Area: Worcester County, Massachusetts, Northeastern Part

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

Date(s) aerial images were photographed: Mar 30, 2011—May 1, 2011

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

<table>
<thead>
<tr>
<th>Map Unit Symbol</th>
<th>Map Unit Name</th>
<th>Acres in AOI</th>
<th>Percent of AOI</th>
</tr>
</thead>
<tbody>
<tr>
<td>52A</td>
<td>Freetown muck, 0 to 1 percent slopes</td>
<td>0.4</td>
<td>1.2%</td>
</tr>
<tr>
<td>102C</td>
<td>Chatfield-Hollis-Rock outcrop complex, 3 to 15 percent slopes</td>
<td>11.7</td>
<td>36.8%</td>
</tr>
<tr>
<td>305B</td>
<td>Paxton fine sandy loam, 3 to 8 percent slopes</td>
<td>5.3</td>
<td>16.6%</td>
</tr>
<tr>
<td>306B</td>
<td>Paxton fine sandy loam, 3 to 8 percent slopes, very stony</td>
<td>8.0</td>
<td>25.1%</td>
</tr>
<tr>
<td>306C</td>
<td>Paxton fine sandy loam, 8 to 15 percent slopes, very stony</td>
<td>3.5</td>
<td>11.1%</td>
</tr>
<tr>
<td>306D</td>
<td>Paxton fine sandy loam, 15 to 25 percent slopes, very stony</td>
<td>2.7</td>
<td>8.6%</td>
</tr>
<tr>
<td>310B</td>
<td>Woodbridge fine sandy loam, 3 to 8 percent slopes</td>
<td>0.1</td>
<td>0.3%</td>
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<tr>
<td>312B</td>
<td>Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony</td>
<td>0.0</td>
<td>0.0%</td>
</tr>
<tr>
<td>420B</td>
<td>Canton fine sandy loam, 3 to 8 percent slopes</td>
<td>0.1</td>
<td>0.4%</td>
</tr>
</tbody>
</table>

**Totals for Area of Interest**

| 31.9 | 100.0% |

## Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties
and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a soil series. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into soil phases. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A complex consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An association is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An undifferentiated group is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include miscellaneous areas. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.
Worcester County, Massachusetts, Northeastern Part

52A—Freetown muck, 0 to 1 percent slopes

Map Unit Setting
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days

Map Unit Composition
Freetown and similar soils: 75 percent
Minor components: 25 percent

Description of Freetown
Setting
Landform: Bogs, bogs
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Highly-decomposed herbaceous organic material

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very high (about 22.6 inches)

Interpretive groups
Farmland classification: Farmland of unique importance
Land capability (nonirrigated): 5w
Hydrologic Soil Group: D

Typical profile
0 to 4 inches: Muck
4 to 60 inches: Muck

Minor Components
Swansea
Percent of map unit: 10 percent
Landform: Bogs

Walpole
Percent of map unit: 5 percent
Landform: Terraces

Saco
Percent of map unit: 5 percent
Landform: Alluvial flats
Scarboro

Percent of map unit: 5 percent
Landform: Terraces

102C—Chatfield-Hollis-Rock outcrop complex, 3 to 15 percent slopes

Map Unit Setting
-Elevation: 100 to 1,000 feet
-Mean annual precipitation: 32 to 50 inches
-Mean annual air temperature: 45 to 50 degrees F
-Frost-free period: 145 to 240 days

Map Unit Composition
-Chatfield and similar soils: 45 percent
-Hollis and similar soils: 25 percent
-Rock outcrop: 15 percent
-Minor components: 15 percent

Description of Chatfield

Setting
-Landform: Hills
-Landform position (two-dimensional): Shoulder, summit
-Landform position (three-dimensional): Side slope, crest
-Down-slope shape: Linear
-Across-slope shape: Convex
-Parent material: Friable, moderately-deep coarse-loamy basal till derived from granite and gneiss over granite and gneiss

Properties and qualities
-Slope: 8 to 15 percent
-Surface area covered with cobbles, stones or boulders: 9.0 percent
-Depth to restrictive feature: 20 to 40 inches to lithic bedrock
-Drainage class: Well drained
-Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
-Depth to water table: More than 80 inches
-Frequency of flooding: None
-Frequency of ponding: None
-Available water capacity: Low (about 3.7 inches)

Interpretive groups
-Farmland classification: Not prime farmland
-Land capability (nonirrigated): 7s
-Hydrologic Soil Group: B

Typical profile
-0 to 2 inches: Muck
-2 to 5 inches: Fine sandy loam
-5 to 32 inches: Fine sandy loam
32 to 34 inches: Unweathered bedrock

Description of Hollis

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder, summit
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Friable, shallow loamy basal till derived from metamorphic rock over metamorphic rock

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 1.7 inches)

Interpretive groups

Farmland classification: Not prime farmland
Land capability (nonirrigated): 7s
Hydrologic Soil Group: C/D

Typical profile

0 to 2 inches: Muck
2 to 6 inches: Fine sandy loam
6 to 14 inches: Fine sandy loam
14 to 19 inches: Gravelly fine sandy loam
19 to 21 inches: Unweathered bedrock

Description of Rock Outcrop

Setting

Parent material: Metamorphic rock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 0 inches to lithic bedrock

Interpretive groups

Farmland classification: Not prime farmland
Land capability (nonirrigated): 8s
Hydrologic Soil Group: D

Minor Components

Paxton

Percent of map unit: 5 percent

Woodbridge

Percent of map unit: 5 percent
Canton

Percent of map unit: 5 percent

305B—Paxton fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days

Map Unit Composition

Paxton and similar soils: 85 percent
Minor components: 15 percent

Description of Paxton

Setting

Landform: Drumlins
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till derived from granite and gneiss

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.6 inches)

Interpretive groups

Farmland classification: All areas are prime farmland
Land capability (nonirrigated): 2e
Hydrologic Soil Group: C

Typical profile

0 to 5 inches: Fine sandy loam
5 to 27 inches: Fine sandy loam
27 to 60 inches: Gravelly fine sandy loam
Minor Components

**Woodbridge**
Percent of map unit: 10 percent

**Canton**
Percent of map unit: 5 percent

306B—Paxton fine sandy loam, 3 to 8 percent slopes, very stony

**Map Unit Setting**
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days

**Map Unit Composition**
Paxton and similar soils: 85 percent
Minor components: 15 percent

**Description of Paxton**

**Setting**
Landform: Drumlins
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Nose slope, side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till derived from granite and gneiss

**Properties and qualities**
Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.5 inches)

**Interpretive groups**
Farmland classification: Farmland of statewide importance
Land capability (nonirrigated): 6s
Hydrologic Soil Group: C

**Typical profile**
0 to 5 inches: Fine sandy loam
5 to 27 inches: Fine sandy loam
27 to 60 inches: Gravelly fine sandy loam
Minor Components

Woodbridge
Percent of map unit: 10 percent

Canton
Percent of map unit: 5 percent

306C—Paxton fine sandy loam, 8 to 15 percent slopes, very stony

Map Unit Setting
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days

Map Unit Composition
Paxton and similar soils: 85 percent
Minor components: 15 percent

Description of Paxton

Setting
Landform: Drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till derived from granite and gneiss

Properties and qualities
Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.5 inches)

Interpretive groups
Farmland classification: Farmland of statewide importance
Land capability (nonirrigated): 6s
Hydrologic Soil Group: C

Typical profile
0 to 5 inches: Fine sandy loam
5 to 27 inches: Fine sandy loam
27 to 60 inches: Gravelly fine sandy loam
Minor Components

Woodbridge
Percent of map unit: 10 percent

Canton
Percent of map unit: 5 percent

306D—Paxton fine sandy loam, 15 to 25 percent slopes, very stony

Map Unit Setting
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days

Map Unit Composition
Paxton and similar soils: 85 percent
Minor components: 15 percent

Description of Paxton

Setting
Landform: Drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till derived from granite and gneiss

Properties and qualities
Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.5 inches)

Interpretive groups
Farmland classification: Not prime farmland
Land capability (nonirrigated): 6s
Hydrologic Soil Group: C

Typical profile
0 to 5 inches: Fine sandy loam
5 to 27 inches: Fine sandy loam
27 to 60 inches: Gravelly fine sandy loam
Minor Components

- Canton
  - Percent of map unit: 10 percent

- Woodbridge
  - Percent of map unit: 5 percent

310B—Woodbridge fine sandy loam, 3 to 8 percent slopes

Map Unit Setting
- Mean annual precipitation: 32 to 50 inches
- Mean annual air temperature: 45 to 50 degrees F
- Frost-free period: 145 to 240 days

Map Unit Composition
- Woodbridge and similar soils: 85 percent
- Minor components: 15 percent

Description of Woodbridge

Setting
- Landform: Drumlins
- Landform position (two-dimensional): Shoulder
- Landform position (three-dimensional): Side slope
- Down-slope shape: Linear
- Across-slope shape: Concave
- Parent material: Friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till

Properties and qualities
- Slope: 3 to 8 percent
- Depth to restrictive feature: More than 80 inches
- Drainage class: Moderately well drained
- Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
- Depth to water table: About 18 to 30 inches
- Frequency of flooding: None
- Frequency of ponding: None
- Available water capacity: Low (about 3.0 inches)

Interpretive groups
- Farmland classification: All areas are prime farmland
- Land capability (nonirrigated): 2e
- Hydrologic Soil Group: C

Typical profile
- 0 to 9 inches: Fine sandy loam
- 9 to 22 inches: Sandy loam
- 22 to 60 inches: Sandy loam
Minor Components

Paxton
Percent of map unit: 10 percent

Ridgebury
Percent of map unit: 5 percent
Landform: Depressions

312B—Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony

Map Unit Setting
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days

Map Unit Composition
Woodbridge and similar soils: 85 percent
Minor components: 15 percent

Description of Woodbridge

Setting
Landform: Drumlins
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till

Properties and qualities
Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.9 inches)

Interpretive groups
Farmland classification: Not prime farmland
Land capability (nonirrigated): 7s
Hydrologic Soil Group: C

Typical profile
0 to 9 inches: Fine sandy loam
9 to 22 inches: Sandy loam
22 to 60 inches: Sandy loam

Minor Components

Paxton
Percent of map unit: 10 percent

Ridgebury
Percent of map unit: 5 percent
Landform: Depressions

420B—Canton fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

Elevation: 0 to 1,000 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days

Map Unit Composition

Canton and similar soils: 75 percent
Minor components: 25 percent

Description of Canton

Setting

Landform: Hills, hills
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Friable coarse-loamy eolian deposits over friable sandy basal till derived from granite and gneiss

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 18 to 36 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.5 inches)

Interpretive groups

Farmland classification: All areas are prime farmland
Land capability (nonirrigated): 2e
Hydrologic Soil Group: B
Typical profile

0 to 4 inches: Fine sandy loam
4 to 13 inches: Fine sandy loam
13 to 26 inches: Gravelly fine sandy loam
26 to 60 inches: Gravelly loamy sand

Minor Components

Paxton

Percent of map unit: 15 percent

Woodbridge

Percent of map unit: 10 percent
References


### TRAFFIC ANALYSIS CHART

<table>
<thead>
<tr>
<th>SITE</th>
<th>NELSON PLACE</th>
<th>NELSON PLACE W/ ADDITIONAL LAND</th>
<th>FOREST GROVE &amp; McGrath SCHOOL SITE</th>
<th>SALTER SCHOOL</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCESS</td>
<td>Nelson Place</td>
<td>Nelson Place</td>
<td>Grove Street</td>
<td>Indian Hill Rd</td>
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**SCORE 0 to 10 (0 being not responsive, 1 least advantageous, 10 most advantageous)**

**Nelson Place School**

Location: The school is located on Nelson Place and is bound by Hapgood Road to the east and Assumption College to the south and west.

Parking: The existing school has a 24 space parking lot, which is used by teachers, staff, and visitors. However, due to the additional parking demand, the vehicles are forced to park in tandem.

Circulation: Parent pick-up/drop-off occurs on Nelson Place. The vehicles arrive from Grove Street. Because Nelson Place does not have the sufficient width to accommodate on street parking, the traffic conditions are severely impacted due to parent vehicles parking on both sides of Nelson Place, and also along Nelson Park Drive.

Sidewalks & Crosswalks: A sidewalk is present on the southerly side of Nelson Place adjacent to the existing School. There are two crosswalks painted across Nelson Place on both sides of the intersection with Nelson Park Drive, however, there are no ADA compliant wheelchair ramps.
3.1.4 EVALUATION OF EXISTING CONDITIONS

FEASIBILITY STUDY

F. Traffic Analysis

Nelson Place School with Additional Land

Location: Same as above.

Parking: The proposed new school should include additional parking to meet the demand.

Circulation: The proposed site with additional land would include a parent pick-up/drop-off area, as well as school bus circulation.

Sidewalks & Crosswalks: Sidewalks and crosswalks should be improved for the proposed new school.

Forest Grove-McGrath School Site

Location: The school is located off Grove Street and is bound by Forest Street to the west and Park Ave to the east. The Francis McGrath Elementary School is located south of the Forest Grove School across the athletic fields.

Parking: The existing schools have 4 parking lots between them, which are used by teachers, staff, and visitors.

Circulation: Parent pick-up/drop-off occurs on site and on Grove Street. The vehicles enter the site from two driveways on Grove Street, and exit from a single driveway.

Sidewalks & Crosswalks: Sidewalks are present on the both sides of Grove Street. There are crosswalks with ADA compliant wheelchair ramps on Grove Street.

Salter School

Location: The school is located on a small parcel bound by Ararat Street to north, and Indian Hill Road to east. It cannot accommodate the current elementary school program requested by the City.
1.1 **Introduction:**

The Nelson Place Elementary School is a 55,400 ft² brick veneered building that is being investigated for a possible renovation and addition to support an increasing student population, as well as address the aging condition of the building. The original 21,100 ft² building was constructed in 1926; an 8,900 ft² addition was added in 1953, and two buildings totaling 25,500 ft² were added in 1967. It is our understanding that the goal of a renovation and addition will be to finish with an approximately 90,000 ft² building. Another possibility being considered is to abandon this school, and build a new school on either the same site or a new site. Should an entirely new building be constructed, it will be designed in accordance to the building code requirements for new construction. This report will describe the general conditions of the existing structure, as well as establish structural guidelines, in accordance with the Massachusetts State Building Code, that must be followed during a building renovation and/or addition.

2.1 **General Report Information:**

This report presents the results of our Massachusetts State Building Code (MSBC) Structural review of the Nelson Place Elementary School in Worcester, Massachusetts. Our review has been completed in conformance with Chapter 34 of the Eighth Edition of the Massachusetts State Building Code, which became effective August 6, 2010 and the International Existing Building Code, 2009 Edition.

3.1 **Basis of the Report:**

- This report is based on the visible observations during our site visit on January 16, 2014.

Our observations of the existing building were limited to what was readily visible. We did not evaluate strengths of materials, remove finishes, or take measurements; therefore, we are unable to comment on any structural capacities or deficiencies of the existing structural systems beyond what was readily visible or shown on the existing drawings.

4.1 **General Building Description:**

The Nelson Place School consists of the original two-story brick veneered building, with a basement, and three brick veneered additions. The additions are one- and two-story buildings connected via interior corridors, ramps and stairs on each side of the original building. The first floor level of the school is located at four different elevations as the school buildings step across the site. See Figure-1 for general school layout. The school buildings have remained relatively unchanged since
construction, with exception to the 1926 building that underwent emergency exterior wall repair in 1992 to stabilize the failing exterior wall system.

The original 1926 building was constructed with masonry bearing walls, concrete framed floors, wood framed floors, and a wood framed flat roof pitched to interior drains. Regular maintenance has included re-roofing the building and general maintenance. A significant repair was completed in 1992 to address deteriorating exterior masonry conditions around the building. Subsequent remedial work has included shoring the classroom floors due to further deterioration of the exterior masonry bearing walls. It should be noted that the front of the 1926 school is surrounded by security fencing, and covered entrances, due to ongoing concerns of falling masonry.

The 1953 and 1967 additions were built with concrete foundations, masonry walls, and steel framing. Regular maintenance has included re-roofing the building and general maintenance. The masonry screen wall at the exterior patio of the 1967 building has been removed, but the patio remains. The buildings appear to be in average condition for their age.

5.1 **General Existing Conditions:**

**General Exterior:**
In general, the exterior walls of the building are 4” brick veneer backed up by unreinforced masonry walls (brick or clay tiles at the 1926 building and concrete masonry units ‘CMU’ at the other buildings) with no airspace between the veneer and backup. The exterior walls bear on continuous concrete frost walls. The exterior walls show signs of minor deterioration (minor thermal cracking and deterioration at steel lintels) due to the age of the building and will require some attention during any renovation. Exterior concrete members are in generally good condition, but there are a few areas that will need attention. These areas include concrete encased steel beams at the second floor exterior of the 1967 classroom building that have thermal cracking and the foundation walls of the 1967 classroom building that have exposed reinforcing that is rusting.

**General Interior:**
The interior of the buildings appears to be in average condition, but is showing signs of wear and tear. There are several minor cracks in the flooring and walls due to thermal movement of the buildings, which is typical for a school building of this age. The cracks appear to be stable and mainly affecting the finishes, but the finishes and substructure should be repaired during any future renovations. The “temporary” shoring system for the floors and exterior wall openings of the 1926
building have remained in place since installation and should stay until the walls are repaired. It is
our understanding that windows near the shored floors are difficult to open/close, which indicates
that deterioration is continuing and any renovation will likely include replacing the entire exterior wall
system at the front and rear of the 1926 building in these areas. The interior of the 1926 building
appears to require more attention than the other buildings due to the structural problems that the
front and rear exterior walls.

5.2 1926 Building

The two-story building, with a basement, consists of:

- **Foundations:**
  - Concrete foundation walls (unreinforced) with continuous spread footings.
  - Interior spread footings (unreinforced).
  - 4” Concrete slab on grade.

- **Columns:**
  - Lally columns (6 5/8” and 7 5/8” dia) below masonry bearing walls at several
    locations in basement.

- **Walls:**
  - Brick masonry bearing walls with brick veneer at exterior walls.
  - Clay tile masonry backup at window systems.
  - Interior brick masonry bearing walls and partitions.

- **Floors:**
  - Classrooms are wood framed with 2 1/2”x14” H.P. joists at 16” o.c.
  - Wood sub-floor over wood framing.
  - Corridors, egress areas, and over the boiler room are framed with one-way concrete
    slabs. Typically 7” or 8” concrete slabs.
  - Cinder concrete fill over slabs with finish floor system (granolithic slab, mastic finish,
    etc.)

- **Roof:**
  - Flat roof is framed with 2x8 and 2x12 rafters at 16” o.c. Rafter members are tied to
    lower ceiling members to create semi-trussed framing. Roof is pitched locally to
    internal drains.
  - 7/8” board sheathing.

![Figure 2-1926 Building]
The 1926 Building is a two-story building, with a full basement, flanked by one-story additions. The building constructed with masonry bearing walls, wood floor joists, concrete floor framing, and wood roof rafters. The masonry walls consist of brick veneer backed up by brick or clay tiles, which was typical in the 1920’s but is rare today due to the lack of reinforcing and problems that can arise with the clay tiles if they are not protected from the weather and movement. The wood joists are typically located at the classrooms and are shown with fire cuts and anchors to the masonry walls. Bearing for the wood floor framing is usually located just above the window heads on one course of masonry above a steel lintel. The interior of the building typically plaster finished walls over wood or masonry walls. The floor finishes are a mix of concrete slabs, granolithic flooring over concrete slabs, or tile on wood floor boards and sheathing.

In general, the interior of the building appears to be in average condition for a building of its age with general wear and tear showing in the flooring, walls, and ceilings. There are no major signs of structural problems showing up through the interior finishes within the interior portions of the building. The exterior bearing walls are a different story; the exterior wall system has undergone significant repair efforts to repair water infiltration and damage to the masonry and steel lintels. The masonry above the second floor ceiling level has been replaced at the exterior walls, as well as the masonry at the front entrance. Even with the repairs that took place, the clay tile masonry and steel lintels around the classroom windows continues to deteriorate causing the masonry to bow out slightly and settle further. Replacement windows at the classrooms do not easily close and have been jammed by the settling wall system above the windows. Shoring systems have been installed at the exterior classroom walls to reduce the floor loads on the exterior walls and support the floor framing, and it is our understanding that the shoring is being continuously monitored. In order to correct the failing wall system, it is our opinion that the exterior walls would need to be rebuilt with new masonry, lintels, and connections to the floor framing, from the foundation level to the roof. This level of demolition and re-construction may not be financially feasible, and it should be understood that repairing the exterior walls does not correct any other deficiencies within the building.

Snow loads for the original design are not noted on the original construction drawings, but rough calculations indicate that the design snow load was approximately 30 pounds per square foot (psf), which is less than the current Building Code load of approximately 40 psf. If the renovation option is chosen, and the roof structure is altered, the existing members in the areas of the alteration will need to be reviewed with modified current snow loads to verify their adequacy. Typically, renovations to roof structures similar to this roof will require supplemental framing at any new modifications or fire protection systems. New roof mounted mechanical units should not be considered for this building.
Lateral loads (wind & seismic) are resisted by unreinforced masonry walls. The walls would not be adequate for new construction, but may remain unchanged as long as the building does not undergo substantial renovation. Under a substantial renovation, new walls or bracing systems would need to be installed to adequately brace Code mandated loads. It should be understood that due to the tight layout of the building, new walls or braces will likely not be possible, or cost effective.

5.3 1953 Classroom/Cafeteria Addition:

The one-story addition is located directly west of the original school and is connected by an interior corridor:

- **Foundations:**
  - Concrete foundation walls and continuous spread footings.
  - Interior spread footings below concrete piers.
  - 4” Concrete slab on grade.
  - Reinforcing not shown on any concrete sections, unknown if owned in specifications.

- **Columns:**
  - Steel wide flange columns, typically 5H16 or 5H18.5.

- **Roof:**
  - Steel joists (B18 & D24 Macomber Joists listed) supported on steel beams and masonry bearing walls.
  - 1½” metal roof deck.

- **Walls:**
  - Exterior walls: 8” unreinforced CMU with 4” brick veneer. Veneer is built integrally with CMU backup using header bricks.
  - Exterior walls are bearing walls at Cafeteria.
  - Interior CMU partitions on thickened slab.

The 1953 addition is located between the 1926 School and the later 1967 Classroom addition. The 1953 addition is structurally connected to both the 1926 building and the 1967 classroom addition at the central corridor with shared masonry bearing walls. The Interior and exterior condition of the building appears to be consistent with the rest of the building. The building appears to have undergone regular maintenance, but has not undergone any significant renovation to update the structure.
The one-story building has two roof elevations, with the Cafeteria roof a few feet above the classroom roof elevation. The roofs are framed with long span steel joists and steel beams girders at the classroom portion. The roof joists are typically spaced around six feet apart with 1½” metal roof deck. There is no design snow load indicated on the existing framing drawings, but based on sample computations, we believe the design load to be about 30 psf, which is less than the current snow load of approximately 40 psf for Worcester. This could be a concern if renovations involved modifying the roofs or installing new roof equipment since the steel framing spans would require supplementary steel to support the added loads.

The exterior walls are typically unreinforced 8” CMU walls with a 4” brick veneer. The veneer is tied to the CMU with header bricks to form a 12” masonry wall. The interior walls are a mix of 4”, 6” and 8” unreinforced CMU. The steel along column lines are typically built around the steel columns and steel framing at the roof level. We could not find any details showing mechanical anchors attaching the masonry to the steel framing. Most interior partitions and exterior walls are not structurally connected to the floor or roof diaphragms either and would need to be connected to conform to the Building Code as part of any renovation.

Snow loads for the original design are not noted on the original construction drawings, but rough calculations of the steel girders indicate that the design snow load was approximately 30 pounds per square foot (psf), which is less than the current Building Code load of approximately 40 psf. If the renovation option is chosen, and the roof structure is altered, the existing members in the areas of the alteration will need to be reviewed with modified current snow loads to verify their adequacy. The roof joists are noted to be “Macomber” joists, which did not conform to standard load tables, so the loads would need to be reviewed specifically for the “Macomber” fabricated joists. Typically, renovations to roof structures similar to this roof will require supplemental framing at any new modifications, mechanical units, or fire protection systems.

Lateral loads (wind & seismic) are resisted by unreinforced masonry walls. The walls would not be adequate for new construction, but may remain unchanged as long as the building does not undergo substantial renovation. Under a substantial renovation, new walls or bracing systems would need to be installed to adequately brace Code mandated loads.

5.4 1967 Classroom Addition:

The two-story classroom addition includes 20,500 ft² of floor area and a covered patio space. The main structure consists of:

- **Foundations:**
  - Reinforced concrete foundation walls and continuous spread footings.
  - Interior spread footings.
  - 4” Concrete slab on grade.
- **Columns:**
  - Steel tube columns, typically 3”-4” square lally columns.
  - Columns at patio are fireproofed.
- **Floors:**
  - Steel joists at 2’-0” o.c. and wide flange steel girders.
  - 2½” concrete slab with form deck and wire fabric reinforcing.
  - Concrete encased beams at perimeter of second floor to support brick veneer above to roof.
- **Roof:**
  - Steel beams on column lines and steel beam girders.
  - Roof joists spaced at approximately 4 feet o.c.
  - 1½” metal roof deck.
Roof noted to be designed to support 40 psf live load.

- Walls:
  - Exterior walls: 8" unreinforced CMU with 4" brick veneer. Veneer is built integrally with CMU backup using header bricks.
  - Interior partitions are typically stud partitions.
  - Some interior unreinforced CMU partitions.

The two-story 1967 Classroom addition is structurally attached to the west end of the 1953 addition. There is an interior corridor ramp to transition to the higher first floor elevation of the 1967 addition. The building appears to have received regular maintenance, but no major renovations since construction.

Similar to the other buildings, the 1967 classroom addition is in generally average condition for a building that is nearly 50 years old. The interior finishes show typical wear and tear, consistent with the age of the building. There are some signs of former roof leaks, but not significant damage and the leaks appear to have been corrected.

The exterior brick veneer is in generally good condition, but does require regular maintenance including some repointing. There is a concrete encased steel beam at the spandrel of the second floor that is showing some signs of minor deterioration, including thermal cracking that should be sealed during any future renovations. There are a few locations where the concrete foundation wall reinforcing is exposed and rusting. The reinforcing should be cleaned and coated with epoxy as part on any future renovations.

The second floor is framed with a concrete slab on form deck, bar joists, wide flange girders, and steel columns. The framing was not exposed to view, but the floor and ceiling finishes below appeared in good condition with normal wear. Unlike the other buildings, many of the interior partitions are studs and plaster, not masonry. The plaster walls will provide less resistance to seismic loads, but may be easier to replace with CMU shear walls during any significant renovation.

The roof is framed with steel joists, wide flange beams, wide flange girders, and steel columns. The ceiling framing of the second floor did not show any signs of distress and we assume the roof framing is in adequate condition to continue to support roof loads.
There is an exterior patio at the north-west end of the school that appears to be unused and un-maintained. The patio was noted to be a former partially enclosed play area for the children. A former masonry screen has been removed and the columns and foundation structure remain exposed. The columns consist of a double shell fire rated tube column. There is also a steel channel at the columns that would abut the masonry screen. The remaining steel members are rusting and delaminating and are in need of maintenance to clean and restore the members. The concrete foundations walls are also spalling at the column locations due to the rusting and water infiltration at the base of the columns.

Snow loads for the original design are noted on the original construction drawings to be 40 psf, which is close to the current snow load of 40 psf. If the renovation option is chosen, and the roof structure is altered, the existing members in the areas of the alteration will need to be reviewed with modified current snow loads to verify their adequacy, but should be able to support current snow loads. New rooftop mechanical equipment would need to be supported on new steel framing members.

Lateral loads (wind & seismic) are resisted by unreinforced masonry walls, similar to the rest of the building. The walls would not be adequate for new construction, but may remain unchanged as long as the building does not undergo substantial renovation. Under a substantial renovation, new walls or bracing systems would need to be installed to adequately brace Code mandated loads. As part of any renovation, seismic restraints would need to be installed at the top of CMU partitions that are not secured to the second floor or roof diaphragm.

5.5 1967 Gymnasium Addition:

The one-story gymnasium addition includes 4,900 ft² of floor area. The main structure consists of:

- **Foundations:**
  - Reinforced concrete foundation walls and continuous spread footings.
  - 4" Concrete slab on grade.
- **Columns:**
Steel wide flange columns, typically 6WF or 8WF.

- Roof:
  - Steel 8B beams and 27WF girders.
  - Roof beams spaced at 8 feet o.c.
  - 1½” metal roof deck.
  - Roof noted to be designed to support 40 psf live load.

- Walls:
  - Exterior walls: 8” unreinforced CMU with 4” brick veneer. Veneer is built integrally with CMU backup using header bricks.
  - Interior unreinforced CMU partitions.

The one-story 1967 Gymnasium addition is structurally attached to the east end of the original 1926 building. There is an interior corridor with stairs to transition to the lower first floor elevation of the 1967 addition. The building appears to have received regular maintenance, but no major renovations since construction.

Similar to the other buildings, the 1967 classroom addition is in generally average condition for a building that is nearly 50 years old. The interior finishes show typical wear and tear, especially at the interface of the flooring and exterior walls. There is some cracking in the CMU walls, but no major signs of distress. The exterior brick veneer is in generally good condition, but does require regular maintenance including some repointing.

The roof is framed with steel beam purlins, long span steel beams, metal roof deck, and steel wide flange columns. The framing appears to be in good condition with no noticeable signs of structural problems.

Snow loads for the original design are noted on the original construction drawings to be 40 psf, which is close to the current snow load of 40 psf. If the renovation option is chosen, and the roof structure is altered, the existing members in the areas of the alteration will need to be reviewed with modified current snow loads to verify their adequacy, but should be able to support current snow loads. New rooftop mechanical equipment would need to be reviewed with the long span beams, and would likely need to be located on new framing.
Lateral loads (wind & seismic) are resisted by unreinforced masonry walls, similar to the rest of the building. The walls would not be adequate for new construction, but may remain unchanged as long as the building does not undergo substantial renovation. Under a substantial renovation, new walls or bracing systems would need to be installed to adequately brace Code mandated loads. As part of any renovation, seismic restraints would need to be installed at the top of CMU partitions that are not secured to the second floor or roof diaphragm.

6.1 **Building Code Review - Structural:**

This review presents our interpretation of the structural requirements of the International Existing Building Code, as modified by the Massachusetts State Building Code. In general, the provisions of The International Existing Building Code are intended to maintain or increase public safety, health, and general welfare in existing buildings by permitting repair, alteration, addition, and/or change of use without requiring full compliance with the code for new construction except where otherwise specified.

**Assumptions:**

In order to review the requirements of the Building Code for a renovation to the Nelson Place School, the scope of the project must be defined. For this review we are assuming that a Renovation/Addition would include:

- Complete renovation to interior finishes (Painting, flooring, wall finishes, etc.)
- New mechanical systems throughout building, including new mechanical rooftop units if the roof is capable of supporting the loads.
- Demolition of select interior partitions of the building.
- Reroof the entire building.
- 35,000 ft² +/-, structurally isolated addition.

**Building Codes:**


Classification of Work: Level 3 (IEBC Section 405) Work area will exceed 50% of the aggregate area of the building.

**Structural Requirements associate with Level 3 Work:**

Level 3 Work is the highest level of Alteration and the Work must conform to the Structural requirements of Levels 1, 2, & 3.

**Level 1 Structural Requirements:**

606.2 Addition or replacement of roofing or replacement of equipment: Where addition or replacement of equipment results in additional dead loads, structural components supporting such reroofing or equipment shall comply with the gravity load requirements of the International Building Code.

- There are several exceptions that are permitted by the IIBC. One exception is “Structural elements where the additional dead load from roofing or equipment does not increase the force in the element by more than 5 percent.” Based on our initial review, general reroofing work will not increase the force in the element by more than 5 percent.
But, new equipment or modification of roof openings will increase the forces in elements
by more than 5 percent and will require a review the element in accordance with the IBC.
Adding new members will be difficult with the wood framing of the 1926 Building and the
bar joists of the other buildings. We recommend avoiding any new equipment on the
1926 Building roof, and assume any new equipment on the 1953 and 1967 Additions will
be supported on new framing above the roof. The new framing would be supported on
steel posts located above existing columns.

606.2.1 Wall anchors for concrete and masonry buildings: Where a permit is issued for reroofing
more than 25 percent of the roof area of a building assigned to Seismic Design Category B, C, D, E
or F with a structural system consisting of concrete or reinforced masonry walls with a flexible roof
diaphragm or unreinforced masonry walls with any type of roof diaphragms, the work shall include
installation of wall anchors at the roof line to resist the reduced International Building Code level
seismic forces as specified in the IEB.

- The existing walls throughout the building are unreinforced masonry walls and will need
to conform to the requirements of this section. Based on our review, many of the walls of
the 1926 Building are anchored to sill plates, but will need to be reviewed to check the
condition of the sills and anchors. The sills and anchors were replaced during the 1990’s
renovation and the condition of the anchors should be acceptable, but will be reviewed
as part of any renovation. The Additions will need new anchors to attach the masonry
walls to the roof diaphragm, especially at interior partitions that are not built around steel
framing.

606.3.1 Bracing for unreinforced masonry bearing wall parapets: Where a permit is issued for
reroofing for more than 25 percent of the roof area of a building that is assigned to Seismic Design
Category B, C, D, E or F that has parapets constructed of unreinforced masonry, the work shall
include the installation of parapet bracing to resist the reduced International Building Code seismic
forces specified.

- Work area exceeds 25 percent of the roof area, but there are no unreinforced masonry
parapets that require structural bracing.

606.3.2 Roof diaphragms resisting wind loads in high wind regions: Where roofing materials are
removed from more than 50 percent of the roof diaphragm of a building or section of a building
located where the basic wind speed is greater than 90 mph or in a special wind region, as defined in
Section 1609 of the International Building Code, roof diaphragms and connections that are part of
the main wind-force resisting system shall be evaluated for the wind loads specified in the
International Building Code, including wind uplift. If the diaphragms and connections in their current
condition do not comply with these wind provisions, they shall be replaced or strengthened in
accordance with the loads specified in the International Building Code.

- Roof diaphragm connections would need to be reviewed as part of the reroofing work.
Based on the original construction drawings, the steel deck diaphragms appear to be
adequately connected to the steel framing. Connection from the framing to the masonry
walls will need to be verified for lateral wind forces. The wood deck diaphragm of the
1926 building will need to be reviewed for adequate load transfer as part of any review
and will likely need to be strengthened with plywood during any significant re-reeofing.

Level 2 Structural Requirements:

707.2 New structural elements: New structural elements in alterations, including connections and
anchorage, shall comply with the International Building Code (IBC).

- New structural elements will comply with the IBC.
707.3 Minimum design loads: The minimum design loads on existing elements of a structure that do not support additional loads as a result of an alteration shall be the loads applicable at the time the building was constructed.

- Renovation will not change the minimum design loads on the structure. Existing design loads do not appear to be noted on existing drawings for the 1926 and 1953 buildings and will need to be computed prior to modifying existing elements. Renovations to the 1967 Buildings will be reviewed with loads noted on Construction Drawings.

707.4 Existing structural elements carrying gravity loads: Alterations shall not reduce the capacity of the existing gravity load-carrying structural elements unless it is demonstrated that the elements have the capacity to carry the applicable design gravity loads required by the International Building Code. Exceptions include structural elements whose stress is not increased by more than 5 percent.

- Design loads will be reviewed, but should remain unchanged at the existing structure.

707.5 Existing structural elements resisting lateral loads: Any existing lateral load-resisting structural element whose demand-capacity ratio with the alteration considered is more than 10 percent greater that its demand-capacity ratio with the alteration ignored shall comply with the structural requirements specified in Section 807.4.

- The existing unreinforced concrete masonry walls provide lateral support for the building. Modifications to the existing building to change wall locations or details will likely increase the demand capacity of the walls by more than 10% and will require an analysis and most likely new structural elements to resist the Code mandated loads.

707.6 Voluntary improvement of the seismic force-resisting system: Alterations to existing structural elements or addition of new structural elements that are not otherwise required by this chapter and are initiated for the purpose of improving the performance of the seismic force-resisting system of an existing structure or the performance of seismic bracing or anchorage of existing nonstructural elements shall be permitted, providing that an engineering analysis is submitted demonstrating the following:

- The altered structure and the altered nonstructural elements are no less conforming with the provisions of this code with respect to earthquake design than they were prior to the alteration.
- New structural elements are detailed and connected to the existing structural elements as required by Chapter 16 of the International Building Code.
- New or relocated nonstructural elements are detailed and connected to existing or new structural elements as required by Chapter 16 of the International Building Code.
- The alterations do not create a structural irregularity as defined in ASCE 7 or make an existing structural irregularity more severe.

- It would be our intention to present improvement options to the Owner as part of a renovation to be included in future work. Existing unreinforced masonry walls do not conform to the current Building Code and should be replaced with a dedicated seismic force-resisting system, if feasible.

Level 3 Structural Requirements:

807.2 New structural elements: New structural elements shall comply with Section 707.2.

- New structural elements will comply with the IBC, per 707.2.

807.3 Existing structural elements carrying gravity loads: Existing structural elements carrying gravity loads shall comply with 707.4.

- Design loads will be reviewed, but should remain unchanged at the existing structure.
807.4 Structural alterations: All structural elements of the lateral-force-resisting system undergoing Level 3 structural alterations or buildings undergoing Level 2 alterations as triggered by Section 707.5 shall comply with this section.

- Alterations to the building structure will be reviewed for conformance to this section. If the building undergoes a renovation/addition that includes demolition and modification of the existing structure, the building will need to be analyzed to support the code mandated loads.

807.4.1 Evaluation and analysis: An engineering evaluation and analysis that establishes the structural adequacy of the altered structure shall be prepared by a registered design professional and submitted to the code official.

- Renovation to the interior finishes and systems is acceptable without a detailed analysis, but if interior partitions or portions of the building are subject to demolition, an analysis will need to be completed. It should be understood that the existing lateral force resisting system was not designed or detailed in accordance with the current seismic code in mind. Any substantial renovation will likely require a new seismic system of reinforced CMU shear walls. The new CMU shear walls may be feasible at the one-story buildings, but will be more difficult at the two-story buildings, especially the 1926 structure.

807.4.2 Substantial structural alteration: Where more than 30 percent of the total floor area and roof areas of the building or structure have been or are proposed to be involved in structural alterations within a 12-month period, the evaluation and analysis shall demonstrate that the altered building or structure complies with the International Building Code for wind loading and with the reduced International Building Code level seismic forces as specified in Section 101.5.4.2 for seismic loading. For seismic considerations, the analysis shall be based on one of the procedures specified in Section 101.5.4. The areas to be counted toward the 30 percent shall be those areas tributary to the vertical load-carrying components, such as joists, beams, columns, walls and other structural components that have been removed, added or altered, as well as areas such as mezzanines, penthouses, roof structures and in-filled courts and shafts.

- The existing building would not conform to mandated loads and would need to be significantly updated, if the renovation included a significant structural alteration. Due to the age of the building, we recommend limiting alterations to the architectural finishes and select structural modifications. This building is not a good candidate for significant structural alterations.

807.4.3 Limited structural alteration: Where not more than 30 percent of the total floor and roof areas of the building are involved in structural alteration within a 12-month period, the evaluation and analysis shall demonstrate that the altered building or structure complies with the loads applicable at the time of the original construction or of the most recent substantial structural alteration as defined by Section 807.4.2. Any existing structural element whose demand-capacity ratio with the alteration considered is more than 10 percent greater than its demand-capacity ratio with the alteration ignored shall comply with the reduced International Building Code level seismic forces as specified in Section 101.5.4.2. For the purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with sections 1609 and 1613 of the International Building Code with Massachusetts Amendments. For purposes of this section, comparisons of demand-capacity ratios and calculation of design lateral loads, forces, and capacities shall account for the cumulative effects of additions and alterations since original construction.

- With structural upgrades that would be required as part of the renovation, and the limited structural alteration, the buildings could be reviewed to support loads applicable at time of original construction. Structural upgrade requirements would be established during the design, but we would expect the seismic force-resisting system would need to be
upgraded throughout the building by replacing existing partitions with dedicated masonry shear walls.

7.1 Conclusions and Recommendations:

The purpose of this report is to identify any structural deficiencies and liabilities that will need to be addressed during any substantial renovation, which we understand, is being considered. The report is based on the premise that the existing building will remain in use as a school, and room live loads will not change. We have reviewed the existing Nelson Place School in accordance to Chapter 34 of the Massachusetts State Building Code, Eighth Edition and the International Existing Building Code, 2009 Edition. We have reviewed the general conditions of the building, as well as the structural modifications that will need to be addressed as part of the renovation to increase the public safety of the building. This report, in its entirety, shall be used as the basis for the renovation. The following items are meant to highlight conditions or deficiencies noted in the report, but do not limit the work required.

General Information:

- Existing main building area is 55,400 ft².
  - 21,100 ft² School building built in 1926.
  - 8,900 ft² Classroom and Cafeteria addition built in 1953.
  - 20,500 ft² Classroom addition built in 1967.
  - 4,900 ft² Gymnasium addition built in 1967.

- The proposed renovation/addition will produce a finished building of approximately 90,000 ft².

- The existing roof membrane should be reviewed for regular maintenance or replacement.

- Any structural work associated with the renovation/addition shall conform to the International Existing Building Code, as amended by the Massachusetts State Building Code, and specifically any additional requirements for Level 3 work.

- Should the renovation project be abandoned and an entirely new building be considered, the new building design shall be in accordance with the Massachusetts State Building Code, current edition.

Existing Conditions:

- 1926 Building exterior walls need to be rebuilt, and floors re-supported, at front and rear classroom areas due to failure of existing wall system. Shoring to remain in place and monitored until walls are re-built.

- Condition of wood floor framing at 1926 building will need to be reviewed at exterior walls due to ongoing deterioration issues.

- Exterior masonry veneer requires regular maintenance. General brick repointing is required at several locations at each building.

- Concrete encased spandrel steel beam at second floor of 1967 building will need to be sealed at thermal cracks.

- Steel columns and foundation at 1967 patio need repair/replacement and long term weather protection.

- 1926 and 1953 buildings appear to be designed to support snow loads of 30 psf, which is less than the approximate 40 psf current snow load in Worcester, and will need to be reinforced at renovations that affect the roof framing.

Structural Requirements for Renovation/Addition:

- Geotechnical exploration will be required for any new construction, as well as any structural foundation work to the existing building.
• Roof snow loads:
  o Original: Unknown at 1926 & 1953 buildings, computations of existing framing estimate at 30 psf. 40 psf at 1967 Additions.
  o Renovation: 40 psf plus drift caused by any additions or new roof elements.
  o Additions: In accordance with Massachusetts State Building Code.

• Lateral load resisting system requires significant modification to conform to current Code requirements.
  o New shear walls or bracing systems are required to provide a regularly spaced and organized system layout, in accordance with accepted engineering practices.
    ▪ Existing interior and exterior bearing walls can remain in service as unreinforced masonry shear walls, but will need to be adequately connected to the roof diaphragm to avoid being a seismic hazard.
    ▪ New shear walls/braces will require structural attachment to the existing diaphragms, as well as new foundations to resist the Code mandated loads.

• Unreinforced masonry partitions (interior) are built-up to the underside of the framing, but are not adequately connected to the roof diaphragms to resist seismic loads. We recommend remedial action be taken during the construction phase to install new anchors at the roof to secure the masonry walls to the diaphragms for in- and out-of-plane loads required by the Building Code.

Based on our review of the existing conditions, as well reviewing Chapter 34 of the Massachusetts State Building Code, it is our professional opinion that the 1953 and 1967 portions of the existing building are capable of being structurally renovated and reused as a school, but will require upgrading of the seismic force-resisting system and installing new structural framing to support new equipment and updated snow loads. It is our opinion that the 1926 building is capable of being renovated, but it would require extensive reconstruction of several exterior load bearing walls to make the building safe for long term use, causing us to recommend replacing the 1926 building due to long term safety concerns.

While it may be structurally possible to renovate the buildings, it may not be financially feasible due to the extent of the renovations required. Should the City of Worcester choose to renovate the building, it should be done with the understanding that structural upgrades noted in this report will only bring the building up to the minimum standards of the Building Code for existing buildings, and will not meet the Building Code requirements for new buildings. The requirements noted in this report will not increase the gravity load capacity of the structure, which will limit the flexibility of any renovation.
BUILDING DESCRIPTION

General:

The Nelson Place Elementary School (NPES) is located at 35 Nelson Place, Worcester, MA. The building was constructed in 3 phases. The original school was built in 1927, and is a combination masonry block / wood-framed, 2-story-plus-basement building with brick facade.

In 1952, a 1-story block and brick classroom wing was added. Though the original construction documents (OCDs) show that wing is primarily non-combustible, there is also miscellaneous wood blocking above ceilings, and in soffits / overhangs. The OCDs also show 9 skylights in this wing. These have been removed and roofed-over – but it is likely some wood framing / blocking has been left behind.

In 1968, another 2-story classroom wing was added at the right end, and a gymnasium added at the left end. The 1968 addition classrooms have multiple movable dividers – to allow adjacent classrooms to be combined or separated. The dividers most likely are supported by wood framing above the ceiling, in addition to any miscellaneous wood blocking.

NFPA would consider all spaces containing miscellaneous exposed wood as “combustible concealed spaces” requiring sprinkler protection.

Current total building area is 54,400 square feet.

The highest floor level (2nd floor) is less than 30’ above-grade. The building is located within 50 feet of the street.

Fire Protection:

There is no existing fire protection system in the existing school. Per the original construction documents, the Nelson Place street main is a 6” line. There are 3 city-owned fire hydrants located within approximately 500’ of the building. The closest is across from the main entrance. The 2nd closest is by Nelson Place Drive – approximately across from the gym, and the 3rd is on the corner of Hapgood – about 500’ before the school.

Ceilings:

Ceilings types vary. In the original building, ceilings are plaster – attached directly to the wood framing above. In the 2 newer wings, ceilings are primarily hung, acoustical-tile, with sheetrock in closets and some smaller rooms. The gymnasium has no ceiling. The cafeteria has a hung tile ceiling.
In the original building 1st-floor, new FP piping would have to either be run exposed, or new hung ceilings added through-out to conceal the piping. This would create some aesthetic issues, as there are numerous “arches” at entrances to halls and some rooms. The arches would most likely be partly above and partly below a new hung ceiling which would be “odd looking”. The OCDs show a small attic space above the 2nd floor – approximately 3’ clear. FP piping for the 2nd floor could be run in this attic, but with increased costs due to the difficulty of access.

In the newer wings, if existing ceiling types are maintained, most new FP distribution piping and branches could be run concealed.

**Layout:**

The building is long and narrow, with 1-deep classrooms on each side of a central hall.

Often a proposed new Fire Protection service entrance can be located in the existing boiler or mechanical room. This existing boiler room is smallish – and does **not have** sufficient space for a new FP service. There is a good sized storage room off the boiler room, however, that could be used. Perhaps because it can only be accessed thru the boiler room, and is a bit damp and musty, this was the only storage room we saw that was under-utilized. It contained a couple dozen desk/chair combinations – scattered over the floor. If these were neatly stacked, they could all fit into 1 end of the room – leaving sufficient space for both new FP and plumbing service entrances.

There is several exterior “canopies”. Some are less than 4’ deep and would not require any fire protection beneath them. Some are over 4’ deep, but could be protected with dry sidewalls piped off the wet system. At the right-front corner, the 2nd floor overhangs a patio below – and this area is too large to protect with dry sidewalls. It would require a dedicated dry riser / compressor system, or any combustibles above the ceiling would have to be replaced with non-combustible materials.

**Hazard Levels:**

Classrooms, offices, hallways, gymnasiums, and cafeterias are generally considered “Light hazard” relative to fire-suppression. Light Hazard areas require the lowest level of sprinkler protection. Being an elementary school, there is no classroom gas supplies (which would raise the hazard level of those rooms).

All storage rooms at NPES are quite small (well under 1,000 sqft), with materials stored under 12’ high. All built-in storage area shelving we saw was 10: deep wood board-type. Some areas also had free standing shelving, which was a mix of metal, wood, and plastic. We saw no shelving over 30” deep (aisle to aisle), which if it existed, would raise the hazard rating. Most of these areas would be considered “miscellaneous storage”, and designed as an ordinary hazard occupancy.
Other “Ordinary hazard” areas would include (group 1) the main kitchen, kitchen service areas, and (group 2) densely packed storage-areas, and the “stage”. As the existing stage is under 1,000 sqft, it would not require standpipe hose stations. It would simply have a slightly greater level of protection (ordinary hazard group 2) than a platform.

**Storage:**

Storage is a critical issue that should be addressed as part of any renovation or new construction. When a building has insufficient storage space, other spaces not intended or designed for storage can end up being used for storage. We noted several electrical closets used for storage, which violates code. We also noted several stairways with large items such as pianos or file cabinets stored in the landing area. This also violates code.

Storage height is another important aspect of the storage issue. Sprinklers require between 18” and 3’ clearance between the sprinkler deflector and the top of storage (depending on the type of sprinkler and type of stored material). Several storage rooms have stored materials stacked up to a foot or less below the ceiling/roof structure. Classrooms generally had wooden “cubbies” for students’ coats, back-packs, etc. Many of these had cardboard boxes stacked on top to within a few inches of the ceiling. These stored materials would obstruct a sprinkler’s water flow, potentially keeping it from reaching the fire. This would also be a code violation.

If a new Fire Protection system is to be installed, it is important that the use of every room to be sprinkled be clearly defined. Storage rooms require a higher level of sprinkler protection than offices, classrooms, electrical rooms or non-combustible mechanical spaces, so it is important that storage be confined to designated storage rooms, and not leak into other spaces having a lesser level of protection.

A storage plan should both include an assessment of “who needs to store what” and “how much should be stored”, as well as an assessment of available storage areas, and the maximum storage height permitted in each space.

According to the custodian – Kevin O’Neil, there is no storage of flammable or combustible liquids in the school. This will help minimize Fire Protection hazard levels and costs.

According to the custodian - Kevin O’Neil, all storage is less than 12’ in height. This will also help minimize FP hazard levels and costs.

One storage issue of concern is that a few areas contain over 25% (by volume) group A plastics – in the form of plastic shelving, plastic bins containing smaller materials, and shrink-wrapped materials. According to the custodian – Kevin O’Neil – the plastic shelving is not the school’s standard, but may have been donated by teacher’s who needed shelving and purchased it themselves. Where exposed group A plastic storage exceeds 5’ in height, this creates an “extra hazard” condition, increasing fire protection
costs for that area. Plastic shelving should be replaced with metal shelving. And plastic storage should be kept below 5’ in height to maintain an “ordinary hazard” rating.

Other than the correctable storage-issue noted above, we did not identify any other areas that would be considered “Extra hazard”.

**Flammability standards:**

527 CMR (State Fire prevention code) sets flammability requirements for furniture, and window coverings (drapes, blinds, etc). We noted several rooms with curtains covering the front of open shelving that appeared to be “home-made”. These would likely not meet any flammability standards.

**Local Requirements:**

According to The Worcester Fire Department’s Captain Thomas Bull, the city has no special fire protection requirements beyond State and NFPA requirements.
HVAC & PLUMBING SYSTEMS

EXISTING CONDITIONS SURVEY

FOR THE

NELSON PLACE ELEMENTARY SCHOOL

IN

WORCESTER, MA

January 22, 2014

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I. GENERAL

The following is a summary report outlining our observations and comments regarding the status of the HVAC and plumbing systems at the Nelson Place Elementary School in Worcester, MA.

In January 2014 we performed a site inspection of the existing building. Our observations along with review of the original contract documents were used extensively in assembling this report.

The building was constructed in 3 phases over the past 90 years (bldg. #1 1927, bldg. #2 1954 and bldg. #3A & #3B circa 1967) and supports elementary school age students. The first section constructed is designated as building #1 and is a 2-story structure with a full mostly below grade basement level. This building segment houses classroom spaces on all floors and a boiler room in the basement level. Building #2 is a single story structure slab on grade and houses classroom spaces, and cafeteria. Building #3A is a 2-story structure slab on grade which houses classroom spaces, library and office space. Building #3B is a single story structure that houses the gymnasium space. Total building square footage is approximately 54,000 SF

Building segments are a mix of wood frame and steel & concrete construction with masonry brick exterior walls. Windows throughout building #1 are primarily of the double hung type with insulating double glazing in aluminum frames installed during a 1992 renovation. Windows in buildings #2, #3A & 3B are primarily of the single glazed type in steel and aluminum frames.

II. PLUMBING

Fixtures:

The existing buildings plumbing systems appear adequate in quantity for the current occupancy use however, none surveyed complied with ADA or MA accessibility codes. Bathrooms failed compliance on numerous levels including the lack of accessible fixtures and the absence of proper wheelchair space.

Existing water closets are a mix of floor mount and wall mount flush valve type most of which were not of the water conserving 1.6 gallon per flush type as required by current code. The lavatory sinks are of the wall hung style, but also most fail accessibility compliance on several levels in that they do not have accessible paddle or equal handle operators or protective insulation on the piping under the sinks. Urinals appear adequate in number to accommodate current code requirements.

There are numerous drinking fountains located within the building, some in public areas and some in classrooms however most all of these sampled were nonoperational. In addition, there was a single electric water cooler located in the entrance lobby of the 1954 building however this unit was also found to be nonoperational. All of these were of the non-accessible type. Electric
water coolers of this age may contain lead components. To ensure there is no health issue we recommend taking an early AM first draw water sample from each cooler and testing for lead.

Drinking Fountain

Most classrooms in building #2 & #3 have stainless steel or enameled steel sinks some of which have a drinking fountain receptacle. Some sinks have both cold and hot water and some sinks are supplied only with cold water. To comply with sanitation code hand wash sinks should be provided with warm water as well although certain exceptions may have been made due to the population’s age.
Classroom Sinks

In the kitchen there is one (1) double-bowl sink. There was no hand wash sink or 3-bay scullery/pot sink both of which would typically be required to satisfy Board of Health requirements for a kitchen area. There was also no grease trap on the sink fixture.

Although the kitchen appears to present as a food warming area only, there are numerous plumbing deficiencies noted as follows:

- There is no 3-bay food sculler/pot sink. Normal configuration would have a three bay wash sink for wash, rinse, sanitize purposes. The current two bay sink does not allow for this type of operation.
- Typically a double bowl food preparation sink is provided to meet Board of Health requirements. This sink must be indirectly wasted as required by the plumbing code. Indirect waste configuration limits the possibility of waste water backing up into the food prep. sink. The current two bowl sink appears to be for general service and not food preparation.
- There is no hand wash sink. A hand wash sink is typically required by the Board of Health so that staff has a place to clean their hands other than the wash sinks or food preparation sink. The water to this hand wash sink is also typically delivered at a lower safety temperature than the other wash and prep sinks.
- Current code and regulations would require an exterior grease trap be provided to intercept all waste from the kitchen fixtures and floor drains in addition to a local source.
grease trap at certain fixtures. This would require rerouting the sanitary waste from the kitchen area to the exterior of the building the waste from this exterior grease trap would then need to discharge to the exterior sanitary sewer drains and could not reenter the building.

It appears most of the fixtures are original vintage many of which are not of the water saving type. Apparently maintenance is routinely performed on faucets, toilet fill valves, etc.. as needed.

**Cold Water Service:**

A 2.5” water service feeds the building’s domestic water needs. The 2.5” line enters the basement of building #1 then reduces to a 1.5” before running through a water meter. The service then increases to 2” to support the buildings domestic water needs. The service has no backflow preventer which would typically be required for a building such as this where numerous sources of cross-contamination could exist.

There is no pressure reducing valve on the incoming water service which would be required if the service pressure exceeds 80 psig. A flow test to determine pressure and flows from the municipal water supply should be performed prior to undertaking any substantial renovation.

The domestic water piping is distributed throughout the building primarily routed above ceilings. Due to the age of the piping system the possibility exists for asbestos insulation to be present. As such piping runs, fittings and elbows are suspect and should be tested.

Due to the age of much of the water piping there is a high probability that the water service could have lead containing solder in the fittings or brass piping. Although typically not a large source of lead contamination it should be tested and monitored and/or corrected if found to be a problem.

With the age of the piping at 50+ years it has exceeded its useful service life. As such a complete replacement of the domestic water system during any substantial renovation is highly recommended.

**Domestic Hot Water Service:**

The domestic hot water needs of the building are supported by a 98-gallon direct fired water heater firing natural gas. The water heater was installed in 2010. The unit is manufactured by Bradford White, model #D100T1993N with a rated input capacity of 199,000 BTUH. The current water heater appears to have ample capacity to support the buildings current domestic hot water needs.

There are no mixing valve stations noted. Current code would require differing water temperatures at different types of fixtures. Lavatory sinks must not discharge hot water at a temperature exceeding 110-112°F for safety reasons, whereas the service fixtures (janitor’s sinks,
kitchenette sinks, etc.) are required to have hot water temperatures in excess of 120°F for sanitation reasons. The current system supplies direct untempered tank water to the dishwasher in the kitchen. The dishwasher has its own electric booster to address the required 180°F sanitizing cycle.

It appears domestic hot water is currently stored in the tank at 120°F. Storage of hot water below 130°F is not recommended can lead to bacteria growth within the system. Any replacement system must consider elevated storage temperatures and mixing valves.

There are two (2) recirculation pumps on the domestic hot water system, which are required since there are fixtures located beyond 100 feet of the hot water source. The building code requires hot water to be available within 100 feet of any hot water consuming fixture. These units appear to be controlled by strap-on style return water aquastats.

*Drainage Systems:*

The roof is drained via an external roof leader system connecting to an underground storm drainage piping system leading to a storm water system. We did however note a vented house trap exiting building #1 which could be indicative of a connection to a combination storm sewer system. Review of this tie in to the municipal systems should be reviewed as combination storm sewer systems are not allowed unless that is the only system which exists in the street. We noticed no outward signs of storm drainage system failure.
Most of the sanitary drainage piping is concealed from view however, what we were able to see was primarily cast iron hub & spigot type. The sanitary sewer lines run below the slab and exit the building to a municipal sewer system. We noticed no outward signs of sanitary system failure.

Based on the age of the sanitary piping we would recommend that during a substantial renovation all above slab sanitary sewer and vent piping be replaced. Below grade piping in buildings #2 & #3 may be able to be reused as typical this style service weight piping retains its integrity better over time however any building #1 is recommended to be replaced. However, we recommend some camera scoping and possibly sampling of the underground piping be taken and tested to verify integrity.

**Natural Gas Service:**

The natural gas to the site is distributed by NSTAR. This appears to be a low pressure service which runs thru and exterior gas meter and increase to 6” prior to entering the building. The 6” low pressure service line enters the basement of building #1 and routes to the boiler room to supports two (2) hot water heating boilers, two (2) steam boilers and one (1) domestic hot water heater. To meet current gas utility requirements the 6” service requires a thermally actuated shut-off valve at the entrance to the building. This valve would shut-off the gas supply should a fire occur in the boiler room. There appears to be a check valve on the service but not the required thermal valve.

There is an abandoned gas meter and gas stub in the basement near the current service entrance which appears to be remnants of an old gas service which was present prior to the installation of the current service. This old meter should be removed and the pipes cut and capped at the foundation wall.

**III. HVAC**

**Boilers:**

The building’s heating requirements are currently served by four (4) cast iron sectional boilers all of which fire natural gas. All the boilers appear to have been installed during a 2005 boiler upgrade project and as such appear to be in good condition.

Two (2) of the boilers support low pressure steam for building #1 & #2. The boilers are Burnham cast iron 10 section boilers each with a rated gross output capacity of 1,941,000 BTUH. Each boiler has a Powerflame® duel-fuel burner rated to fire the maximum input capacity of each boiler being 2,396,000 BTUH of gas or 16.6 GPH of #2 fuel oil.
The other two (2) boilers support hydronic hot water heating for building #3A & #3B. The boilers are Burnham cast iron 8 section boilers each with a rated gross output capacity of 1,517,000 BTUH. Each boiler has a Powerflame® duel-fuel burner rated to fire the maximum input capacity of each boiler being 1,876,000 BTUH of gas or 13 GPH of #2 fuel oil. Each boiler is equipped with a boiler pump and return water mixing control to insure proper flow and temperatures are maintained thru the boiler to prevent thermal shock related failure.
Hot Water Boilers & Boiler Pumps

The heating boilers vent to a common breeching prior to entering a masonry chimney. The internal condition of the chimney is unknown.

The boilers at 9 years of age are well within their useful expected service life of 30 years as defined in the American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE) Applications Handbook. Any substantial renovations should include consideration of converting from steam heat to hot water due to the inherent inefficiencies and poor controllability of steam. The current steam boilers could be converted to hot water by changing some controls and flooding however high consideration should be given to a hybrid plant which uses one or two of the old boilers coupled with a newer high efficiency (94%+) condensing gas-fired boiler. This can result in significantly improved operational heating plant efficiency for the building. A minimum of two (2) boilers would be recommended to insure some level of redundancy as well as improved staging capabilities.

# 2 fuel oil is supplied from a single exterior above ground fuel oil tanks located at the rear of the building. Although it was difficult to access the tank during our inspection as it was located in a locked fenced in area it appears to be of the double wall type with a capacity of approximately 5,000 gallons. The tank appears to have replaced a former 10,000 gallon underground tank that was decommissioned. A single fuel oil transfer pump circulates fuel oil from the tank to the burners and back to the tank. The pump was off and the valves closed at the time of our visit.
Combustion air for the boiler room is supplied from ductwork connecting to a louver in the boiler room. Although the vertical duct appears to be properly sized the horizontal duct and louver appear to be significantly undersized. In addition, the ductwork does not have a motorized damper installed which is required for energy code. It appears the inadequate combustion air has presented an issue in the past as we have been told high CO levels have been experienced thereby forcing the shutdown of two (2) of the four (4) boilers. Combustion air issues should be addressed immediately.

Control of the plant appears to be via a building energy management system provided by Automated Logic. Control routines need to be reviewed with the EMS vendor however it appears that boilers are enabled and disabled based on outdoor air temperature as well as centralized space temperature sensors.

Steam Distribution System:

Heating from the boiler plant is distributed throughout the building via a combination two-pipe and one-pipe steam distribution system serving radiators and unit ventilators located throughout buildings #1 and #2. Radiators in building #1 are primarily of the one-pipe type with a mix of 2-pipe style whereas those in building #2 are of the two-pipe type. Piping runs above ceiling and
below slabs within utility pipe trenches and pipe sleeves to serve the heating terminal units.

The steam distribution system, radiators and unit ventilators are of original vintage to the respective buildings. Due to the systems age and non-uniform heat distribution in the building noted during our walk-thru we consider the entire steam piping system and radiators prime candidates for replacement during a substantial renovation project.

Perimeter steam radiators or fin-tube supply heat to most rooms and have no control other than that which can be afforded by manual valves located on each section. As such, the temperatures in the buildings can vary widely and require building occupants to open and close their windows or adjust radiator valves to maintain comfortable temperatures.

Steam radiators are not desirable in an elementary school environment as they are extremely hot and can quickly cause burns if touched. One of the worst instances of this is in the nurse’s office bathroom. The steam radiator is very close to the toilet and could easily result in someone being burned.
Radiator in Close Proximity to Toilet (Burn Danger)

*Hydronic Distribution:*

Hot water from the heating plant is distributed to building #3A & #3B via a supply and return distribution system which runs above ceilings thru building #1 & #2 to get to the respective building segments. The system circulates hot water to fin-tube radiation, classroom unit ventilators and heating & ventilating units located throughout the building.
The boiler room has two (2) end suction close coupled floor mounted pumps serving the heating circulation zones. The pumps are Bell & Gossett 1510 series, 3 HP, each rated for 132 GPM @ 35 ft Head.

![System Pump with Hanging Capacitors](image_url)

The pumps appear to be operational however they show signs of bearing assembly and motor changes which would be expected for pumps of this age. However one appears to be out of service with start capacitors hanging from motor as shown in attached photo. During a substantial renovation project new pumps with premium efficient motors and variable speed drives would result in good energy saving potential.

**Ventilation:**

Classroom unit ventilators are located throughout the classroom wings with the exception that there are none in the classroom spaces on the upper 2 floors of building #1. Units are located along exterior walls and each has an outdoor air louver and associate control dampers to allow outdoor air to enter the classroom space through the unit ventilator. Typically during occupied periods, the unit fans are to run continuous to provide space ventilation and electric control valves and/or dampers modulate flow through the heating coils to maintain space temperature. During our inspection most units in building #2 & 3A were found to be operating but several were not and non in the basement of building #1 were operational.
We need to open a unit to confirm the presence of face and bypass damper control on the coils which can make them less prone to freezing, especially for the hot water units located in building #3A.

Most of the lower level classroom unit ventilators have outdoor air intakes that are very close to grade. Current mechanical code would require these intakes to be at least 9” above grade and located in a non-vegetated (no grass) area. In addition, to comply with MA-CHPS these intakes must be at least 6 feet above grade.

The units still being operational is a testament to good maintenance however, most are in fair to poor condition and all have well exceeded their expected service life of 20 years as defined by ASHRAE. As such, any substantial renovation should include replacement of these units. There are several strategies to provide fresh air to the rooms that would not require classroom unit ventilators which are generally considered noisy and present additional maintenance and indoor air quality issues.

Most classroom exhaust for building #2 & #3A is supported by central roof exhaust fans connecting to exhaust ductwork and grilles located within closet spaces of each classroom area. According to the original design drawings the exhausters are sized to exhaust the minimum
amount of fresh air brought in by the unit ventilators. They are not sized to accommodate 100% outside air when the unit ventilators go into free cooling (summer vent) mode if applicable.

Classrooms in building #1 are ventilated thru the use of outdoor air shafts with steam coils located in the basement level. Steam coils in these shafts cause air to be heated and drawn in through partially open windows in the basement level. The warm air rises up to classrooms on the upper floors and discharges to the rooms via high supply air grilles.

Exhaust for the classrooms in building #1 is passively vented out exhaust shafts connecting to low return grilles and lead to the roof. Although we could not confirm it during our walk-thru, often times these shafts had steam radiations in them to help accelerate the air out of the building. Obviously heating the air to cause it to enter and exit the building is not a cost effective option with today’s utility prices.
The cafeteria space is served by an air handling unit located over the kitchen space. The systems each have a supply fan, steam coil, filter section and mixing box for control of outdoor air. In addition there appears to be relief dampers which connect to the return duct and a large roof mounted relief hood. The unit has exceeded its useful expected service life as defined by ASHRAE and as such should be replaced during a renovation project. The unit was not operating during our inspection. As space also has fin-tube radiation, it is possible the unit is not operational which would imply that no outdoor air is being supplied to this space which is required by code.

The gymnasium space is served by air handling units located on mezzanine level mechanical spaces. The systems each have a supply fan, hot water coil, face & bypass dampers, filter section and external dampers for control of outdoor air and relief air ventilation rates. Roof mounted vent hoods connect to the return duct system to accommodate space exhaust as outdoor air levels increase. The units have exceeded their useful expected service life as defined by ASHRAE and as such should be replaced during a renovation project. The units were not operating during our inspection however being as they appear to be the only heat source for the gym we presume they do operate. We noted building EMS Automated Logic thermostats in the gym which apparently control these air handlers.
All building restrooms appear to have ducted exhaust systems. We were unable to confirm if these systems were operational during our visit. During a renovation, exhaust capacities must be addressed to insure proper air exchange rates in accordance with current codes.

In general, building outdoor air and exhaust ventilation rates appear to comply with outdated ventilation standards and will most likely need to be adjusted during a renovation project to support current ventilation standards.

Controls:

Controls of the building HVAC systems are a mix of manual, electric and a digital energy management system. The energy management system (EMS) appears to be limited to control of the boiler plant and the gymnasium air handlers. The EMS is manufactured by Automated Logic. Existing electric style controls control many of the individual classroom spaces in buildings #2 & #3. Building #1 individual space control appears to be limited to adjustment of manual steam valves at radiators.

Any substantial renovation should consider replacement of all the electric controls in the building with electronic based DDC type controllers. These controllers can enact numerous energy-saving routines such as optimized start and set-back, CO2 demand ventilation control, occupancy based ventilation control, space pressure control, etc….

Report prepared by:

Seaman Engineering Corporation

Kevin R. Seaman (e-signature)

Kevin R. Seaman P.E. LEED® AP
President
Existing Electrical Systems Review
Nelson Place Elementary
Worcester, MA

Date: January 24, 2014
Prepared by: Azim Rawji, P.E.

SUMMARY

ART Engineering (ART) has completed site surveys and reviewed available drawings for the existing 54,000 sq. ft. three story structure operating as an Elementary School in Worcester, Massachusetts. We have developed a Failed/Poor/Fair/Good/Excellent/Indeterminate rating system for the various electrical systems.

Failed – The equipment, component or system is no longer in proper operating condition.

Poor – The equipment, component or system is still in operation, but failure is imminent. Significant signs of deterioration are present and/or components may be missing from equipment. Significant repair work may be required.

Fair – The equipment, component or system in still in operation and still has some operational life left. Minor signs of deterioration may be present. Equipment has all its required components still working correctly. Minor repair work may be required.

Good - The equipment, component or system in still in operation and still has significant operational life left. No signs of deterioration are present and all components are in present and in proper working order. Some clearing may be required, but no repair work should be necessary.

Excellent - The equipment, component or system is in like-new condition. No signs of deterioration are present and all components are in present and in proper working order. No repair work is required and very minor cleaning is necessary.

Indeterminate – The equipment, component of system could not be accessed to determine its condition.

Most of the systems included in this study were found to have poor or fair overall ratings. There are many reasons for this, including the age and systems that do not meet current code requirements. The rating system takes into account the condition of the electrical systems as well as the types of systems, sizing and applicability for their respective spaces.

The Massachusetts State Building Code 780 CMR requires all buildings and structures and all parts thereof, both existing and new, and all systems and equipment therein which are regulated by the State Building Code to be maintained in a safe, operable and sanitary condition. All service equipment, means of egress, devices and safeguards which are required by the State Building Code in a building or
structure, or which were required by a previous statute in a building or structure, when erected, altered or repaired, shall be maintained in good working order.

**BUILDING ELECTRICAL SYSTEMS:**

The existing electrical service is rated 400A, 208Y/120V, 3-phase, 4-wire and is located in the basement art storage room. The main distribution switch appears to have been replaced in the last 10-20 years and is in good condition. All other equipment appears to be 30+ years old and is beyond its useful life. The distribution equipment is fed from overhead wires from a utility pole. The utility company metering is located adjacent to the main distribution equipment. The distribution equipment is by Square D.

The majority of the electrical distribution equipment appears to be 30+ years old and is beyond its useful life. It is unknown whether any of the existing systems have been maintained or tested per the manufacturer’s recommendations or system standards. The branch circuitry, outlets and lighting exceeds the 20-yr life expectancy for electrical installations.

Rating: Poor

**NORMAL DISTRIBUTION:**

The panelboards in the building are by Square D. The panelboards are located throughout the building and are circuit breaker type. Due to numerous alterations to the building the age of the panelboards varies greatly. The majority of the panelboards are in excess of 30-yr old and past their useful life. The wiring method appears to be pipe and wire throughout most of the building.

Rating: Poor

**GENERAL PURPOSE POWER:**

The general purpose power in the building is inadequate given the extensive use of extension cords and power strips.

Rating: Poor

**EMERGENCY/STANDBY GENERATOR POWER:**

The building is not equipped with a standby/emergency generator. Egress lighting and life safety is supported by backup battery.

Rating: N/A
**EGRESS & EXIT LIGHTING:**

The egress lighting consists of remote batteries with remote lighting units, normally off, located in the egress pathways. The majority of exit signs are backlit by incandescent bulbs; many were observed to have been burnt out. The exit signs do not comply with the graphics requirements in article 1011.5.1 of the Massachusetts State Building Code. NFPA Code requires a 90-minute battery backup system for emergency and egress lighting and that the system be tested monthly for 30-seconds, and annually for the full 90-minutes. No record of monthly or annual testing was observed. It does not appear that the exit signage and egress lighting comply system is in compliance with article 1011.5.3 of the Massachusetts State Building Code.

Rating: Poor

**LIGHTING AND CONTROLS:**

The lighting in the building is a mixture of fixtures with T8, T5, incandescent and metal halide lamps. Fluorescent fixtures with T8 lamps are in a majority of areas. Most of the existing fixtures were retrofitted with T8 ballasts and lamps as part of an energy conservation initiative.

Lighting control is by wall mounted switches with limited automated controls, occupancy sensing in some classrooms and no light harvesting sensors. The building’s perimeter lighting utilizes flood lights which produce light pollution and glare. In general, the lighting system does not meet today’s requirements for efficiency, controls and light pollution.

Rating: Poor

**TELECOMMUNICATIONS CABLING INFRASTRUCTURE:**

The telecommunications system comprises mostly of Category 5 cables for data and voice communications. The system is outdated and does not comply with the BICSI standards for telecommunications infrastructure. Telecommunications equipment is not installed in dedicated rooms or closets.

Rating: Poor

**VOICE COMMUNICATIONS EQUIPMENT:**

The school does not have a telephone system throughout the entire facility. Telephones are located in select offices for outside communication.

Rating: Poor

**FIRE ALARM SYSTEM:**

The fire alarm system is by Fire Control Instruments. The fire alarm control panel is non-addressable and is located in the main entry vestibule. The fire alarm control panel is a conventional zoned system, has exceeded its useful life and is considered obsolete. The number of visual signaling devices are
inadequate and do not comply with NFPA-72 2010 standards for visual notification. Overall coverage of the automatic fire detection devices is rated poor. Additional automatic detection and signaling devices need to be installed to comply with NFPA-72 2010 standards and the State

Rating: Poor

PUBLIC ADDRESS AND CLOCK SYSTEMS:

The school communications system is by Dukane. The system comprises of head end equipment located in the main admin office. Speakers are located in common areas and classrooms. The public address equipment appears to be obsolete. The clock system is by The Standard Electric Time Company. The system did not appear to be functioning.

Rating: Poor

AUDIO-VIDEO SYSTEMS:

N/A

Rating: Poor

VIDEO SURVEILLANCE, ACCESS CONTROL & INTRUSION DETECTION SYSTEMS:

There is no video surveillance system in the elementary school. A buzzer Entry System exists at the main entrance with door contact release at the administration desk. Security keypads exist in the administration office. The system appeared to be in working condition.

Rating: Poor
INTRODUCTION

On February 7, 2014, in collaboration with the office of Lamoureux Pagano Associates, Colburn & Guyette performed a site visit of the existing foodservice operation at the Nelson Place School in Worcester. Our goal for this exercise is to give a high level overview of the operation and to identify the existing building conditions as it relates to foodservice, equipment condition and conformance with health codes. The intent of our report is to provide assistance with the decision making process for future renovations or new construction to the foodservice facilities, as they relate to the overall proposed school project.

OVERVIEW

The Nelson School population is approximately 600 students, Pre-K through 6th grade. It is important to note that this facility is a satellite kitchen and not fully self supportive. Therefore, cooking, preparation and storage are minimized. The school is utilized for other programs which require it be operational on a year round basis. This needs to be taken into consideration for any future planning. Based on conversations with the Worcester Schools Foodservice Director the desired program designed in the best interest of the students for any new or renovated facility is to be a self-supportive fully functioning operation. In addition to the change to fully self supported, there is also a proposal for this school to be a model net zero school building. Therefore we will address this in regards to possible foodservice options to assist in achieving the net zero status.

SITE OBSERVATION

Typical back of house functions are lacking. This includes items such dry and refrigerated storage, clean appropriate work space and proper food storage. There is one walk-in cooler located in the seating area which is in seating area and can be accessed by the public. The compressor for the unit is mounted on top of the walk-in box, therefore rejecting hot air into the cafeteria space. Adjacent to the walk-in cooler are two antiquated reach-in refrigerators. It is unknown if the units are in good working order, however based on the age it is assumed they have reached their useful life expectancy. Food is warmed/cooked in a small commercial convection oven located in a room adjacent to the cafeteria. This room has double doors on the cafeteria side and main isle leading to cafeteria as well. Although the oven is located in the adjoining room it is set next to the doors on the isle side which remain open. This is a potential safety hazard. The oven has no exhaust system in place, so again it is rejecting heat into the general space. There is an old ceramic 2-bay sink that is used for a hand sink. No other rinse sink is available and the existing sink does not meet current health code or NSF (National Sanitation Foundation) standards. The room containing the oven has concrete block walls that are not sealed, glazed or covered which makes them difficult to clean. The ceiling appears to be plaster which is not easily cleanable. Per the local health department, both walls and ceiling are to be easily cleanable. The lighting is fluorescent with tubes

Nelson Place School –Foodservice Narrative
exposed to the room, this is a health code violation. The flooring appears to be a vinyl tile which is well past it's useful life and cannot be easily or properly cleaned for a food environment. Per the current health code, the flooring must be non-permeable and easily cleanable. The room containing the oven has an abundance of exposed plumbing and electrical pipes on the walls and ceiling. The exposed piping is not clean itself and difficult to clean around. The work space for foodservice is very limited. Work tables have chipped painted or wood legs and all are covered with tableclothes. All tables should be stainless steel or of a material that can be easily cleaned/sanitized and is non-water permeable. No dedicated foodservice mop sink is present for the foodservice operation, which is another code standard.

The serving operation is comprised of tables against a wall with disposable trays, required menu components and flatware. The cashier is at one end of the tables. No refrigerated food serving is provided or hot holding, this is not typical for a school facility. The walls, floors, ceiling and lighting are the same for the cafeteria space. All are not easily cleanable and have reached their useable life expectancy.

The following photos were taken during our site visit. The photos are intended to help support existing condition descriptions within the report.

Walk-in Cooler and Refrigerators

Small Convection Oven
Hand sink

Exposed piping

Work Tables
Serving / Display Tables

Lighting

Flooring
RECOMMENDATIONS

The MSBA will provide 1900 square feet for a full service kitchen under the current guidelines based on student population. The existing foodservice space is approximately 150 square feet which is extremely undersized even for a satellite operation. In either a renovation or new construction, the current operation should be decommissioned due to its condition and lack of space to accommodate any program. If the final decision for this project is to be a no build situation and only renovate the current operation, we estimate approximately 1300 square feet of the existing building will be required to accommodate appropriately feeding 600 students daily from a satellite kitchen. Components for this operation should consist of a new walk-in cooler (sized correctly and located in the kitchen space), mobile refrigerated cabinets utilized for transport as well as serving without over handling of product. New energy efficient convection oven and hot holding cabinets should replace the existing small convection oven. Replace the work tables with new NSF approved stainless steel units. Provide handsinks for serving, work and washing areas. Install an exhaust hood for the new oven. Trash and recycling should have dedicated space for proper disposal during lunch and storage between pick-up. The infrastructure of this space will need to be completely renovated to meet current building / health codes and to meet federally required menu platform for breakfast and lunch.

If the new operation is to be a full service kitchen and servery as planned, it is our opinion that the allocated 1900 square feet is undersized. The school will utilize two seatings for the lunch period. Based on the population and number of seatings, we believe three serving lines will be required. To accommodate the storage, preparation, cooking, washing and three serving lines, we estimate approximately 2800 square feet of foodservice space will be required. This is 900 square feet more than provided by current MSBA guidelines. Based on $200.00 per square foot, the estimated foodservice equipment budget for 2800 SF would be $560,000. This is for all new equipment delivered and set-in place, it does not include hard construction costs or final connections by trades.

The students and staff will benefit greatly from a more open, clean and ventilated space. Renovated/addition or new construction, the facility will have the ability to provide a full servery with all the typical aspects of a current and progressive school foodservice program. A newly constructed kitchen will provide the opportunity to bring all architectural, plumbing, electrical, HVAC, life safety and health codes up to current and future standards. The current conditions are in desperate need of change. They cannot meet the existing operational needs or code requirements. Due to the lack of current infrastructure and/or equipment, it is very difficult for the foodservice department to meet the 2010 requirements of the USDA National School Meal Program or provide an academically enhancing meal to students in general. As it cannot meet the current needs, it is obvious that any plan for a full service operation such as the proposed future program will not be possible without complete renovation and a substantial addition to the dining area. Due to the population, year round status and net zero building goals we recommend providing a new full service operation for any future planning for the Nelson Place School foodservice.
SUSTAINABLE FOODSERVICE EQUIPMENT OPTIONS

The following are current options available in the foodservice industry to assist in the goal of Net Zero, LEED and overall sustainability for the Nelson Place project. All have different ROI schedules and initial capital costs associated with their implementation. This list represents some of what is available and further study would be required to determine best fit for the project.

waste

- Up to 85% volume reduction
- Capacity 700 pounds of waste per hour
- Fits under a table - minimum height 34”
- Designed predominantly for food waste
- Recommended waste mix at least 50% food waste
- Stainless steel construction
- No tools required to clean
- Minimum water required
- WE credit 4.3: Water Use Reduction-Food Waste Systems 1 point
EnviroPure Technology

EnviroPure’s revolutionary food waste elimination systems are self-contained, continual feed, organic waste disposal systems designed to solve the environmental, operational and economic problems of dealing with food waste. EP systems fit seamlessly into any supermarket, commercial or industrial kitchen operation allowing food waste to be dealt with at the source where it is produced. The technology maintains optimal temperatures and oxygen levels necessary to hyper-accelerate the natural aerobic decomposition process. The secret is the all natural EP-BioMix formulation that provides the natural bacteria present in the food with critical nutrients required for rapid break down of food. The result is total elimination of food waste with NO odors, NO sludge build-up and NO system clean outs. EP systems can handle virtually any kind of food waste including vegetables, fruits, meat, fish, poultry, dairy products, bones, shells and pits, with complete decomposition typically occurring within 24 hours!

Anaerobic Digestion & Organics Diversion

In an oxygen-free environment, bacteria can convert organic materials into renewable biogas. Food waste that’s composted rather than dumped in a landfill can save nearly a ton of greenhouse gases for every ton of landfill avoided. Anaerobic Digester facilities use microbes to break down organic waste and create electricity and useable heat.

Dishwashing

Built-in Energy Saving Devices (ESD). The ESD is an internal condenser which utilizes the steam generated by the machine in the rinse and wash tanks to heat up incoming cold water entering the booster. The incoming cold water is heated up to approximately 110°F (43°C) and a built in booster will heat this water to 180°F (82°C) minimum for the final sanitizing rinse. Therefore no hot water line is required to the machine.
Equipment

Choose ENERGY STAR Certified Commercial Food Service Equipment

The ENERGY STAR program helps restaurant and commercial kitchen operators save energy and money on utility bills by identifying more energy efficient equipment. Purchasing ENERGY STAR certified CFS equipment for new construction or to replace aging equipment can cut kitchen utility costs without sacrificing features, quality, or style – all while making significant contributions to a cleaner environment. Certified equipment is 10-70% more efficient than standard equipment, depending on product type.

Walk-In Cooler/Freezer

Energy Saving Technology Evaporator Efficiency provides energy savings up to 40% over mechanically controlled systems. Ideal for walk-in coolers, closed door display cases, refrigerated warehouses, meat prep rooms, walk-in freezers and blast chillers. It eliminates unnecessary defrosts typically associated with timed based alternatives – reducing energy consumption and preserving product integrity to maximizes energy efficiency with less compressor run time resulting from shorter defrosts.

Exhaust Systems

Heat Recovery from exhaust:

A Heat Recovery Unit (HRU) is a packaged exhaust fan and make-up air unit with heat reclaim. The HRU recovers heat from exhaust air to preheat incoming make-up air, eliminating the need for a dedicated make-up air unit. In addition, during the summer, waste heat can be used to preheat hot water further accelerating the payback time.
Kitchen Demand Ventilation Controls:

Measuring temperature, steam and smoke in the hood, the hood adjusts the fan speed accordingly to save both fan energy and conditioned air. Demand control ventilation systems run at 40% to 80% of maximum speed. During actual cooking, the speed increases as needed up to 100% until smoke and vapors are removed, keeping the ambient temperature comfortable.

Demand ventilation saves up to 90% in fan energy and 50% in conditioned air.

In addition to the products listed above the following are other available technologies that can assist in reducing energy consumption as well as sustainable for the environment:

- High efficiency lighting in exhaust hoods and walk-in coolers/freezers
- Enhanced refrigeration management
- Heat reclaim for walk-in compressors
- Low Flow faucet aerators and pre-rinse assemblies
- Recirculating water where applicable
- Collection of waste oil for biofuel production

END OF REPORT
3.1.4 EVALUATION OF EXISTING CONDITIONS

G. Determination for Need & Schedule for Soils Exploration & Geotechnical Evaluation
3.1.4 EVALUATION OF EXISTING CONDITIONS

FEASIBILITY STUDY

G. Need for Soils Exploration & Geotechnical Evaluation

The following reports reviewed the Nelson Place site, the alternate sites, and have reported on findings from record information. Refer also to CR Environmental site assessments, where the USDA soil mapping is included. Generally, the soils are glacial till and are reported as adequate. Excavation costs and potential ledge cost will be the focus of future reviews.

Under the next phases of the project, soils boring and/or test pits will be scheduled in two phases. The first phase will be for general soils information and potential ledge depths whereas the second phase will be later in the project when footprint location of fields and building are determined. Additional borings and/or test pits will be done as appropriate.
January 31, 2014

Robert Para Jr., AIA
Lamoureux Pagano Associates
108 Grove Street, Suite 300
Worcester, MA 01605
Tel: (508) 752-2831
Fax: (508) 757-7769
E-mail: rpara@lamoureuxpagano.com

Re: Preliminary Subsurface Data Review
    Proposed Elementary School
    Nelson Place School Site and Assumption College Parcel
    Worcester, Massachusetts
    LGCI Project No. 1402

Dear Mr. Para:

Lahlaf Geotechnical Consulting, Inc. (LGCI) has performed a site visit and completed a preliminary review of the available subsurface data for the Nelson Place School site. Our services were performed in accordance with our proposal No. 13087 dated January 7, 2014. Mr. Michael Pagano of Lamoureux Pagano Associates (LPA) authorized our services in an e-mail dated January 16, 2014.

This letter includes a summary of our field observations, a summary of the subsurface data we reviewed, our opinion about possible foundation issues during construction, and our recommendations for subsurface explorations should this site be selected for the proposed construction.

Reviewed Documents

LGCI reviewed the following documents:

- Custom Soil Resource Report for Worcester County, Massachusetts, Northern Part (Soil Resource Report) dated October 29, 2013 and provided to us by LPA on November 19, 2013.


A plan titled: “Nelson Place Elementary School – Site Selection, Existing Site & Assumption Parcel,” (Existing Site Plan) Provided to us by LPA on December 30, 2013.

Site Location and Project Description

We understand that LPA was selected to conduct a feasibility study for the proposed Nelson Place Elementary School in Worcester, Massachusetts.

The existing school is located on Nelson Place near the intersection with Grove Street in Worcester, Massachusetts as shown in Figure 1. The site is bordered by Nelson Place on the northern side, by residential properties and Hapgood Road on the eastern side, by wooded land on the western side, and by private properties on the southern side. The site is occupied by the existing two-story school, parking lots, driveway, and athletic fields. The existing school consists of four buildings: a 1927 two-story structure which appears to have a partial basement, a 1954 one-story addition, and two 1967 additions, including a two-story building and a one-story gymnasium. Based on the Existing Site Plan, the site of a new school would consist of the Nelson Place School site and an undeveloped parcel of land located on the southern side of the school, labeled as “Assumption College Rear Land.” What appears to be a water stream with wetlands is located along the western boundary of the site.

We understand that as part of the feasibility study, LPA will be evaluating different options, including: renovation of the existing school, renovation and addition to the existing school, and construction of a new school. You indicated to us that in addition to the Nelson Place School site, LPA will be assessing the feasibility of three additional sites, including Forest Grove site, Slater Elementary School, and St. George Church (rear land). The focus of this letter is the Nelson Place School site. Our letter reports for other three sites will be submitted separately.

Based on a Memorandum contained in the Additional Information, issued by the Department of Code Enforcement and dated November 10, 2004, the 1927 portion of the existing building showed signs of deterioration to the brick veneer and the steel lintels in 2003. We understand that subsequent to that date, barricades were installed around the building and a shoring and bracing system was installed in the building to allow for its continued use.

Field Observations

An LGCI representative visited the site on January 21, 2014. At the time of our visit, the site was covered with 6 to 10 inches of snow. Surficial features such as rock outcrops were concealed by the snow.
The existing Nelson Place School is located on the northern side of the site. A paved driveway and parking lot, and a playground are located just south of the school. The area beyond the developed portion of the site is on a hill and is accessible through a gated dirt path located near the southwestern side of the existing building. An athletic field is located on the hill behind the school. The remainder of the site is wooded. The topography of the portion of the site south of the existing school is characterized by rolling, locally hummocky, terrain. Abundant surficial boulders could be observed at the ground surface.

Summary of Existing Subsurface Data

Soil Resource Report – Based on the Soil Resource Report, the soils over a small portion of the site near the western boundary consist of Freetown Muck. These materials are organic soils typical of swamp deposits. The Soil Resource Report indicates that the majority of the middle to southern portion of the site consists of Rock Outcrop Complex characterized by a thin layer of soil up to 3.5 feet in thickness overlying rock. The Soil Resources Report indicates that the other soils at the site are stony sandy loam that extends to depths in excess of 5 feet.

Surficial Geologic Maps – The surficial geologic map indicates that the natural soils at the site are mostly thin glacial till deposits consisting of non-sorted, non-stratified matrix of sand, some silt, and little clay, containing scattered gravel clasts and a few large boulders. The map also shows abundant rock outcrops or zones of shallow bedrock near the southern side of the site. Swamp deposits are present near the western boundary of the site. These deposits are generally less than 10 feet thick and overlying glacial till deposits or bedrock. The surficial geologic map of the site is shown in Figure 2.

Previous Borings – Six borings were advanced on the western side of the existing school in 1967. The borings were advanced to depths of up to 10 feet beneath the original ground surface. The subsurface conditions encountered in the previous borings consisted of up to 2 feet of topsoil, overlying very dense glacial till with boulders. Refusal was encountered in two of the previous borings at depths of 4.2 and 6.2 feet beneath the original ground surface.

The subsurface data summarized above are generally consistent with each other and indicate that the subsurface conditions at the site likely consist of topsoil, overlying a thin layer of glacial till consisting of silty sand and gravel with cobbles and boulders, overlying shallow bedrock. Organic soils are possibly present near the western boundary of the site.

Preliminary Recommendations

Please note that the review of available information summarized in this letter is not a substitute for a subsurface exploration program. The information gathered as part of this review may be incomplete and the recommendations derived therefrom are at best preliminary in nature and must be confirmed with actual subsurface explorations, laboratory testing, and geotechnical analyses.
Based on the available subsurface data, we believe that the subsurface conditions at the site are suitable to support shallow foundations after the surficial topsoil, subsoil, and root balls are removed. Rock blasting will likely be required. The lateral extent and quantity of rock blasting will depend on the location of the proposed building and on the proposed grades. Excavations for foundations and utilities in the glacial till are anticipated to generate a large quantity of boulders. The boulders and the blasted rock could be crushed on site during construction to produce materials to be used as backfill.

It is not known at this time whether the existing school will remain in use during construction. A major consideration during construction, if the existing school remains in use, will be associated with the effect of rock blasting on the existing building. In addition to nuisance to the building occupants from noise and vibrations generated during rock blasting operations, damage may occur to the building, especially within the portion of the building where deterioration of the structure was previously documented. Consideration should be given to construct the proposed building in the farthest portion of the site from the existing building. In addition, rock blasting will have to be controlled to reduce the magnitude of the vibrations.

To explore the depth to the bottom of the rock and to characterize the rock, we recommend performing test pits and soil borings at the site. We believe that an exploration program consisting of one day of test pits and one day of borings is sufficient during the schematic design phase. Additional test pits and borings, including rock cores should be performed, and at least two groundwater observation wells should be installed at the site during final design.

Limitations

Our letter is based on project information provided to us at the time of this letter. If changes to the type, size, and location of the proposed structures or to the site grading are made, the recommendations contained in this letter shall not be considered valid unless the changes are reviewed and the conclusions and recommendations modified in writing by LGCI. LGCI cannot accept responsibility for designs based solely on these preliminary recommendations.

It is not part of our scope to perform a more detailed site history; therefore, we have not explored for or researched the locations of buried utilities or other structures in the area of the proposed construction. Our scope did not include environmental services or services related to moisture, mold, or other biological contaminates in or around the site.

The recommendations in this letter are based in part on the data obtained from the review of existing subsurface data. The recommendations contained in this letter are at best preliminary in nature and must be confirmed with actual subsurface explorations, laboratory testing, and geotechnical analyses.
Mr. Robert Para, Jr., AIA  
January 31, 2014

Our letter has been prepared in accordance with generally accepted engineering practices and in accordance with the terms and conditions set forth in our agreement. No other warranty, expressed or implied, is made. This report has been prepared for the exclusive use of Lamoureux Pagano & Associates, Inc. for the specific application to the proposed elementary school at the Nelson Place site in Worcester, Massachusetts as conceived at this time.

If you have any questions or need further assistance, please contact us at (978) 330-5912.

Very truly yours,

Lahlaf Geotechnical Consulting, Inc.

[Signature]

Abdelmadjid M. Lahlaf, Ph.D., P.E.  
Principal Engineer

Attachments:  
Figure 1 – Site Location Map  
Figure 2 – Surficial Geologic Map
Approximate limits of Site

Approximate Scale: 1:25000
Contour intervals: 3 meters

Note: Figure based on USGS topographic map of North Worcester, MA from http://mapserver.mytopo.com

Client: Lamoureux Pagano Associates, Inc.
Project: Proposed Elementary School
Figure 1 – Site Location Map – Existing Nelson Place School Site and Assumption College Parcel

Project Location: Worcester, MA
LGCI Project No.: 1402
Date: Jan. 2014
Figure 2 - Surficial Geologic Map

Existing Nelson Place School Site and Assumption College Parcel

Project Location: Worcester, MA

LGCI Project No.: 1402

Date: Jan. 2014
3.1.4 EVALUATION OF EXISTING CONDITIONS

H. Environmental Site Assessments
PHASE I-ENVIRONMENTAL SITE ASSESSMENT

Nelson Place Elementary School
35 Nelson Place
Worcester, Massachusetts

Prepared for:

Mr. Ammar Dieb
Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702-6218

Prepared by:

Lord Associates, Inc.
1506 Providence Highway, Suite 30
Norwood, Massachusetts 02062

Project # 2076

February 5, 2014
February 5, 2014

Mr. Ammar Dieb
Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702-6218

RE: Phase I Environmental Site Assessment
35 Nelson Place
Worcester, Massachusetts

Dear Mr. Dieb:

Lord Associates, Inc. has completed a Phase I Environmental Site Assessment of the referenced property (the “Site”). Environmental investigations were completed with consideration to standard industry practice, the ASTM E-1527 site assessment standard entitled “Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process”, applicable regulations as defined by Chapter 21E of the Massachusetts General Laws, and the Massachusetts Contingency Plan (MCP, 310 CMR 40.0000). The purpose of this assessment was to identify “Recognized Environmental Conditions” as defined in ASTM E-1527-05, and to determine if additional investigation is warranted.

This assessment has not identified any Recognized Environmental Conditions (RECs) in connection with the subject Site.

Please refer to the attached report for specific details and findings of our assessment. We appreciate the opportunity to have provided our professional environmental consulting and analytical services.

Sincerely,

LORD ASSOCIATES, INC.

Ralph Tella, CHMM, LSP
President

Andrea J. Lang
Project Manager

Enc.: Phase I ESA
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1.0 INTRODUCTION

1.1 Purpose

Lord Associates, Inc. (LAI) has completed a Phase I Environmental Site Assessment for 35 Nelson Place Worcester, Massachusetts (the “Site”). The purpose of this assessment was to identify “Recognized Environmental Conditions” as defined in ASTM standard E1527-13 (the Standard), and to determine if additional investigation is warranted.

Recognized Environmental Conditions are defined as the presence or likely presence of any hazardous substances or petroleum products on the property under conditions that indicate an existing release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. The term Recognized Environmental Conditions is not intended to include de minimis conditions which generally do not present a material risk of harm to public health or the environment, and that generally would not be the subject of a notification and/or enforcement action if brought to the attention of appropriate governmental agencies.

The Phase I consisted of a Site reconnaissance and an assessment of the Site and surrounding properties for visual and/or olfactory evidence of the use, storage, and/or release of oil and/or hazardous material. The Phase I also included a review of federal, state, and local agency files regarding the history of the Site and surrounding area relative to the use, storage and/or release of oil and/or hazardous material.

Please note that an investigation for the presence of mold, asbestos and PCBs in building materials, lead-based paint, indoor air quality, or regulatory compliance is beyond the scope of work described by ASTM E 1527-13, therefore LAI did not explore those conditions.

1.2 Significant Assumptions

Factual information regarding operations, conditions, and other data provided by the Client, site contacts, third parties, and governmental agencies are assumed to be correct and complete.

1.3 Special Terms and Conditions

The Phase I ESA was conducted by LAI on behalf of Universal Environmental Consultants consistent with the agreed upon Scope of Work and LAI Standard Terms and Conditions. No other special terms and conditions were established in connection with these services.
2.0 SCOPE OF SERVICES

This assessment was performed following standard industry practice and with consideration to the ASTM E-1527-13 site assessment standard entitled “Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process. The investigation included completion of the following tasks:

1. A field investigation was performed including a visual surficial inspection of the Site and abutting properties; and

2. The following agencies were contacted to inquire of past ownership, complaints, or violations concerning environmental issues at the Site and vicinity.

   - The Massachusetts Department of Environmental Protection (MADEP)
   - The Worcester Tax Assessor’s Office
   - The Worcester Town Clerk’s Office
   - The Worcester Health Department
   - The Worcester Building Department
   - The Worcester Water Department
   - The Worcester Conservation Commission
   - The Worcester Fire Prevention Office
   - Environmental Data Resources Inc.
   - Sanborn Fire Insurance Maps

3.0 SITE DESCRIPTION

3.1 Site Location and Parcel Legal Description

Information provided indicates that the Site consists of a single lot totaling approximately 9.45 acres of land located at the south side of Nelson Place in Worcester, Massachusetts. A Site Location Map is included as Figure 1. The Site is designated as Lot 35, on Worcester Tax Assessor’s Maps J14 and J15 (Mblu # 21/002/00002). A Plot Plan is included as Figure 2 and a Site Plan depicting pertinent Site features is included as Figure 3.

Information provided indicates the Site longitude and latitude are approximately −71.821300° west and 42.295400° north, respectively. Universal Transverse Mercator (UTM) coordinates are approximately 4,686,216 meters north by 267,414 meters east.

3.2 Site and Vicinity General Characteristics

The Site is located at the south side of Nelson Place in Worcester, Massachusetts. The Site is occupied by the Nelson Place Elementary School. The building was constructed in three phases in 1927, 1954, and 1967. Information provided by the Worcester Assessor’s Office indicates the building was constructed in 1940, however Sanborn Maps depict the original portion of the building as being constructed in 1927. The building is surrounded...
by asphalt driveways and parking areas to the north and south. Landscaping also exists on the north side of the building as well as the east and west. Further south is a playground and wooded land.

3.3 Current Property Use

The Site property is occupied by Nelson Place Elementary School.

3.4 Description of Improvements

The Site is improved with one partial single-story and two-story school building constructed partially on slab and partially with a basement. The building totals 46,937 square feet in size and comprises roughly 15% of the total surface area of the Site.

The building is situated on the northern portion of the Site, with asphalt driveways and parking areas to the north and south. Landscaping also exists on the north side of the building as well as the east and west. Further south is a playground and wooded land. There are no pits, ponds, lagoons or surface water bodies located at the Site. A detailed Site description is presented in Section 4.0.

3.4.1 Wastewater

Wastewater generated on-Site is discharged to the municipal sewer system. No information pertaining to storm water handling and/or management was encountered during this assessment. Sumps and floor drains were observed in the boiler room.

3.4.2 Water Supply

Water is supplied by the Town of Worcester; the connection date was not available through files reviewed.

3.4.3 Wells

No potable, irrigation, injection, dry, or abandoned wells were observed or identified from the interviews or records reviewed.

3.4.4 Heating/Cooling System

The building is heated by forced hot water from boilers located in the basement of the original portion of the building; they are dual fueled by natural gas and heating oil contained in one 1,000-gallon AST. However, the boilers are currently running on natural gas. The building is also connected to natural gas which fuels the water heaters.
3.4.5 Solid Waste Disposal

Two solid waste dumpsters were observed at the Site; no staining was observed in the vicinity of the dumpsters. There were no areas of solid waste disposal, mounds or depressions, or areas apparently filled or graded by non-natural causes suggesting solid waste disposal observed.

3.4.6 Storage Tanks

LAI observed one 1,000-gallon heating oil aboveground storage tank (AST) associated with the boilers. Fire Prevention Department records indicate the Site also contains one 10,000-gallon heating oil underground storage tank (UST); no removal records were in the Fire Department files. However, the Worcester Schools Facility Director, Mr. James Bedard provided LAI with an Underground Storage Tank (UST) Closure report, prepared by Corporate Environmental Advisors, Inc. (CEA), dated November 2007. The report indicates that on July 30, 2007, one 10,000-gallon UST was removed from the Site. Following removal the UST, soil samples were collected from the excavation and submitted for analysis of volatile petroleum compounds (VPH) and extractable petroleum compounds (EPH). The results of the analysis indicate that none of the analytes were detected in concentrations exceeding the MCP most stringent reportable concentrations.

3.4.7 Transformers, Hydraulic Equipment and Other Potential Evidence of the Potential Use of Polychlorinated Biphenyls

Polychlorinated Biphenyls (PCBs) can be found in hydraulic-oil filled equipment (such as elevators and lifts), electrical motors, capacitors or transformers, and fluorescent light ballasts manufactured prior to July 2, 1979. They may also be found in paints, caulking and window glazing materials and a variety of other building materials.

LAI observed fluorescent light fixtures throughout the Site. The age of the fixtures could not be determined. However, it is not likely that the light ballasts were manufactured prior to 1979, as the average life span for the fluorescent fixtures is less than 15 years. Additionally, any light ballast manufactured after 1979 must be labeled “No PCB”.

No evidence of the use of PCBs in other equipment was observed on the Site during the inspections. However, a complete building material inspection for PCBs is beyond the scope of ASTM 1527.

3.5 Current Uses of Adjoining Properties

Residential properties surround the Site. No bulk fuel storage was observed on adjacent properties. The table below summarizes current abutting land usage.
Table 1
Area Land Usage

<table>
<thead>
<tr>
<th>Usage</th>
<th>Orientation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>North</td>
</tr>
<tr>
<td>Undeveloped land</td>
<td>South</td>
</tr>
<tr>
<td>Residential</td>
<td>East</td>
</tr>
<tr>
<td>Residential</td>
<td>West</td>
</tr>
</tbody>
</table>

4.0 USER PROVIDED INFORMATION

A summary of user provided information is provided below.

4.1 User Questionnaire

A User Questionnaire was provided to the user (Client) to assist the user and LAI in gathering information from the user that may be material to identifying RECs. LAI did not receive a response to the User Questionnaire that was provided to the user. Furthermore, the user did not provide any of the information requested in the questionnaire and required by Section 6 of the ASTM Standard E 1527-05. The lack of or inability to obtain this information represents a data gap. However, based on the findings of this report, the absence of this information is not considered a significant data gap.

4.2 Title Records

LAI did not review the property title.

4.3 Environmental Liens, Activity and Use Limitations

The owner has no knowledge of environmental liens, and the agency check revealed no listing for an Activity and Use Limitation in connection with the Site.

4.4 Specialized Knowledge

No specialized knowledge of Recognized Environmental Conditions was provided to LAI by the owner or client.

4.5 Commonly Known or Reasonably Ascertainable Information

No commonly known or reasonably ascertainable information regarding Recognized Environmental Conditions was provided to LAI by the owner or client.
4.6 Valuation Reduction for Environmental Issues

No information regarding the sale price of the Site in comparison to the expected value of the property was provided to LAI by the owner or client.

4.7 Owner, Property Manager, and Occupant Information

According to the Worcester Assessor’s Department, the current owner of the property is the City of Worcester School Department.

LAI conducted an interview with Mr. Joe Delgado, the school maintenance personnel. Mr. Delgado provided information regarding the history of the Site and operations at the Site.

4.8 Reason for Performing Phase I Study

A Phase I ESA is being conducted in connection with the renovation of the property.

5.0 RECORDS REVIEWS

A review of federal, state and local regulatory agency files was conducted in accordance with ASTM E-1527-05 standards to identify the use, generation, storage, treatment, disposal and/or release of oil and/or hazardous materials that may potentially impact the Site.

5.1 Municipal Offices

5.1.1 Assessor’s Office

Lord Associates, Inc. visited the municipal Assessor’s Office to review historical ownership information for the Site. This data was reviewed for the purposes of land use determination and should not be relied upon as a complete chain-of-title. The following table offers a summary of ownership information obtained at the assessor’s office for the Site.

<table>
<thead>
<tr>
<th>Grantee</th>
<th>Date of Acquisition</th>
<th>Book/Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albert Morton</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>City of Worcester</td>
<td>10/29/1926</td>
<td>2420/532</td>
</tr>
</tbody>
</table>

5.1.2 Health Department

LAI made inquiries at the municipal Board of Health (BOH). No records of environmental concern were on file for the Site.

Lord Associates, Inc.
5.1.3 Building Department

A review of files was requested at the municipal Building Department to obtain information on historical building alterations. No building permits of environmental significance were available for review.

5.1.4 Water Department

Water is supplied by the municipal Water Department; the connection date was not available.

5.1.5 Conservation Commission

A review of files was requested at the municipal Conservation Commission regarding environmental violations. No records were available pertaining to the Site.

5.1.6 Clerk’s Office

A review of files was requested at the municipal Clerk’s Office regarding environmental violations. No records were available pertaining to the Site.

5.1.7 Fire Prevention

LAI requested a review of information regarding the storage of hazardous materials at the Site from the municipal Fire Prevention Office. Fire Prevention Department records indicate that the Site currently contains one 10,000-gallon heating oil UST installed in 1998; no removal records for this tank were in the Fire Department files. However, the Worcester Schools Facility Director, Mr. James Bedard provided LAI with an Underground Storage Tank (UST) Closure report, prepared by Corporate Environmental Advisors, Inc. (CEA), dated November 2007. According to the Fire Department records the 10,000-gallon UST was installed in 1954 and originally contained No 5 fuel oil. A permit dated June 12, 1968, indicates that the original permit was amended to use No 2 fuel oil in place of No 5 and continue to use the same 10,000-gallon tank. A 1998 permit indicates that the UST was removed and replaced with an upgraded 10,000-gallon UST with 5 gallon overspill containment and overfill prevention valve.

5.2 Sanborn/Historical Map Review

Sanborn Fire Insurance Maps were reviewed for the Site and vicinity. Sanborn Maps usually show property use and underground commercial fuel storage for the purposes of insurance companies. The following Sanborn Maps were available for the Site.
Table 4
Sanborn Maps

<table>
<thead>
<tr>
<th>Map Year</th>
<th>Site Description</th>
<th>Area Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Direction</td>
</tr>
<tr>
<td>1936</td>
<td>Three buildings are depicted; one residential building and a stable on the north</td>
<td>North</td>
</tr>
<tr>
<td>1950</td>
<td>west, and the Nelson Place public school on the northeast. Notations indicate</td>
<td>South</td>
</tr>
<tr>
<td></td>
<td>that the school was constructed in 1927.</td>
<td>East</td>
</tr>
<tr>
<td></td>
<td></td>
<td>West</td>
</tr>
<tr>
<td>1978</td>
<td>The Nelson Place public school on the northern portion of the Site. Three</td>
<td>North</td>
</tr>
<tr>
<td></td>
<td>additions have been constructed; one in 1954 and two in 1968.</td>
<td>South</td>
</tr>
<tr>
<td></td>
<td></td>
<td>East</td>
</tr>
<tr>
<td></td>
<td></td>
<td>West</td>
</tr>
</tbody>
</table>

5.3 Historical Aerial Photograph Review

Aerial photographs from 1960, 1971, 1972, 2001 and 2005 were reviewed through the Historic Aerials website (www.historicaerials.com) and a current 2010 aerial photograph was reviewed from Google Earth. The following table summarizes the aerial photographs review.

Table 5
Aerial Photographs

<table>
<thead>
<tr>
<th>Aerial Year</th>
<th>Site Description</th>
<th>Area Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Direction</td>
</tr>
<tr>
<td>1960</td>
<td>The school building appears on the northern portion of the Site with one addition</td>
<td>North</td>
</tr>
<tr>
<td></td>
<td>on the west side. Cleared land appears on the southern portion.</td>
<td>South</td>
</tr>
<tr>
<td></td>
<td></td>
<td>East</td>
</tr>
<tr>
<td></td>
<td></td>
<td>West</td>
</tr>
<tr>
<td>1971</td>
<td>The school building appears similar to its current configuration. An athletic</td>
<td>North</td>
</tr>
<tr>
<td>1972</td>
<td>field appears centrally.</td>
<td>South</td>
</tr>
<tr>
<td>2001</td>
<td></td>
<td>East</td>
</tr>
<tr>
<td>2005</td>
<td></td>
<td>West</td>
</tr>
<tr>
<td>2010</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5.4 Radius Search for Properties of Environmental Concern

A radius search was conducted of federal and state-listed sites of potential environmental concern as outlined in ASTM E-1527 guidelines. The search was performed using software developed by Environmental Data Resources Inc. (EDR). The Site is identified on the US AIRS and FINDS databases; in compliance and with no violations. Sites identified within the designated ASTM search radii are summarized in the following table. The EDR report is included in Appendix B.

Table 6
Properties of Potential Environmental Concern

<table>
<thead>
<tr>
<th>NPL (1 mi.)</th>
<th>RCRIS (1 mi.)</th>
<th>CERCLIS (0.5 mi.)</th>
<th>Landfill (0.5 mi.)</th>
<th>STATE SITES (0.5 mi.)</th>
<th>LUST &amp; SPILLS (0.25 mile)</th>
<th>ERNS (Site/Abutters)</th>
<th>RCRIS (Site/Abutter)</th>
<th>UST (Site/Abutter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NI</td>
<td>NI</td>
<td>NI</td>
<td>NI</td>
<td>Browning-Ferris</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Industrial Roadway</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>69 Nelson Pl</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.18 mi W</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Elev Diff= +11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2-11912/RAO</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NI</td>
<td>NI</td>
<td>NI</td>
<td>NI</td>
<td>NI</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
All locations in Worcester, MA
N=north, S=south, W=west, E=east
Elev. Diff. = Difference in elevation from Site in feet
NPL = National Priorities List
RCRIS = Resource Conservation and Recovery Information System
TSDF = Treatment Storage & Disposal Facilities
ERNS = Environmental Response Notification System
NI = None Identified
NFA – LSP Opinion of No Further Action
RAO = Closed in accordance with MADEP Regulations
TierII = Listed with MADEP due to oil or hazardous material in soil/groundwater (not closed)
DPS = Downgradient Property Status (contamination is from an upgradient source)
UST = Underground Storage Tank
F = Final
AUL = Activity and Use Limitation

5.5 Massachusetts Department of Environmental Protection Review

Site-specific files were not reviewed at the Massachusetts Department of Environmental Protection (MADEP) since sites identified in the FirstSearch report have been closed out by the MADEP or the identified properties are located topographically and/or hydraulically downgradient from the Site. The identified properties, therefore, are not suspected to pose a material threat of harm to the Site.

5.6 Previous Reports

The Worcester Schools Facility Director, Mr. James Bedard provided LAI with an Underground Storage Tank (UST) Closure report, prepared by Corporate Environmental Advisors, Inc. (CEA), dated November 2007. The report indicates that on July 30, 2007, one 10,000-gallon UST was removed from the Site. Following removal the UST, soil samples were collected from the excavation and submitted for analysis of volatile
petroleum compounds (VPH) and extractable petroleum compounds (EPH). The results of the analysis indicate that none of the analytes were detected in concentrations exceeding the MCP most stringent reportable concentrations.

5.7 Physical Setting Sources

LAI reviewed information provided by the United States Geological Survey (USGS) in connection with physiographic conditions, soil and bedrock types. LAI also reviewed the MassGIS Resource Map for the area, and located natural resources during the Site Reconnaissance. According to the USGS Worcester Quadrangle Topographical Map, the elevation of the Site is approximately 625 feet above mean sea level. Topography of the Site vicinity is sloped down to the north and east. The direction of groundwater flow in the vicinity is estimated to the east.

No water bodies are located on the Site. Indian Lake is located approximately 800 feet to the east of the Site. Review of the Flood Insurance Rate Map, published by the Federal Emergency Management Agency (FEMA) indicated the Site is located in Zone X, areas outside the 500-year flood plain with less than 0.2% annual probability of flooding.

Review of the MassGIS Bureau of Waste Site Cleanup Priority Resources Maps published by the MADEP, indicated the Site is not located in a potential aquifer area. Review of the National Wetlands Inventory from the U.S fish and Wildlife Service, indicated that wetlands are located on the southeastern and southwestern portions of the Site and on the west adjacent property.

The Soil Survey of Worcester County indicates that the majority of the soil in the vicinity of the Site is classified as Paxton, described as a fine sandy loam with three to eight percent slopes.

5.8 Historical Use Information

Research regarding historical land usage of the Site and surrounding properties was conducted using data obtained from historical maps, parties familiar with the Site, and municipal officials. Based on information gathered through the course of this assessment, the following history of the Site has been prepared:

- The Site is occupied by the Nelson Place Elementary School. The building was constructed in three phases in approximately 1927, 1954 and 1967. The building has been utilized as a school since its construction. Prior to construction of the current Site building the Site was occupied by residential homes.
6.0 SITE RECONNAISSANCE

6.1 Methodology and Limiting Conditions

On January 10, 2013, LAI personnel conducted on-Site inspections, which consisted of a visual examination of the Site and portions of adjacent properties and interviews with Site personnel. Areas were examined for surficial indications of releases of oil and/or hazardous materials (OHM).

Mr. Joe Delgado, the school maintenance personnel accompanied our personnel during the inspection. A Site Plan depicting significant features observed is included as Figure 3 and photographs are included in Appendix A of this report.

6.2 Interior Inspection

The Site is located at the south side of Nelson Place in Worcester, Massachusetts. The Site is occupied by the Nelson Place Elementary School. The building was constructed in three phases in approximately 1927, 1954 and 1967. The Site is improved with one partial single-story and two-story school building constructed partially on slab and partially with a basement.

The basement of the original portion of the building contains the boiler room, fire suppression system and water heaters. Sumps and floor drains were observed in the boiler room. The remainder of the building is occupied by classrooms and offices.

No evidence of a significant surface release of OHM was observed through the course of our inspection. LAI did not inspect the roof.

6.3 Exterior Inspection

The building is situated on the northern portion of the Site, with asphalt driveways and parking areas to the north and south. Landscaping also exists on the north side of the building as well as the east and west. There are no pits, ponds, lagoons or surface water bodies located at the Site. One 1,000-gallon heating oil AST associated with the boilers. Topography is sloped gently toward the north.

Two solid waste dumpsters were observed at the Site; no staining was observed in the vicinity of the dumpsters. There were no areas of solid waste disposal, mounds or depressions, or areas apparently filled or graded by non-natural causes suggesting solid waste disposal observed. A playground followed by wooded land was observed on the southern portion of the Site.
7.0 INTERVIEWS

LAI interviewed the Mr. Joe Delgado, the school maintenance personnel in connection with property conditions and the potential for Recognized Environmental Conditions.

He was interviewed and questioned of any knowledge regarding environmental conditions or releases at the Site.

8.0 SUMMARY OF FINDINGS AND CONCLUSION

8.1 Findings

Lord Associates, Inc. has completed a Phase I Environmental Site Assessment of the Site. This assessment was performed with consideration to standard industry practice and the ASTM E-1527-13 site assessment standard entitled “Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process”. Our findings are presented below:

1. Information provided indicates that the Site consists of a single lot totaling approximately 9.45 acres of land located at the south side of Nelson Place in Worcester, Massachusetts. The Site is designated as Lot 35, on Worcester Tax Assessor’s Maps J14 and J15 (Mblu # 21/002/00002).

2. The Site is occupied by the Nelson Place Elementary School. Historical information indicates that the building was constructed in three phases in approximately 1927, 1954 and 1967. The building has been utilized as a school since its construction. Prior to construction of the current Site building the Site was occupied by residential homes.

3. Lord Associates, Inc. conducted an inspection of the Site consisting of a visual examination of the Site, immediate surrounding features, and abutting properties. The building is connected to municipal water and sewer systems. The building is heated by forced hot water from boilers located in the basement of the original portion of the building; they are dual fueled by natural gas and heating oil contained in one 1,000-gallon AST. However, the boilers are currently running on natural gas.

4. Municipal file reviews were performed. Fire Prevention Department records indicate the Site also contains one 10,000-gallon heating oil UST installed in 1998; no removal records for this tank were in the Fire Department files. According to the Fire Department records the 10,000-gallon UST was installed in 1954 and originally contained No 5 fuel oil. A permit dated June 12, 1968, indicates that the original permit was amended to use No 2 fuel oil in place of No 5 and continue to use the same 10,000-gallon tank. A 1998 permit indicates that the UST was removed and replaced with an upgraded 10,000-gallon UST with 5 gallon overspill containment and overfill prevention valve.
5. The Worcester Schools Facility Director, Mr. James Bedard provided LAI with an Underground Storage Tank (UST) Closure report, prepared by Corporate Environmental Advisors, Inc. (CEA), dated November 2007. The report indicates that on July 30, 2007, one 10,000-gallon UST was removed from the Site. Following removal the UST, soil samples were collected from the excavation and submitted for analysis of volatile petroleum compounds (VPH) and extractable petroleum compounds (EPH). The results of the analysis indicate that none of the analytes were detected in concentrations exceeding the MCP most stringent reportable concentrations.

6. Several State sites were identified in the radius search of waste sites in the vicinity. Based on the location, distance, and/or cleanup activities, it is our opinion that properties listed in the vicinity will not adversely impact the Site.

8.2 Conclusions

This assessment has not identified any Recognized Environmental Conditions (RECs) in connection with the subject Site located at 35 Nelson Place in Worcester, Massachusetts.

Any exceptions to, or deletions from, ASTM Practice E1527 are described in Section 9 of this report. Please note that an investigation for the presence of mold, asbestos and PCBs in building materials, lead-based paint, indoor air quality, or regulatory compliance is beyond the scope of work described by ASTM E 1527-13, therefore LAI did not explore those conditions.

9.0 RESTRICTIVE CONDITIONS

9.1 Limitations & Deviations

LAI recognizes the following limitations and/or deviations from the Standard with respect to this Phase I Environmental Site Assessment:

- LAI did not interview past owners of the Site;
- LAI did not interview owners of neighboring property;
- LAI did not review Title Records for the Site; and
- LAI did not conduct an evaluation of the purchase price of the Site compared to the fair market value.

9.2 Significance of Data Gaps

As described above, the deviations from the Standard constitute data gaps. However, it is our opinion that these data gaps do not raise reasonable concerns that would affect the ability to identify conditions indicative of a release or threatened release or Recognized Environmental Conditions (RECs) based upon other information collected during the course of the Phase I Environmental Site Assessment.
• Although the past owner and owners of neighboring property were not interviewed, site and surrounding area history does not indicate prior use involving oil and/or hazardous materials.
• In Massachusetts, all environmental liens and Activity and Use Limitations are identified on the MADEP sites database, which has been searched.
• Based on Site History, there is no reasonable indication that property value has been affected due to environmental concerns.

10.0 LIMITATIONS

No warranty, whether expressed or implied, is given with respect to this report or any opinions expressed herein. It is expressly understood that this report and the opinions expressed herein are based upon Site conditions, as they existed only at the time of assessment. Nothing in this report constitutes a legal opinion or legal service, and should not be relied upon as such. The data reported and the findings, observations, and opinions expressed in the report are limited by the Scope of Work. The Scope of Work was performed based on budgetary, time, and other constraints imposed by the Client, and the agencies and persons reviewed. In preparing this report, Lord Associates, Inc. has relied upon and presumed accurate certain information about the Site and adjacent properties provided by governmental agencies, the client and others identified in the report. Except as otherwise stated in the report, Lord Associates, Inc. has not attempted to verify the accuracy or completeness of any such information. This report has been prepared on behalf of and for the exclusive use of the client, and those immediate entities involved with the proximate financing of this project, solely for use in the environmental evaluation of the Site. Any reuse or reliance on this report by any other third party shall be done only with the written consent of LAI.

11.0 SIGNATURES AND ENVIRONMENTAL PROFESSIONAL STATEMENT

LAI declares that, to the best of our professional knowledge and belief, we meet the definition of Environmental Professional as defined in §312.10 of 40 CFR 312. LAI has the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. LAI has developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

This report is dated this February 5, 2014 and is signed by individuals who are duly authorized to do so.

Ralph Tella, CHMM, LSP
President

Andrea J. Lang
Project Manager
FIGURE 2: PLAT PLAN
LOT 35
35 NELSON PLACE
WORCESTER, MASSACHUSETTS
FIGURE 4: AERIAL MAP

35 NELSON PLACE
WORCESTER, MASSACHUSETTS

REFERENCE:
GOOGLE MAPS
User Remarks:
Lord Associates, Inc.  

PHOTOGRAPHIC RECORD  

Project #:  2076

Photo #1: North side of Site

Photo #2: West side of Site, facing south

Photo #3: East side of Site

Photo #4: South portion, facing west
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35 Nelson Place
35 Nelson Place
Worcester, MA 01605

Inquiry Number: 3829145.1s
January 13, 2014
## Search Summary Report

**TARGET SITE**

35 NELSON PLACE  
WORCESTER, MA 01605  

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# Search Summary Report

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**WORCESTER, MA 01605**

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- Totals --  
|            | 3   | 0  | 1  | 0  | 27 | 39 | 70 |
Site Information Report

Request Date: JANUARY 13, 2014  
Request Name: ANDREA J. LANG  
Search Type: COORD  
Job Number: NA

Target Site: 35 NELSON PLACE  
WORCESTER, MA 01605

Site Location

<table>
<thead>
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<th>Degrees (Decimal)</th>
<th>Degrees (Min/Sec)</th>
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Demographics

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RADON

Federal Area Radon Information for WORCESTER County: 1

Note: Zone 1 indoor average level > 4 pCi/L.  
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.  
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for Zip Code: 01605

Number of sites tested: 7

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<th>Average Activity</th>
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<th>% 4-20 pCi/L</th>
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Federal Area Radon Information for WORCESTER COUNTY, MA

Number of sites tested: 192

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<th>% 4-20 pCi/L</th>
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<td>34%</td>
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## Site Information Report

### RADON

**State Database: MA Radon**

**Radon Test Results**

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## Target Site Summary Report

**Target Property:** 35 NELSON PLACE  
WORCESTER, MA  01605

**JOB:** NA

**TOTAL:** 70  
**GEOCODED:** 31  
**NON GEOCODED:** 39

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## Sites Summary Report

**Target Property:** 35 NELSON PLACE  
WORCESTER, MA 01605  

**JOB:** NA

**TOTAL:** 70  
**GEOCODED:** 31  
**NON GEOCODED:** 39

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Sites Summary Report

**Target Property:** 35 NELSON PLACE

**WORCESTER, MA 01605**

**JOB:** NA

**TOTAL:** 70

**GEOCODED:** 31

**NON GEOCODED:** 39

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## Sites Summary Report

**Target Property:** 35 NELSON PLACE  
**WORCESTER, MA 01605**  
**JOB:** NA

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**TOTAL:** 70  
**GEOCODED:** 31  
**NON GEOCODED:** 39
## Sites Summary Report

**Target Property:** 35 NELSON PLACE  
**Worcester, MA 01605**  
**Job:** NA

**Total:** 70  
**GEOCODED:** 31  
**Non GEOCODED:** 39

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## Sites Summary Report

**Target Property:** 35 NELSON PLACE
WORCESTER, MA  01605

**Total:** 70  
**GEOCODED:** 31  
**NON GEOCODED:** 39

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## Sites Summary Report

**Target Property:** 35 NELSON PLACE  
**WORCESTER, MA 01605**  
**JOB:** NA

**TOTAL:** 70  
**GEOCODED:** 31  
**NON GEOCODED:** 39

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WORCESTER, MA 01609 | NON GC | N/A | N/A

SWF/LF | WORCESTER WIRE COMPANY DUMP | JAMES ST  
WORCESTER, MA 01600 | NON GC | N/A | N/A

FINDS | WORCESTER WIRE COMPANY DUMP | JAMES ST  
WORCESTER, MA 01600 | NON GC | N/A | N/A

RELEASE | CANADA IMPERIAL OIL ASPHALT RE | KANSAS ST AT RR SPUR  
WORCESTER, MA 01605 | NON GC | N/A | N/A

SHWS | CANADA IMPERIAL OIL ASPHALT RE | KANSAS ST AT RR SPUR  
WORCESTER, MA 01605 | NON GC | N/A | N/A

RELEASE | LENOX ST | LENOX ST  
WORCESTER, MA | NON GC | N/A | N/A

SHWS | LENOX ST | LENOX ST  
WORCESTER, MA | NON GC | N/A | N/A

RELEASE | UTILITY POLE NO 46 | MASSASOIT RD  
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SHWS | UTILITY POLE NO 46 | MASSASOIT RD  
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RELEASE | FORMER L FABER CO | SAINT JOHNS RD  
WORCESTER, MA | NON GC | N/A | N/A

SHWS | FORMER L FABER CO | SAINT JOHNS RD  
WORCESTER, MA | NON GC | N/A | N/A

RELEASE | UNION ST | UNION ST  
WORCESTER, MA | NON GC | N/A | N/A

SHWS | UNION ST | UNION ST  
WORCESTER, MA | NON GC | N/A | N/A
# Site Detail Report

**Target Property:** 35 NELSON PLACE  
**WORCESTER, MA 01605**  
**JOB:** NA

### FINDS

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**NAME:** NELSON PLACE SCHOOL  
**ADDRESS:** 35 NELSON ST  
**WORCESTER, MA**  
**WORCESTER**  
**SOURCE:** US EPA

---

**FINDS:**

Registry ID: 110043895531

Environmental Interest/Information System  
MA-EPICS - Massachusetts Environmental Protection Integrated Computer System
Site Detail Report

Target Property: 35 NELSON PLACE
WORCESTER, MA 01605

JOB: NA

US AIRS

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NAME: NELSON PLACE SCHOOL
ADDRESS: 35 NELSON PL
         WORCESTER, MA
         WORCESTER

SOURCE: US EPA

Backward: 1008296146
Forward: 641
A2

AIRS (AFS):

Air Minor Details:
EPA plant ID: 110021860459
Plant name: NELSON PLACE SCHOOL
Plant address: 35 NELSON STREET
         WORCESTER, MA 016050000
County: CENTRAL MASSACHUSETTS
Region code: 01
Dunn & Bradst #: Not reported
Air quality cntrl region: 118
Sic code: 8211
Sic code desc: Not reported
North Am. industrial classf: 611110
NAIC code description: Elementary and Secondary Schools
Default compliance status: IN COMPLIANCE - INSPECTION
Default classification: POTENTIAL UNCONTROLLED EMISSIONS < 100 TONS/YEAR
Govt facility: SOURCE OWNED OR OPERATED BY THE MUNICIPALITY
Current HPV: Not reported

Compliance and Enforcement Major Issues:
Air program: SIP SOURCE
National action type: Not reported
Date achieved: 00000
Penalty amount: Not reported

Air program: SIP SOURCE
National action type: Not reported
Date achieved: 00000
Penalty amount: Not reported

Air program: SIP SOURCE
National action type: Not reported
Date achieved: 00000
Penalty amount: Not reported

Historical Compliance Minor Sources:
State compliance status: IN COMPLIANCE - INSPECTION
Hist compliance date: 1004
Air prog code hist file: SIP SOURCE
State compliance status: IN COMPLIANCE - INSPECTION

- Continued on next page -
Site Detail Report

Target Property: 35 NELSON PLACE
WORCESTER, MA 01605

JOB: NA

US AIRS

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NAME: NELSON PLACE SCHOOL
ADDRESS: 35 NELSON PL
WORCESTER, MA
WORCESTER
SOURCE: US EPA

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Compliance & Violation Data by Minor Sources:

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US AIRS

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Air program code: SIP SOURCE
Plant air program pollutant: Not reported
Default pollutant classification: POTENTIAL UNCONTROLLED EMISSIONS < 100 TONS/YEAR
Def. poll. compliance status: IN COMPLIANCE - INSPECTION
Def. attainment/non attmnmt: ATTAINMENT AREA FOR GIVEN POLLUTANT
Repeat violator date: Not reported
Turnover compliance: Not reported

Air program code: SIP SOURCE
Plant air program pollutant: SULFUR DIOXIDE
Default pollutant classification: POTENTIAL UNCONTROLLED EMISSIONS < 100 TONS/YEAR
Def. poll. compliance status: IN COMPLIANCE - INSPECTION
Def. attainment/non attmnmt: ATTAINMENT AREA FOR GIVEN POLLUTANT
Repeat violator date: Not reported
Turnover compliance: Not reported

Air program code: SIP SOURCE
Plant air program pollutant: CARBON MONOXIDE
Default pollutant classification: POTENTIAL UNCONTROLLED EMISSIONS < 100 TONS/YEAR
Def. poll. compliance status: IN COMPLIANCE - INSPECTION
Def. attainment/non attmnmt: ATTAINMENT AREA FOR GIVEN POLLUTANT
Repeat violator date: Not reported
Turnover compliance: Not reported

Air program code: SIP SOURCE
Plant air program pollutant: TOTAL PARTICULATE MATTER
Default pollutant classification: POTENTIAL UNCONTROLLED EMISSIONS < 100 TONS/YEAR
Def. poll. compliance status: IN COMPLIANCE - INSPECTION
Def. attainment/non attmnmt: ATTAINMENT AREA FOR GIVEN POLLUTANT
Repeat violator date: Not reported
Turnover compliance: Not reported

Air program code: SIP SOURCE
Plant air program pollutant: VOLATILE ORGANIC COMPOUNDS
Default pollutant classification: POTENTIAL UNCONTROLLED EMISSIONS < 100 TONS/YEAR
Def. poll. compliance status: IN COMPLIANCE - INSPECTION
Def. attainment/non attmnmt: ALL OTHER NON-ATTAINMENT FOR PRIMARY AND SECONDARY STANDARDS
Repeat violator date: Not reported
Turnover compliance: Not reported
Environmental Interest/Information System

AFS (Aerometric Information Retrieval System (AIRS) Facility Subsystem) replaces the former Compliance Data System (CDS), the National Emission Data System (NEDS), and the Storage and Retrieval of Aerometric Data (SAROAD). AIRS is the national repository for information concerning airborne pollution in the United States. AFS is used to track emissions and compliance data from industrial plants. AFS data are utilized by states to prepare State Implementation Plans to comply with regulatory programs and by EPA as an input for the estimation of total national emissions. AFS is undergoing a major redesign to support facility operating permits required under Title V of the Clean Air Act.

The NEI (National Emissions Inventory) database contains information on stationary and mobile sources that emit criteria air pollutants and their precursors, as well as hazardous air pollutants (HAPs).

CRITERIA AND HAZARDOUS AIR POLLUTANT INVENTORY
Target Property: 35 NELSON PLACE
WORCESTER, MA 01605

 JOB: NA

SHWS

SHWS:

EDR ID: S102967222 DIST/DIR: 0.176 West ELEVATION: 652 MAP ID: 3

NAME: BROWNING-FERRIS INDUST ROADWAY RELEASE
ADDRESS: 69 NELSON PL
WORCESTER, MA 01605

SOURCE: MA Department of Environmental Protection

BROWNING-FERRIS INDUST ROADWAY RELEASE

S102967222

0.176 West

652

3

10/08/2013

ID/Status: 2-0011912 / RAO

Rev:

Action Date: 10/06/1997
Action Status: FOLOFF
Action Type: RLFA
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Notification Date: 10/06/1997
Category: TWO HR
Associated ID: Not reported
Current Status: Response Action Outcome
Status Date: 12/12/1997
Phase: Not reported
Response Action Outcome: A1 - A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Release Tracking Number/Current Status: 2-0011912 / RAO
Release Town: WORCESTER

Oil Or Haz Material: Oil
Location Type: ROADWAY
Source: VEHICLE

Click here to access the MA DEP site for this facility:

Chemicals:
Chemical: DIESEL FUEL
Quantity: 20 gallons

Actions:
Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.)
Action Date: 10/20/1997
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Immediate Response Action
Action Status: Oral Approval of Plan or Action
Action Date: 10/6/1997
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 10/6/1997
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: RLFA
Action Status: FOLOFF
Action Date: 10/6/1997

- Continued on next page -
**Site Detail Report**

Target Property: 35 NELSON PLACE  
WORCESTER, MA 01605

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| ADDRESS: 69 NELSON PL  
WORCESTER, MA 01605 |
| SOURCE: MA Department of Environmental Protection |

Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

- **Action Type**: RLFA  
- **Action Status**: FOLOFF  
- **Action Date**: 10/8/1997

Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

- **Action Type**: RNF  
- **Action Status**: Reportable Release under MGL 21E  
- **Action Date**: 12/12/1997

Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

- **Action Type**: Response Action Outcome - RAO  
- **Action Status**: RAO Statement Received  
- **Action Date**: 12/12/1997

Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.
## Site Detail Report

**Target Property:** 35 NELSON PLACE  
Worcester, MA 01605  

**JOB:** NA

### SHWS

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### NAME: RESIDENCE

**ADDRESS:** 47 INDIAN LAKE PKWY  
Worcester, MA 01605

**SOURCE:** MA Department of Environmental Protection

---

**SHWS:**  
Release Tracking Number/Current Status: 2-0017906 / TIERII  
Release Town: Worcester  
Notification Date: 06/18/2010  
Category: 120 DY  
Associated ID: Not reported  
Current Status: Tier II, a site/release receiving a total NRS score of less than 350, unless the site meets any of the Tier 1 Inclusionary Criteria (see above). Permits are not required at Tier 2 sites/releases and response actions may be performed under the supervision of an LSP without prior DEP approval. All pre-1993 transition sites that have accepted waivers are categorically Tier 2 sites.  
Status Date: 06/17/2011  
Phase: PHASE II  
Response Action Outcome: -  
Oil Or Haz Material: Oil and Hazardous Material

Click here to access the MA DEP site for this facility:

---

**Chemicals:**

- Chemical: C11 THRU C22 AROMATIC HYDROCARBONS  
  Quantity: 1620 milligrams per kilogram

- Chemical: C9 THRU C18 ALIPHATIC HYDROCARBONS  
  Quantity: 2280 milligrams per kilogram

- Chemical: 2-METHYLNAPHTHALENE  
  Quantity: 19.4 milligrams per kilogram

- Chemical: C9 THRU C10 AROMATIC HYDROCARBONS  
  Quantity: 162.2 milligrams per kilogram

- Chemical: NAPHTHALENE  
  Quantity: 29.6 milligrams per kilogram

- Chemical: FUEL OIL  
  Quantity: 6640 milligrams per kilogram

**Actions:**

- Action Type: A Notice sent to a Potentially Responsible Party (PRP)  
  Action Status: ALENT  
  Action Date: 4/6/2011  
  Response Action Outcome: Not reported

- Action Type: Tier Classification  
  Action Status: Transmittal, Notice, or Notification Received  
  Action Date: 6/17/2011  
  Response Action Outcome: Not reported

- Continued on next page -
Target Property: 35 NELSON PLACE
WORCESTER, MA 01605

JOB: NA

SHWS

EDR ID: S110361048 DIST/DIR: 0.589 ESE ELEVATION: 600 MAP ID: 4

NAME: RESIDENCE
ADDRESS: 47 INDIAN LAKE PKWY
WORCESTER, MA 01605

MA Department of Environmental Protection

Action Type: Phase 1
Action Status: Completion Statement Received
Action Date: 6/17/2011
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Tier 2 Classification
Action Date: 6/17/2011
Response Action Outcome: Not reported

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 6/18/2010
Response Action Outcome: Not reported

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 6/18/2010
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FOLOFF
Action Date: 7/2/2013
Response Action Outcome: Not reported

Action Type: Phase 1
Action Status: Level I - Technical Screen Audit
Action Date: 7/8/2011
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 9/23/2010
Response Action Outcome: Not reported
# Site Detail Report

## Target Property: 35 NELSON PLACE
WORCESTER, MA 01605

## JOB: NA

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<tr>
<th>EDR ID:</th>
<th>S104941812</th>
<th>DIST/DIR: 0.590 SSE</th>
<th>ELEVATION: 639</th>
<th>MAP ID: 5</th>
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### NAME: MAHER PROPERTY
### ADDRESS: 20 HANCOCK HILL DR
WORCESTER, MA 01609

### SOURCE: MA Department of Environmental Protection

### SHWS:
- Release Tracking Number/Current Status: 2-0013728 / RAO
- Release Town: WORCESTER
- Notification Date: 03/09/2001
- Category: 120 DY
- Associated ID: Not reported
- Current Status: Response Action Outcome
- Status Date: 03/15/2002
- Phase: Not reported
- Response Action Outcome: A2 - A permanent solution has been achieved. Contamination has not been reduced to background.
- Oil Or Haz Material: Oil

Click here to access the MA DEP site for this facility:

### Chemicals:
- **Chemical:** C9 THRU C18 ALIPHATIC HYDROCARBONS
  - Quantity: 3400 parts per million
- **Chemical:** C11 THRU C22 AROMATIC HYDROCARBONS
  - Quantity: 2220 parts per million

### Actions:
- **Action Type:** A Notice sent to a Potentially Responsible Party (PRP)
  - Action Status: ALSENT
  - Action Date: 1/17/2002
  - Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

- **Action Type:** Response Action Outcome - RAO
  - Action Status: Fee Received - FMCRA Use Only
  - Action Date: 3/15/2002
  - Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

- **Action Type:** Response Action Outcome - RAO
  - Action Status: RAO Statement Received
  - Action Date: 3/15/2002
  - Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

- **Action Type:** Response Action Outcome - RAO
  - Action Status: Level I - Technical Screen Audit
  - Action Date: 3/22/2002

- Continued on next page -
Target Property: 35 NELSON PLACE
WORCESTER, MA 01605

JOB: NA

SHWS

EDR ID: S102084120  DIST/DIR: 0.984 ESE  ELEVATION: 510  MAP ID: 30

NAME:  
ADDRESS: 75 77 GOLD STAR BLVD
WORCESTER, MA

SOURCE: MA Department of Environmental Protection

Action Type: Compliance and Enforcement Action
Action Status: Interim Deadline Letter Issued
Action Date: 7/9/2002
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

Action Type: Phase 1
Action Status: Level III - Comprehensive Audit
Action Date: 7/9/2002
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

Action Type: An activity type that is related to an Audit
Action Status: Audit Follow-up Completion Statement Received
Action Date: 9/23/2002
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.
Database Descriptions

NPL: NPL National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA’s Environmental Photographic Interpretation Center (EPIC) and regional EPA offices. NPL - National Priority List Proposed NPL - Proposed National Priority List Sites.

NPL Delisted: DELISTED NPL The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate. DELISTED NPL - National Priority List Deletions

CERCLIS: CERCLIS CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL. CERCLIS - Comprehensive Environmental Response, Compensation, and Liability Information System

NFRAP: CERCLIS-NFRAP Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site. CERCLIS-NFRAP - CERCLIS No Further Remedial Action Planned

RCRA COR ACT: CORRACTS CORRACTS identifies hazardous waste handlers with RCRA corrective action activity. CORRACTS - Corrective Action Report

RCRA TSD: RCRA-TSDF RCRAInfo is EPA’s comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat, or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste. RCRA-TSDF - RCRA - Treatment, Storage and Disposal

RCRA GEN: RCRA-LQG RCRAInfo is EPA’s comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month. RCRA-LQG - RCRA - Large Quantity Generators RCRA-SQG - RCRA - Small Quantity Generators. RCRA-CESQG - RCRA - Conditionally Exempt Small Quantity Generators.

Federal IC / EC: US ENG CONTROLS A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health. US ENG CONTROLS - Engineering Controls Sites List US INST CONTROL - Sites with Institutional Controls.

ERNs: ERNS Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances. ERNS - Emergency Response Notification System
Database Descriptions

State/Tribal CERCLIS: SHWS Contains information on releases of oil and hazardous materials that have been reported to DEP. SHWS - Site Transition List

State/Tribal SWL: SWF/LF Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites. SWF/LF - Solid Waste Facility Database/Transfer Stations


State/Tribal Tanks: UST Registered Underground Storage Tanks. UST’s are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program. UST - Summary Listing of all the Tanks Registered in the State of Massachusetts AST - Aboveground Storage Tank Database. INDIAN UST R8 - Underground Storage Tanks on Indian Land. INDIAN UST R9 - Underground Storage Tanks on Indian Land. INDIAN UST R1 - Underground Storage Tanks on Indian Land. INDIAN UST R7 - Underground Storage Tanks on Indian Land. INDIAN UST R5 - Underground Storage Tanks on Indian Land. INDIAN UST R4 - Underground Storage Tanks on Indian Land. INDIAN UST R6 - Underground Storage Tanks on Indian Land. INDIAN UST R10 - Underground Storage Tanks on Indian Land.

State/Tribal IC / EC: INST CONTROL Activity and Use Limitations establish limits and conditions on the future use of contaminated property, and therefore allow cleanups to be tailored to these uses. INST CONTROL - Sites With Activity and Use Limitation

ST/Tribal Brownfields: BROWNFIELDS Under Massachusetts law, M.G.L. c. 21E is the statute that governs the cleanup of releases of oil and/or hazardous material to the environment. The Brownfields Act of 1998 amended M.G.L. c. 21E by establishing significant liability relief and financial incentives to spur the redevelopment of brownfields, while ensuring that the Commonwealth’s environmental standards are met. Most brownfields are redeveloped with the benefit of liability protections that operate automatically under M.G.L. c. 21E. BROWNFIELDS - Completed Brownfields Covenants Listing

US Brownfields: US BROWNFIELDS Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs. US BROWNFIELDS - A Listing of Brownfields Sites

Other Haz Sites: US CDL A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments. US CDL - Clandestine Drug Labs
Database Descriptions


## Database Sources

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<tr>
<th>Database Source</th>
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<th>Update Frequency</th>
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<td>Quarterly</td>
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<td>EPA</td>
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<td>CERCLIS: EPA</td>
<td>EPA</td>
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</tr>
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<td>NFRAP: EPA</td>
<td>EPA</td>
<td>Quarterly</td>
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<td>RCRA COR ACT: EPA</td>
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<td>RCRA TSD: Environmental Protection Agency</td>
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<td>RCRA GEN: Environmental Protection Agency</td>
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<td>Federal IC / EC: Environmental Protection Agency</td>
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<td>ERNS: National Response Center, United States Coast Guard</td>
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<td>State/Tribal CERCLIS: Department of Environmental Protection</td>
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<td>State/Tribal LTANKS: Department of Environmental Protection</td>
<td>Updated Quarterly</td>
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<td>State/Tribal Tanks: Department of Fire Services, Office of the Public Safety</td>
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Database Sources

State/Tribal IC / EC: Department of Environmental Protection
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ST/Tribal Brownfields: Office of the Attorney General
    Updated Annually

US Brownfields: Environmental Protection Agency
    Updated Semi-Annually

Other Haz Sites: Drug Enforcement Administration
    Updated Quarterly

Spills: U.S. Department of Transportation
    Updated Annually

Other: Environmental Protection Agency
    Varies
### Street Name Report for Streets near the Target Property

**Target Property:** 35 NELSON PLACE  
WORCESTER, MA 01605  
**JOB:** NA

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<tr>
<th>Street Name</th>
<th>Dist/Dir</th>
<th>Street Name</th>
<th>Dist/Dir</th>
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<tbody>
<tr>
<td>Barnstable Rd</td>
<td>0.24 SE</td>
<td>Deborah Rd</td>
<td>0.08 NNW</td>
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<tr>
<td>Diana St</td>
<td>0.17 SSE</td>
<td>Gaylord St</td>
<td>0.18 SE</td>
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<td>Gaylord St</td>
<td>0.18 SE</td>
<td>Holden St</td>
<td>0.16 East</td>
</tr>
<tr>
<td>Hapgood Rd</td>
<td>0.07 East</td>
<td>N Pond Rd</td>
<td>0.19 ENE</td>
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<tr>
<td>Nelson Park Dr</td>
<td>0.05 North</td>
<td>Nelson Pl</td>
<td>0.03 NNW</td>
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<td>Neptune Rd</td>
<td>0.21 South</td>
<td>Red Wing Ln</td>
<td>0.10 WSW</td>
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<td>0.17 SSE</td>
<td>State Hwy 122A</td>
<td>0.15 ENE</td>
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<tr>
<td>Waycross St</td>
<td>0.19 ESE</td>
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35 NELSON PL

Location 35 NELSON PL

Mblu 21/ 002/ 00002/ /

Acct# 21-002-00002

Owner CITY OF WORCESTER SCHOOL DEPT

Assessment $3,729,700

PID 54906

Building Count 1

Current Value

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<tr>
<th>Assessment</th>
<th>Valuation Year</th>
<th>Improvements</th>
<th>Land</th>
<th>Total</th>
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<tbody>
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<td>2014</td>
<td>$2,614,300</td>
<td>$1,115,400</td>
<td>$3,729,700</td>
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</table>

Owner of Record

Owner CITY OF WORCESTER SCHOOL DEPT

Sale Price $0

Co-Owner

Book & Page 00000/

Address 20 IRVING ST

WORCESTER, MA 01609

Sale Date 01/01/1988

Ownership History

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Owner</td>
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<tr>
<td>CITY OF WORCESTER SCHOOL DEPT</td>
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Building Information
**Building 1: Section 1**

**Year Built:** 1940  
**Living Area:** 46937  
**Replacement Cost:** $4,618,263  
**Building Percent Good:** 55  
**Replacement Cost Less Depreciation:** $2,540,000

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<td>MODEL</td>
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<td>Occupancy</td>
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<tr>
<td>Exterior Wall 1</td>
<td>Brick/Stone</td>
</tr>
<tr>
<td>Exterior Wall 2</td>
<td>Concrete Block</td>
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<tr>
<td>Roof Structure</td>
<td>Flat</td>
</tr>
<tr>
<td>Roof Cover</td>
<td>T&amp;G Resden</td>
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<tr>
<td>Interior Wall 1</td>
<td>Drywall/Shtrk</td>
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<tr>
<td>Interior Wall 2</td>
<td>Plaster</td>
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<tr>
<td>Interior Floor 1</td>
<td>Hardwood</td>
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<tr>
<td>Interior Floor 2</td>
<td>Vinyl/Asphalt</td>
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<tr>
<td>Ext. Qual.</td>
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<tr>
<td>Int. Qual.</td>
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<tr>
<td>Bldg Use</td>
<td>CHARTER SCHL</td>
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<td>1st Floor Use:</td>
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<tr>
<td>Heat/AC</td>
<td>Steam</td>
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<tr>
<td>Frame Type</td>
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<td>Baths/Plumbing</td>
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**Building Sub-Areas**

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<td>Gross Leasable Area</td>
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<tr>
<td>GLU</td>
<td>GLA - Upper Story</td>
<td>17100</td>
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<tr>
<td>CAN</td>
<td>Canopy</td>
<td>2278</td>
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**Building Layout**

**Extra Features**

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<th>Legend</th>
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Land

Land Use

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<tr>
<th>Use Code</th>
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<th>Zone</th>
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<td>CHARTER SCHL</td>
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Land Line Valuation

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<th>Size (Sqr Feet)</th>
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Outbuildings

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<td>2012</td>
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<td>2011</td>
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<td>$3,782,800</td>
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APPLICATION


To the Chief of the Fire Department,

The undersigned, respectfully asks for a permit to keep, store, use or transport Fuel Oil, Kerosene #5.

(Here state what the permit is desired for, the amount, the place, and a description of the building and the business.)

City of Worcester, Nelson Place School, 31 Nelson Place

1-10,000 gal. tank for fuel oil storage for heating only to be located about 10 ft. from nearest bldg. which is of brick and concrete and used for a school.

Name: City of Worcester - School Dept
Address: City Hall, Worcester

Worcester, Mass., 19

This is to certify that

has been granted a license to

on the day of

Clerk of the License Board

To the License Board of the City of Worcester:

#5 Fuel Oil

The undersigned respectfully requests that a LICENSE be granted to Nelson Place School, 31 Nelson Place be amended to allow the use of #2 Fuel Oil in place of #5 Fuel Oil. (To use the present tanks)

Worcester, Mass., 6-12-68

s/ William F. Lynch Co. Inc.
Anthony Kokernak
Fuel Oil #5

Applicant:
City of Worcester,

Nelson Place School

Hearing: June 30, 1954

Licensed:
For: Motor Vehicles

APPROVED

Jun 4, 1954

CITY MANAGER

ON CONDITION THAT a reinforced concrete slab eight inches in thickness cover tank, if the tank is located in a driveway or where vehicles would be liable to pass over tank.
The Commonwealth of Massachusetts
Department of Fire Services
Office of the State Fire Marshal
P.O. Box 1026, State Road, Stow, MA 01775
APPLICATION FOR PERMIT

To: HEAD OF FIRE DEPARTMENT
WORCESTER ____________________________ (TANK INSTALLATION)

In accordance with the provisions of Chapter 148,
G.L. as provided in Sec. 10A-4 CMR 900, application is hereby
made by

City of Worcester

1) Name and Address of Owner
Worcester Public Schools
Telephone No. (Day) (508) 799-3151 (Night)

2) Name and Address of Operator
City of Worcester. Worcester Public Schools, 20 Irving Street, Worcester
Telephone No. (Day) (508) 799-3151 (Night)

3) Number of Tanks Location: 35 Nevada Place
Capacity 10,000 gallons
Content Heating Oil

4) Type of construction of each tank and its piping with tank approval number, if any upgrading tank with
5 gallon overspill containment bucket and overfill prevention valve.

5) Description of any provisions for cathodic protection, electrical isolation and detection of leaks

6) In storage facilities with more than one proposed tank, the applicant shall furnish the chief of the department
with a signed certificate by a qualified person stating that the proposed facility meets all the design
and construction requirements of 527 CMR 900.

7) Applicant shall furnish a plot plan of the site and the area surrounding it.

8) The Head of the Fire Department may require secondary containment.

Date: November 5, 1998

D.O.S. SAFE NUMBER M.O.L. C. 81. 4-5
984507261
Start Date 11/11/98

APPROVED: 
NOT APPROVED: 

(Additional information - reverse side)
EXIST. UNDERGROUND FUEL OIL STORAGE TANK
FILL DIA.: 12"x12" BOX
DEPTH TO TOP OF TANK: 24"
REMOVE EXIST. FILL AND REPLACE W/ NEW SPILL CONTAINMENT BUCKET AND OVERFILL PREVENTION VALVE
SEE DETAIL SHEETS
### Notification for Storage Tanks Regulated Under 527 CMR 9.00

**Forward completed form, signed by local fire department, to: Mass. UST Program, Office of the State Fire Marshal, 1010 Commonwealth Ave., Boston, MA 02215**

(Fire Department retains one copy of FP-290)

<table>
<thead>
<tr>
<th>A. New Facility (see instructions, #1)</th>
<th>B. Amended</th>
<th>C. Renewal</th>
</tr>
</thead>
</table>

**No. of tanks at facility**

**No. of continuation sheets attached**

**INSTRUCTIONS:** Form FP-290 (Notification for Aboveground and Underground Storage Tanks) is to be completed for each location containing underground or aboveground storage tanks regulated under 527 CMR 9.00. If more than five tanks are owned at this location, photocopy the following pages and staple continuation sheets to the form. The FP-290 must be completed in duplicate. Although the form may be photocopied, the facility owner or representative must sign each copy separately; photocopied signatures are not sufficient. Both copies of the FP-290 are to be forwarded to the local fire department, who will check all information and certify the forms. The fire department will retain one copy of the FP-290 for its records, and the facility owner shall be responsible for forwarding the other copy to the Office of the State Fire Marshal at the address above. The local fire department will issue the permit portion of the FP-290. However, registration is not complete until the FP-290 is received and checked by the Office of the State Fire Marshal. All questions on this form are to be answered. Incomplete forms will be returned.

**"New Facility"** means a tank or tanks located at a site where tanks have not been previously located. **"Facility street address"** must include both a street number and a street name. Post office box numbers are not acceptable, and will cause a registration to be returned. If geographic location of facility is not provided, please indicate distance and direction from closest intersection, e.g., (facilities at 199 North Street is located 400 yards southeast of Commons Road intersection).

### GENERAL INFORMATION

**Notification Required**

Fire Prevention Form FP-290 is to be used as Notification, Registration, and Permit for aboveground and underground storage tanks and tank facilities regulated under 527 Code of Massachusetts Regulations 9.00. No regulated aboveground or underground storage tank facility shall be installed, maintained, replaced, substantially modified or removed without a permit (FP-290) issued by the head of the local fire department. The owner of any storage facility shall within seven working days notify the head of the local fire department and the State Fire Marshal in any change in the name, address, or telephone number of the owner or operator of a storage facility subject to regulation by Chapter 148, Mass. General Law and by 527 CMR 9.00.

**Underground Storage Tanks**

Each owner of an underground tank first put into operation on or after Jan. 1, 1991, shall, within thirty days after the tank is first put into operation, notify the Department of Public Safety (the department) of the existence of such tank, specifying, to the extent known, the owner of the tank, date of installation, capacity, type, location, and use of such tank. By no later than Jan. 31, 1991, each owner of an underground storage tank that was in operation at any time after Jan. 1, 1974, regardless of whether or not such tank was removed from beneath the surface of the ground at any time, shall notify the department of the existence of such tank, specifying, to the extent known, the owner of the tank, date of installation, capacity, type, location of the tank, and the type and quantity of substances stored in such tank, or which were stored in such tank before the tank ceased being in operation if the tank was removed from beneath the surface of the ground prior to the submittal of such notice to the department. Such notice shall also specify, to the extent known, the date the tank was removed from beneath the surface of the ground prior to the submittal of such notice to the department. The operator of any tank that has no owner or whose owner cannot be definitely ascertained, shall notify the department of the existence of such tank, specifying, to the extent known, any information relating to ownership of the tank, and date of installation, capacity, type, and location of the tank, and the type and quantity of substances stored in such tank, or which were stored in such tank before the tank ceased being in operation if the tank was removed from beneath the surface of the ground prior to the submittal of such notice to the department. If the tank was abandoned beneath the surface of the ground prior to the submittal of such notice to the department, such notice shall also specify, to the extent known to the owner or operator, the date the tank was abandoned in the ground and all methods used to stabilize the tank after the tank ceased being in operation.

### I. OWNERSHIP OF TANK(S)

**Owner Name (Corporation, Individual, Public Agency, or Other Entity)**

**Worcester Public Schools**

20 Irving Street

Street Address

**City**

**State**

**Zip Code**

**Worcester**

**MA**

**01609**

**County**

**(508) 799-3151**

**04:600-1418**

**Phone Number (Include Area Code)**

**Owner’s Employer, Federal ID #**

### II. LOCATION OF TANK(S)

If known, give the geographic location of tanks by degrees, minutes, and seconds. Example: Lat. 42, 36, 12 N Long. 85, 24, 17 W

**Latitude**

**Longitude**

**Distance and direction from closest intersection (see instructions #2)**

**Nelson Place**

**Facility Name or Company Site Identifier, as applicable**

35 Nelson Place

Street Address (P.O. Box not acceptable - see instructions #2)

**Worcester**

**MA**

**01605**

**City**

**State**

**Zip Code**

**Worcester**

**County**
<table>
<thead>
<tr>
<th>III. Type of Owner</th>
<th>IV. Indian Lands</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Federal Government</td>
<td>☐ Commercial (storage and sale)</td>
</tr>
<tr>
<td>☐ State Government</td>
<td>☐ Private (storage and use)</td>
</tr>
<tr>
<td>☒ Local Government</td>
<td>☐ Tanks are located on land within an Indian Reservation, other trust lands.</td>
</tr>
<tr>
<td></td>
<td>☐ Tanks are owned by native American nation, tribe, or individual</td>
</tr>
</tbody>
</table>

V. Type of Facility

Select the appropriate facility description: (check all that apply)

- Gas Station
- Petroleum Distributor
- Airport
- Aircraft Owner
- Vehicle Dealership
- Marina
- Railroad
- Federal - Military
- Industrial
- Contractor
- Trucking/Transport
- Utilities
- Residential
- Farm
- Other (explain) School

VI. Contact Person in Charge of Tanks

Name: Richard G. Bedard
Job Title: School Plant Manager
Address: 20 Irving Street, Worcester, MA 01609
Phone Number (include area code): (508) 799-3666
Fax: (508) 799-3151

VII. Financial Responsibility

☐ I have met the financial responsibility requirements in accordance with 527 CMR 9.00.

Check all that apply:

☒ Self Insurance
☒ Commercial Insurance
☐ Risk Retention Group
☐ Guarantee
☐ Surety Bond
☐ Letter of Credit
☐ State Fund
☐ Trust Fund
☐ Other Method Allowed - Specify

VIII. Environmental Site Information

This information should be available from local health agent, conservation commission, or planning department.

1. Tank site located in wellhead protection area
   - Yes ☐ No ☐ Unknown ☒
2. Tank site located in surface drinking water supply protection area
   - Yes ☐ No ☐ Unknown ☒
3. Tank site located within 100 feet of a wetland
   - Yes ☐ No ☐ Unknown ☒
4. Tank site located within 300 feet of a stream or water body
   - Yes ☐ No ☐ Unknown ☒

IX. Description of Storage Tanks and Piping (Complete for each tank at this location)

<table>
<thead>
<tr>
<th>Tank Identification Number</th>
<th>Tank No.</th>
<th>Tank No.</th>
<th>Tank No.</th>
<th>Tank No.</th>
<th>Tank No.</th>
</tr>
</thead>
</table>
1. Tank status
   a. Tank mfr's serial # (if known)
   b. Currently in Use
   c. Temporarily Out of Use
   d. Permanently Out of Use
   e. Aboveground storage tank (AST) or Underground storage tank (UST)
      - ☐ AST ☒ UST
2. Date of Installation (mo./day/yr.)
   - 10/10/2023
3. Estimated Total Capacity (gallons)
   - 10,100
4. Substance Currently or Last Stored
   a. Gasoline
   Motor vehicle or other use □ MV □ other □ MV □ other □ MV □ other □ MV □ other □ MV □ other
   b. Diesel
   Motor vehicle or other use □ MV □ other □ MV □ other □ MV □ other □ MV □ other □ MV □ other
   c. Kerosene
   d. Fuel Oil X
   e. Waste Oil
   f. Other, Please specify

Hazardous Substance (other than 4a thru 4e above)
CERCLA name and/or CAS number
Mixture of Substances
Please specify

5. Material of Construction - Tank (mark all that apply)
   Asphalt coated or bare steel X
   Cathodically protected steel
   Epoxy coated steel
   Composite (steel with fiberglass)
   Fiberglass reinforced plastic (FRP)
   Concrete
   Other, Please specify

6. Type of Construction-Tank (mark all that apply)
   Lined interior
   Double walled
   Single walled X
   Polyethylene tank jacket
   Excavation liner
   Unknown
   Other, please specify
   Has tank been repaired?
   □ Yes □ No □ Yes □ No □ Yes □ No □ Yes □ No □ Yes □ No
   Date
<table>
<thead>
<tr>
<th>Tank Identification Number (cont.)</th>
<th>Tank No. 1</th>
<th>Tank No. 2</th>
<th>Tank No. 3</th>
<th>Tank No. 4</th>
<th>Tank No. 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Material of Construction - Piping</td>
<td>Bare steel</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(mark all that apply)</td>
<td>Galvanized steel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fiberglass reinforced plastic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flexible</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Copper</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cathodically protected</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Secondary containment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unknown</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other, please specify</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

|                                    |            |            |            |            |            |

| 8. Type of construction - Piping | Double walled |            |            |            |            |
| (mark all that apply)           | Single walled | x          |            |            |            |
|                                    | Suction: Check valve at tank only | |            |            |            |
|                                    | Suction: Check valve at dispenser only | |            |            |            |
|                                    | Pressure    |           |            |            |            |
|                                    | Gravity feed |            |            |            |            |
|                                    | Other, please specify |       |            |            |            |
|                                    | Has piping been repaired? | Yes | No | Yes | No | Yes | No | Yes | No | Yes | No |
|                                    | Date        |            |            |            |            |

**X. TANKS/PIPING OUT OF USE**

<table>
<thead>
<tr>
<th>1. Tank/Piping closed or removed</th>
<th>(mark all that apply)</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A. Estimated date last used (mo./day/yr.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B. Estimated date of removal (mo./day/yr.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. Tank was removed from ground</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>D. Tank was not removed from ground</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tank was filled with inert material</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Describe:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>E. Piping was removed from ground</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>F. Piping was not removed from ground</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>G. Other, please specify</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identification Number (cont.)</td>
<td>Tank No.</td>
<td>Tank No.</td>
<td>Tank No.</td>
<td>Tank No.</td>
<td>Tank No.</td>
</tr>
<tr>
<td>------------------------------</td>
<td>----------</td>
<td>----------</td>
<td>----------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>Tank closed in accordance</td>
<td>□ Yes □ No</td>
<td>□ Yes □ No</td>
<td>□ Yes □ No</td>
<td>□ Yes □ No</td>
<td>□ Yes □ No</td>
</tr>
<tr>
<td>with 527 CMR 9.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Evidence of leak detected</td>
<td>□ Yes □ No</td>
<td>□ Yes □ No</td>
<td>□ Yes □ No</td>
<td>□ Yes □ No</td>
<td>□ Yes □ No</td>
</tr>
<tr>
<td>B. Mass. DEP notified</td>
<td>□ Yes □ No</td>
<td>□ Yes □ No</td>
<td>□ Yes □ No</td>
<td>□ Yes □ No</td>
<td>□ Yes □ No</td>
</tr>
<tr>
<td>1. Mass. DEP tracking number</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Agency or company performing assessment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**XI. CERTIFICATION OF COMPLIANCE**

1. Installation
   A. Installer certified by tank and piping manufacturers
      □ □ □ □ □□
   B. Installer certified or licensed by the implementing agency
      □ □ □ □ □□
   C. Installation inspected by a registered engineer
      □ □ □ □ □□
   D. Installation inspected and approved by the implementing agency
      □ □ □ □ □□
   E. Manufacturers' installation checklists have been completed
      □ □ □ □ □□
   F. Another method allowed by 527 CMR 9.00. Please specify
      □ □ □ □ □□

2. Tank Leak Detection
   (mark all that apply)
   □ □ □ □ □□
   A. Double-wall tank - Interstitial monitoring
      □ □ □ □ □□
   B. Approved in-tank monitor
      □ □ □ □ □□
   C. Continuous vapor monitoring in soil
      □ □ □ □ □□
   D. Monthly vapor monitoring in soil
      □ □ □ □ □□
   E. Inventory record-keeping and tank testing
      □ □ □ □ □□
   F. Other method allowed by 527 CMR 9.00. Please specify
      □ □ □ □ □□

3. Piping Leak Detection
   (mark all that apply)
   □ □ □ □ □□
   A. Pressurized
      Interstitial space monitor
      □ □ □ □ □□
      Automatic flow restrictor*
      □ □ □ □ □□
      Automatic shut-off device*
      □ □ □ □ □□
      Continuous alarm*
      □ □ □ □ □□
      * Also requires annual tank tightness test or monthly vapor monitoring of soil.
<table>
<thead>
<tr>
<th>Tank Identification Number (cont.)</th>
<th>Tank No.</th>
<th>Tank No.</th>
<th>Tank No.</th>
<th>Tank No.</th>
<th>Tank No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. Suction: Check valve at tank only</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interstitial space monitor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. Suction: Check valve at dispenser only</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None required</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D. Tightness tested</td>
<td>□ 1yr. □ 3 yr.</td>
<td>□ 1yr. □ 3 yr.</td>
<td>□ 1yr. □ 3 yr.</td>
<td>□ 1yr. □ 3 yr.</td>
<td>□ 1yr. □ 3 yr.</td>
</tr>
<tr>
<td>E. Other method allowed by 527 CMR 9.00. Please specify</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Spill containment and overfill protection

A. Spill containment device installed          |          |          |          |          |          |
B. Overfill prevention device installed        |          |          |          |          |          |

5. Daily Inventory Control

A. Manual gauging by stick and records reconciliation |          |          |          |          |          |
B. Mechanical tank gauge                        |          |          |          |          |          |
C. Automatic gauging system                     |          |          |          |          |          |

**XII. CERTIFICATION** (Read and sign after completing all sections)

NOTE: Both the copy being sent to the State Fire Marshal's Office and the copy retained by the local fire department must be signed separately. A photocopied signature will not be accepted on either document.

I declare under penalty of perjury that I have personally examined and am familiar with the information submitted in this and the attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete.

<table>
<thead>
<tr>
<th>Name and official title of owner or owner's authorized representative (Print)</th>
<th>Signature:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Richard C. Bedard, School Plant Manager</td>
<td>Richard C. Bedard</td>
<td>11/24/94</td>
</tr>
</tbody>
</table>
November 28, 2007

Mr. Jeffery Lassey
School Plant Division
Worcester Public Schools
20 Irving Street
Worcester, MA 01609

RE: Underground Storage Tank (UST) Closure
   Nelson Place School
   35 Nelson Place
   Worcester, Massachusetts
   CEA Project 6513-07

Dear Mr. Lassey,

This letter report summarizes monitoring and assessment activities performed by Corporate Environmental Advisors, Inc. (CEA) during UST closure activities at the above-referenced property. One 10,000-gallon fuel oil underground storage tank (UST) was removed from the subject property on July 30, 2007. The location of the site, former UST, and other pertinent site features are depicted on Figure 1, Site Sketch.

**UST Removal**

On July 30, 2007, one 10,000-gallon fuel oil, single walled steel UST, and associated piping was excavated and removed from the site. The UST was emptied prior to removal. The UST removal was approved by the City of Worcester Fire Department under a storage tank removal permit. A copy of the Fire Department permit is attached as Appendix A. Fire Inspector Thomas Hackett and CEA personal were present as the UST was removed from the ground by DB Environmental of Hanson, Massachusetts.

Upon removal, the UST was inspected for corrosion or signs of leakage. No visible holes were observed along the outside walls and bottom of the UST. Photographs of the UST and excavation area are attached as Appendix B.

The UST was transported to the William Reisner Corporation in Clinton, Massachusetts. A copy of the UST Disposal Receipt is attached as Appendix C.

Following the removal of the UST, several soil samples were collected from the excavation side walls and bottom. Using the Massachusetts Department of Environmental Protection (MADEP) jar headspace technique, collected samples were screened in the field with a mini-RAE Photoionization detector (PID). Pursuant to 310 CMR 40.0313(2), a 72-hour release notification

www.cea-inc.com

CORPORATE HEADQUARTERS: HARTWELL BUSINESS PARK • 127 HARTWELL STREET • WEST BOYLSTON, MA 01583 • PHONE: 508-835-8822 • FAX: 508-835-8812

Solutions Since 1985

Offices in Massachusetts, Connecticut, Rhode Island & New Hampshire
must be made to the MADEP if a soil sample collected within 10 feet of the exterior wall of the UST greater than 2 feet below grade has a headspace reading over 100 parts per million by volume (ppmv). During the removal of the 10,000-gallon UST, total organic vapors (TOVs) ranged from 0 to 14.4 ppmv in soil samples collected from the side walls and bottom of the excavation. A composite sample from all four side walls and a sample from the bottom of the excavation were collected for volatile petroleum hydrocarbons (VPH) and extractable petroleum hydrocarbon (EPH) analysis. All soil samples were properly preserved, stored on ice and transported to GeoLabs Inc. Environmental Laboratories (GeoLabs) of Braintree, Massachusetts.

No soil was stockpiled on-site during the UST removal and the excavation was backfilled on the same day.

**Analytical Results – Excavation Soil Samples**

Laboratory analytical results for soil samples collected on July 30, 2007 were compared to RCS-1 reportable concentrations. RCS-1 reportable concentrations were used because the site is a school and is also located within 500 feet of residential properties.

C₁₁-C₂₂ aromatics and phenanthrene were detected in the soil samples collected from the bottom and sidewalls of the excavation. These detections were below RCS-1 reportable concentrations. Therefore, reportable concentrations were not exceeded in the soil samples collected. Laboratory analytical results from all soil samples collected to date are further summarized in Table 1. A copy of the laboratory analytical report is attached as Appendix D.

**Soil Disposal**

No soil was generated for disposal during this UST removal. All construction debris and tank cleaning waste was managed by the contractor, DB Environmental.

**Current Site Conditions**

The excavation was backfilled to grade after the UST removal and soil excavation activities were completed. The area of the UST excavation has been paved over with asphalt and restored to a condition prior to the UST removal.

**Conclusions**

PID readings from all the soil samples collected within 10 feet of the UST system were less than 100.0 ppmv. EPH compounds were detected above laboratory detection limits, but below RCS-1 reportable concentrations in the collected soil samples. Therefore, a reportable condition was not encountered. No further subsurface investigation will be performed to assess the UST area as results indicate no release of petroleum occurred from the UST.
If you should have any questions or if you require additional information, please do not hesitate to contact our office at (508) 835-8822.

Sincerely,

CORPORATE ENVIRONMENTAL ADVISORS, INC.

James M. Gouin
Environmental Scientist I

Figure 1: Site Sketch
Table 1: Summary of Soil Analytical Results
Attachment A: Worcester Fire Department Removal Permit
Attachment B: Photographs of the UST Removal
Attachment C: UST Disposal Receipts
Attachment D: Soil Laboratory Analytical Report
FIGURE 1

SITE SKETCH
Table 1
Summary of Soil Analytical Results
<table>
<thead>
<tr>
<th>EPH Compounds</th>
<th>Reportable Concentrations (mg/kg)</th>
<th>Method 1 Cleanup Standards (mg/kg)</th>
<th>Sample ID</th>
<th>Bottom-1</th>
<th>Sidewalls</th>
</tr>
</thead>
<tbody>
<tr>
<td>C₉-C₁₈ Aliphatic</td>
<td>1,000</td>
<td>1,000</td>
<td></td>
<td>&lt;11.2</td>
<td>&lt;10.9</td>
</tr>
<tr>
<td>C₁₉-C₃₈ Aliphatic</td>
<td>3,000</td>
<td>3,000</td>
<td></td>
<td>&lt;11.2</td>
<td>&lt;10.9</td>
</tr>
<tr>
<td>C₁₁-C₂₂ Aromatic</td>
<td>200</td>
<td>800 / 800</td>
<td></td>
<td>17.1</td>
<td>35.6</td>
</tr>
<tr>
<td>Total PAH Target Concentration</td>
<td>NA</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acenaphthene</td>
<td>20</td>
<td>1,000 / 1,000</td>
<td></td>
<td>&lt;0.112</td>
<td>&lt;0.109</td>
</tr>
<tr>
<td>2-Methylnaphthalene</td>
<td>4</td>
<td>500 / 500</td>
<td></td>
<td>&lt;0.112</td>
<td>&lt;0.109</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>4</td>
<td>40 / 500</td>
<td></td>
<td>&lt;0.112</td>
<td>&lt;0.109</td>
</tr>
<tr>
<td>Phenanthrene</td>
<td>100</td>
<td>1,000 / 100</td>
<td></td>
<td>1.75</td>
<td>2.03</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VPH Compounds</th>
<th>Reportable Concentrations (mg/kg)</th>
<th>Method 1 Cleanup Standards (mg/kg)</th>
<th>Sample ID</th>
<th>Bottom-1</th>
<th>Sidewalls</th>
</tr>
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<tbody>
<tr>
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<td>100</td>
<td>100</td>
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<td>&lt;28.1</td>
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<tr>
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<td>40 / 500</td>
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<td>&lt;1.12</td>
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All results and standards in mg/kg
Concentrations bolded exceed RCS-1 Standards
Concentrations bolded and shaded exceed S-1(GW-2/GW-3) Standards

MCP standards 4-3-06
ATTACHMENT A

WORCESTER FIRE DEPARTMENT PERMIT
**APPLICATION and PERMIT**

for storage tank removal and transportation to approved tank disposal yard in accordance with the provisions of M.G.L. Chapter 148, Section 38A, 527 CMR 9.00, application is hereby made by:

### Tank Owner

<table>
<thead>
<tr>
<th>Tank Owner Name (please print)</th>
<th>CITY OF WORCESTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>455 MAIN ST WORCESTER MA 01608</td>
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### Tank Information

<table>
<thead>
<tr>
<th>Tank Location</th>
<th>35 NELSON PL, Worcester MA 01605</th>
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</thead>
<tbody>
<tr>
<td>Tank Capacity (gallons)</td>
<td>10,000</td>
</tr>
<tr>
<td>Tank Dimensions (diameter x length)</td>
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<tr>
<td>Remarks</td>
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### Disposal Information

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<th>Firm transporting waste</th>
<th>WESTERN OIL ENVIRONMENTAL</th>
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<tr>
<td>State Lic. #</td>
<td>RI 17133</td>
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<tr>
<td>E.P.A. #</td>
<td>RIR50025</td>
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<tr>
<td>Approved tank disposal yard</td>
<td>REISNER CORP</td>
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<tr>
<td>Tank yard #</td>
<td>011</td>
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<tr>
<td>Type of inert gas</td>
<td>CO2</td>
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<tr>
<td>Tank yard address</td>
<td>33 ELM ST CLINTON MA 01510</td>
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### Approvals

<table>
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<tr>
<th>City or Town</th>
<th>Worcester</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDID #</td>
<td>Permit #</td>
</tr>
<tr>
<td>Date of issue</td>
<td>Date of expiration</td>
</tr>
<tr>
<td>Dig safe approval number</td>
<td>20072599641</td>
</tr>
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After removal (s) (*Consumptive Use* fuel oil tanks exempted) send form FP-290 signed by Local Fire Department to Office of the State Fire Marshal, UST Regulatory Compliance Unit, P.O. Box 1025, Stow, MA 01775.

*International Fire Code Institute P-292 (revised 4/97)
ATTACHMENT B

PHOTOGRAPHS OF THE UST REMOVAL
Nelson Place School
35 Nelson Place Worcester, MA
UST Closure

Side wall of UST after it was removed from the UST grave.

Second sidewall of UST after it was removed from the UST grave.
UST being removed from the UST grave.

UST grave after the UST was removed.
ATTACHMENT C

UST DISPOSAL RECEIPTS
TANK DATA
Gallons 10,000
Previous Contents #2
Diameter ______ Length ______
Date Received 2-30-07
Serial # (If available) Dig Safe 20072509641
Tank I.D. # (Form FP-290) 20072509641

TANK REMOVED FROM
35 Nelson Pl
(Ward, Street)
WORCESTER
(City or Town)

Fire Department Permit # 200700002556

Owner/Operator to mail revised copy of Notification Form (FP290, or FP290R) to: UST Compliance, Office of the State Fire Marshal, P.O. Box 1025 State Road, Stow, MA 01775.

Commonwealth of Massachusetts
Department of Fire Services - Office of the State Fire Marshal
RECEIPT OF DISPOSAL OF UNDERGROUND STEEL STORAGE TANK

NAME AND ADDRESS OF APPROVED TANK YARD

APPROVED TANK YARD NO. 011 Tank Yard Ledger 502 CMR 3.03 (4) Number: 230

I certify under penalty of law I have personally examined the underground steel storage tank delivered to this "approved tank yard" by firm, corporation or partnership, ___________________________ and accepted same in conformance with Massachusetts Fire Prevention Regulation 502 CMR 3.00 Provisions for Approving Underground Storage Tank dismantling yards. A valid permit was issued by LOCAL Head of Fire Department. FDID# _______ _______ _______ to transport this tank to this yard.

Name and official title of approved tank yard owner or owners authorized representative: ___________________________ SCALE ___________________________ 7-30-07

SIGNATURE ___________________________ DATE SIGNED ___________________________

Each tank must have a receipt of disposal.
ATTACHMENT D

LABORATORY ANALYTICAL REPORTS
Tuesday, August 07, 2007

Brenda Dennison
DB Environmental
201 Maguan Street
Hanson, MA 02341

TEL: (781) 294-4285
FAX: (781) 293-5492

Project: Worcester Schools
Location:  

Order No.: 0707434

Dear Brenda Dennison:

GeoLabs, Inc. received 2 sample(s) on 7/31/2007 for the analyses presented in the following report.

There were no problems with the analyses and all data for associated QC met EPA or laboratory specifications.

Analytical methods and results meet requirements of 310CMR 40.1056(J) as per MADEP Compendium of Analytical Methods (CAM).

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Jim Chen
Laboratory Director

Certifications:

CT (PH-0148) - MA (M-MA015) - NH (2508) - NJ (MA009) - NY (11796) - RI (LA000252)
CASE NARRATIVE

Physical Condition of Samples

The project was received by the laboratory in satisfactory condition. The sample(s) were received undamaged, in appropriate containers with the correct preservation.

Project Documentation

The project was accompanied by satisfactory Chain of Custody documentation.

Analysis of Sample(s)

No analytical anomalies or non-conformances were noted by the laboratory during the processing of these samples.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature:                Position: Lab Director

Printed Name: Jim Chen      Date: August 7, 2007
VPH Methods

Method for Ranges: MADEP VPH 04-1.1
Method for Target Analytes: MADEP VPH 04-1.1

Carbon Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.

C5-C8 Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range. (MTBE, Benzene, Toluene)

C9-C12 Aliphatic Hydrocarbons exclude concentration of Target Analytes eluting in that range (Ethylbenzene, m&p-Xylenes, o-Xylene) AND concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION
Were all QA/QC procedures REQUIRED by the VPH Method followed? YES
Were all QA/QC performance/acceptance standards achieved? YES
Were any significant modifications made to the VPH method, as specified in Sec. 11.3? NO

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge, accurate and complete.

SIGNATURE:                POSITION: LAB DIRECTOR

PRINTED NAME: Jim Chen

DATE: August 7, 2007
GeoLabs, Inc.

CLIENT: DB Environmental  
Lab Order: 0707434  
Project: Worcester Schools  
Lab ID: 0707434-002

Reported Date: 07-Aug-07
Client Sample ID: Sidewalls 7-8"
Collection Date: 7/30/2007 2:00:00 PM
Date Received: 7/31/2007
Matrix: SOIL

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<tr>
<th>Analyses</th>
<th>Result</th>
<th>Det. Limit</th>
<th>Qual</th>
<th>Units</th>
<th>DF</th>
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</table>

| Analyses                          |        |            |      |         |    |               |
| **EPH TARGET ANALYTES - MADEP EPH** |        |            |      |         |    |               |
| Naphthalene                       | ND     | 0.109      |      | mg/Kg-dry | 1  | 8/3/2007 3:06:00 PM |
| 2-Methylnaphthalene               | ND     | 0.109      |      | mg/Kg-dry | 1  | 8/3/2007 3:06:00 PM |
| Acenaphthene                      | ND     | 0.109      |      | mg/Kg-dry | 1  | 8/3/2007 3:06:00 PM |
| Phenanthrene                      | 2.03   | 0.109      |      | mg/Kg-dry | 1  | 8/3/2007 3:06:00 PM |
| Total PAH Target Concentration    | 2.03   | 0          |      | mg/Kg-dry | 1  | 8/3/2007 3:06:00 PM |
| Surr: 2,2'-Difluorobiphenyl       | 73.0   | 40-140     | %REC | 1       | 8/3/2007 |
| Surr: 2-Fluorobiphenyl            | 80.8   | 40-140     | %REC | 1       | 8/3/2007 |

Qualifiers:  
B Analyte detected in the associated Method Blank  
H Holding times for preparation or analysis exceeded  
ND Not Detected at the Reporting Limit  
E Value above quantitation range  
J Analyte detected below quantitation limits  
S Spike Recovery outside accepted recovery limits
### ANALYTICAL QC SUMMARY REPORT

**TestCode:** VPH_S2  
**RunNo:** 18524  
**SeqNo:** 175123  
**Analysis Date:** 8/12/2007

#### Sample ID: MBLK-R18524  
**Client ID:** ZZZZZ  
**Batch ID:** R18524  
**TestNo:** VPH  
**Units:** mg/Kg  
**Prep Date:**  
**ND:** Not Detected at the Reporting Limit

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<th>SPK value</th>
<th>SPK Ref Val</th>
<th>%REC</th>
<th>LowLimit</th>
<th>HighLimit</th>
<th>RPD Ref Val</th>
<th>%RPD</th>
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#### Sample ID: LCS-R18524  
**Client ID:** ZZZZZ  
**Batch ID:** R18524  
**TestNo:** VPH  
**Units:** mg/Kg  
**Prep Date:**  
**ND:** Not Detected at the Reporting Limit

<table>
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<tr>
<th>Analyte</th>
<th>Result</th>
<th>PQL</th>
<th>SPK value</th>
<th>SPK Ref Val</th>
<th>%REC</th>
<th>LowLimit</th>
<th>HighLimit</th>
<th>RPD Ref Val</th>
<th>%RPD</th>
<th>RPDLimit</th>
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<td>0</td>
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<td>70</td>
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<td>o-Xylene</td>
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</table>

#### Qualifiers:  
- E: Value above quantitation range  
- II: Holding times for preparation or analysis exceeded  
- J: Analyte detected below quantitation limits  
- ND: Not Detected at the Reporting Limit  
- R: RPD outside accepted recovery limits  
- S: Spike Recovery outside accepted recovery limits
**Client:** UBEEnvironmental  
**Address:** 201 Main St, Hanson, MA  
**Contact:** Brenda Dennis

**Client Inspection:**

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Sample Location / ID</th>
<th>Sample Type</th>
<th>Quantity</th>
<th>Matrix</th>
<th>Comp</th>
<th>Grab</th>
<th>GeoLabs Sample Number</th>
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</thead>
<tbody>
<tr>
<td>7/30</td>
<td>10:30</td>
<td>Bottom-1, 11-1'</td>
<td>AV</td>
<td>5</td>
<td>S</td>
<td>K</td>
<td>7434-001</td>
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</tr>
<tr>
<td>7/30</td>
<td>2:00</td>
<td>Side-14, 17-8'</td>
<td>A</td>
<td>2</td>
<td>S</td>
<td>K</td>
<td>002</td>
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</table>

**Preservatives:**

- HCl

**Containers:**

- A: Amber
- B: Bag
- C: Can
- S: Summa
- V: Vial

**Matrix Codes:**

- GW = Ground Water
- DW = Drinking Water
- WW = Waste Water
- SL = Sludge

**Preservation:**

- Lab to do: Y/N

**Sample Handling:**

- Filtration: Done
- Preservation: Lab to do

**Requirements:**

- CT RCP (Reasonable Confidence Protocols)
- DEP
- QC

**Special Instructions:**

- Copy lab data to CEN. Fadlady@CEN-Inc.com
- Copy lab data to CEN. Fadlady@CEN-Inc.com

**Payment Terms:**

- Payment due within 30 days unless other arrangements are made. Past due balances subject to interest and collection costs. Note: Homeowners and Law Firms must pay when dropping off samples. We accept cash, check and credit cards.
3.1.4 EVALUATION OF EXISTING CONDITIONS

I. Assessment of the Facility for the Presence of Hazardous Materials
January 17, 2014

Mr. Rob Para
Lamoureux Pagano Associates
108 Grove Street
Worcester, MA 01605

Reference: Hazardous Materials Identification Survey
Nelson Place Elementary School, Worcester, MA

Dear Mr. Para:

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

Enclosed please find the report for Hazardous Materials Identification Survey at the Nelson Place Elementary School, Worcester, MA.

21E Site assessment report will be submitted under a separate cover.

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

Very truly yours,

Universal Environmental Consultants

______________________________
Ammar M. Dieb
President

UEC:\214 007\REPORT.DOC

Enclosure
REPORT
FOR
HAZARDOUS MATERIALS DETERMINATION
SURVEY
AT THE
NELSON PLACE ELEMENTARY SCHOOL
WORCESTER, MASSACHUSETTS

PROJECT NO: 214 007.00

Survey Dates:
January 9-10, 2014

SURVEY CONDUCTED BY:
UNIVERSAL ENVIRONMENTAL CONSULTANTS
12 BREWSTER ROAD
FRAMINGHAM, MA  01702
1.0 INTRODUCTION:

UEC has been providing comprehensive asbestos services since 2001 and has completed projects throughout New England. We have completed projects for a variety of clients including commercial, industrial, municipal, and public and private schools. We maintain appropriate asbestos licenses and staff with a minimum of twenty years of experience.

As part of the proposed renovation and demolition project, UEC was contracted by Lamoureux Pagano Associates to conduct the following services at the Nelson Place Elementary School, Worcester, MA:

- Asbestos Containing Materials (ACM) Inspection and Testing;
- Exterior Destructive Testing;
- Lead Based Paint (LBP) Inspection;
- Polychlorinated Biphenyls (PCB’s)-Electrical Equipment and Light Fixtures Inspection;
- Phase 1 Environmental Site Assessment (Will be submitted under a separate cover).

Information included in this report was based on the AHERA Management Plan, subsequent inspection report and on a determination inspection and testing performed by UEC. It is required that once a detailed scope of work is identified for a renovation or a demolition project, a comprehensive Environmental Protection Agency (EPA) NESHAP inspection including asbestos testing for all suspect materials and testing for other hazardous materials including Polychlorinated Biphenyls (PCB’s) should be performed, which would provide a more accurate hazardous materials abatement scope.

Additional PCB’s testing and abatement plans for EPA review are required to be performed should PCB’s was found in the caulking.

The scope of work included the inspection of accessible ACM, collection of bulk samples from materials suspected to contain asbestos, determination of types of ACM found and cost estimates for remediation. Bulk samples analyses for asbestos were performed using the standard Polarized Light Microscopy (PLM) in accordance with EPA standard.

Bulk samples were collected by a Massachusetts licensed asbestos inspector Mr. Jason Becotte (AI-034963) and analyzed by a Massachusetts licensed laboratory Asbestos Identification Laboratory, Woburn, MA.

Refer to samples results.

2.0 FINDINGS:

The regulations for asbestos inspection are based on representative sampling. It would be impractical and costly to sample all materials in all areas. Therefore, representative samples of each homogenous area were collected and analyzed or assumed.

All suspect materials were grouped into homogenous areas. By definition a homogenous area is one in which the materials are evenly mixed and similar in appearance and texture throughout. A homogeneous area shall be determined to contain asbestos based on findings that the results of at least one sample collected from that area shows that asbestos is present in an amount greater than 1 percent in accordance with EPA regulations.

All suspect materials that contain any amount of asbestos must be considered asbestos if it is scheduled to be removed per the Department of Environmental Protection (DEP) regulations.
**Number of Samples Collected**

**Interior of School:**

Forty three (43) bulk samples were collected from the following materials suspected of containing asbestos:

**Type and Location of Material**

1. Grey 12”x 12” vinyl floor tile at room 7 – 1927 Wing
2. Grey 12”x 12” vinyl floor tile at room 8 – 1927 Wing
3. White 12”x 12” vinyl floor tile at second floor side room – 1927 Wing
4. White 12”x 12” vinyl floor tile at second floor middle room – 1927 Wing
5. Glue daub at basement room – 1927 Wing
6. Glue daub at basement room – 1927 Wing
7. Interior door glazing caulking at room 2 – 1927 Wing
8. Interior door glazing caulking at room 4 – 1927 Wing
9. Black paper under hardwood floor at room 2 closet – 1927 Wing
10. Textured ceiling plaster at lobby – 1927 Wing
11. Textured ceiling plaster at lobby – 1927 Wing
12. Textured ceiling plaster at lobby – 1927 Wing
13. Hard plaster at hallway – 1927 Wing
14. Hard plaster at hallway – 1927 Wing
15. Hard plaster at hallway – 1927 Wing
16. Hard plaster at hallway – 1927 Wing
17. Hard plaster at hallway – 1927 Wing
18. Hard plaster at hallway – 1927 Wing
19. Hard plaster at hallway – 1927 Wing
20. Black paper under hardwood floor at stage – 1954 Wing
21. Interior window glazing caulking at hallway – 1954 Wing
22. Interior window glazing caulking at hallway – 1954 Wing
23. 2’x 4’ Suspended acoustical ceiling tile at room 10 – 1954 Wing
24. 2’x 4’ Suspended acoustical ceiling tile at room 12 – 1954 Wing
25. 1’x 1’ Acoustical ceiling tile at lobby – 1954 Wing
26. 1’x 1’ Acoustical ceiling tile at lobby – 1954 Wing
27. 2’x 4’ Suspended acoustical ceiling tile at room 14 – 1967 Wing
28. 2’x 4’ Suspended acoustical ceiling tile at room 19 – 1967 Wing
29. Interior window glazing caulking at hallway – 1967 Wing
30. Interior window glazing caulking at library – 1967 Wing
31. Interior door glazing caulking at room 14 – 1967 Wing
32. Interior door glazing caulking at room 19 – 1967 Wing
33. Hard wall plaster at room 14 – 1967 Wing
34. Hard wall plaster at room 14 – 1967 Wing
35. Hard wall plaster at room 19 – 1967 Wing
36. Hard wall plaster at room 19 – 1967 Wing
37. Hard wall plaster at room 21 – 1967 Wing
38. Hard wall plaster at room 21 – 1967 Wing
39. Hard wall plaster at room 21 – 1967 Wing
40. 2’x 4’ Suspended acoustical ceiling tile at gymnasium hallway
41. 2’x 4’ Suspended acoustical ceiling tile at gymnasium hallway
42. Beige 12”x 12” vinyl floor tile at gymnasium hallway
43. Beige 12”x 12” vinyl floor tile at gymnasium hallway
Exterior of School:

Thirty (30) bulk samples were collected from the following materials suspected of containing asbestos:

**Type and Location of Material**

44. Door framing caulking – 1927 Wing
45. Door framing caulking – 1927 Wing
46. Window framing caulking – 1927 Wing
47. Window framing caulking – 1927 Wing
48. Window glazing caulking – 1927 Wing
49. Window glazing caulking – 1927 Wing
50. Door framing caulking – 1954 Wing
51. Door framing caulking – 1954 Wing
52. Window framing caulking – 1954 Wing
53. Window framing caulking – 1954 Wing
54. Window glazing caulking – 1954 Wing
55. Window glazing caulking – 1954 Wing
56. Copper tar building flashing on foundation – 1954 Wing
59. Door framing caulking – 1967 Wing
60. Door framing caulking – 1967 Wing
61. Door glazing caulking – 1967 Wing
62. Door glazing caulking – 1967 Wing
63. Window glazing caulking – 1967 Wing
64. Window glazing caulking – 1967 Wing
65. Window glazing caulking – 1967 Wing
66. Window framing caulking – 1967 Wing
67. Window framing caulking – 1967 Wing
68. Window framing caulking at gymnasium
69. Window glazing caulking at gymnasium
70. Door framing caulking at gymnasium
71. Door framing caulking at gymnasium
72. Expansion joint caulking – 1927 Wing and Gymnasium
73. Expansion joint caulking – 1927 Wing and Gymnasium

**Samples Results**

**Type and Location of Material**

<table>
<thead>
<tr>
<th>Sample Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grey 12”x 12” vinyl floor tile at room 7 – 1927 Wing</td>
</tr>
<tr>
<td>Grey 12”x 12” vinyl floor tile at room 8 – 1927 Wing</td>
</tr>
<tr>
<td>White 12”x 12” vinyl floor tile at second floor side room – 1927 Wing</td>
</tr>
<tr>
<td>White 12”x 12” vinyl floor tile at second floor middle room – 1927 Wing</td>
</tr>
<tr>
<td>Glue daub at basement room – 1927 Wing</td>
</tr>
<tr>
<td>Glue daub at basement room – 1927 Wing</td>
</tr>
<tr>
<td>Interior door glazing caulking at room 2 – 1927 Wing</td>
</tr>
<tr>
<td>Interior door glazing caulking at room 4 – 1927 Wing</td>
</tr>
<tr>
<td>Black paper under hardwood floor at room 2 closet – 1927 Wing</td>
</tr>
<tr>
<td>Textured ceiling plaster at lobby – 1927 Wing</td>
</tr>
<tr>
<td>Textured ceiling plaster at lobby – 1927 Wing</td>
</tr>
</tbody>
</table>

**Interior of School:**

1. Grey 12”x 12” vinyl floor tile at room 7 – 1927 Wing | No Asbestos Detected |
2. Grey 12”x 12” vinyl floor tile at room 8 – 1927 Wing | No Asbestos Detected |
3. White 12”x 12” vinyl floor tile at second floor side room – 1927 Wing | No Asbestos Detected |
4. White 12”x 12” vinyl floor tile at second floor middle room – 1927 Wing | No Asbestos Detected |
5. Glue daub at basement room – 1927 Wing | No Asbestos Detected |
6. Glue daub at basement room – 1927 Wing | No Asbestos Detected |
7. Interior door glazing caulking at room 2 – 1927 Wing | No Asbestos Detected |
8. Interior door glazing caulking at room 4 – 1927 Wing | No Asbestos Detected |
9. Black paper under hardwood floor at room 2 closet – 1927 Wing | No Asbestos Detected |
10. Textured ceiling plaster at lobby – 1927 Wing | No Asbestos Detected |
11. Textured ceiling plaster at lobby – 1927 Wing | No Asbestos Detected |
12. Textured ceiling plaster at lobby – 1927 Wing  
13. Hard plaster at hallway – 1927 Wing  
14. Hard plaster at hallway – 1927 Wing  
15. Hard plaster at hallway – 1927 Wing  
16. Hard plaster at hallway – 1927 Wing  
17. Hard plaster at hallway – 1927 Wing  
18. Hard plaster at hallway – 1927 Wing  
19. Hard plaster at hallway – 1927 Wing  
20. Black paper under hardwood floor at stage – 1954 Wing  
21. Interior window glazing caulking at hallway – 1954 Wing  
22. Interior window glazing caulking at hallway – 1954 Wing  
23. 2’x 4’ Suspended acoustical ceiling tile at room 10 – 1954 Wing  
24. 2’x 4’ Suspended acoustical ceiling tile at room 12 – 1954 Wing  
25. 1’x 1’ Acoustical ceiling tile at lobby – 1954 Wing  
26. 1’x 1’ Acoustical ceiling tile at lobby – 1954 Wing  
27. 2’x 4’ Suspended acoustical ceiling tile at room 14 – 1967 Wing  
28. 2’x 4’ Suspended acoustical ceiling tile at room 19 – 1967 Wing  
29. Interior window glazing caulking at hallway – 1967 Wing  
30. Interior window glazing caulking at library – 1967 Wing  
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39. Hard wall plaster at room 21 – 1967 Wing  
40. 2’x 4’ Suspended acoustical ceiling tile at gymnasium hallway  
41. 2’x 4’ Suspended acoustical ceiling tile at gymnasium hallway  
42. Beige 12”x 12” vinyl floor tile at gymnasium hallway  
43. Beige 12”x 12” vinyl floor tile at gymnasium hallway  

**Exterior of School:**

44. Door framing caulking – 1927 Wing  
45. Door framing caulking – 1927 Wing  
46. Window framing caulking – 1927 Wing  
47. Window framing caulking – 1927 Wing  
48. Window glazing caulking – 1927 Wing  
49. Window glazing caulking – 1927 Wing  
50. Door framing caulking – 1954 Wing  
51. Door framing caulking – 1954 Wing  
52. Window framing caulking – 1954 Wing  
53. Window framing caulking – 1954 Wing  
54. Window glazing caulking – 1954 Wing  
55. Window glazing caulking – 1954 Wing  
56. Copper tar building flashing on foundation – 1954 Wing  
59. Door framing caulking – 1967 Wing  
60. Door framing caulking – 1967 Wing  
61. Door glazing caulking – 1967 Wing  
62. Door glazing caulking – 1967 Wing
63. Window glazing caulking – 1967 Wing No Asbestos Detected
64. Window glazing caulking – 1967 Wing No Asbestos Detected
65. Window glazing caulking – 1967 Wing No Asbestos Detected
66. Window framing caulking – 1967 Wing No Asbestos Detected
67. Window framing caulking – 1967 Wing 3% Asbestos
68. Window framing caulking at gymnasium No Asbestos Detected
69. Window glazing caulking at gymnasium No Asbestos Detected
70. Door framing caulking at gymnasium No Asbestos Detected
71. Door framing caulking at gymnasium No Asbestos Detected
72. Expansion joint caulking – 1927 Wing and Gymnasium 3% Asbestos
73. Expansion joint caulking – 1927 Wing and Gymnasium 3% Asbestos

3.0 OBSERVATION AND COST ESTIMATES:

OBSERVATIONS:

All ACM must be removed by a Massachusetts licensed asbestos abatement contractor under the supervision of a Massachusetts licensed project monitor prior to any renovation or demolition activities that might disturb the ACM.

1. 9”x 9” Vinyl floor tiles and mastic were previously assumed to contain asbestos. The ACM was found at throughout the school. The ACM was also found underneath new 12”x 12” vinyl floor tiles.
2. Pipe and hard joint insulation was previously assumed to contain asbestos. The ACM was found at throughout the school.
3. Interior door glazing caulking was found to contain asbestos. The ACM was found at the 1927 and 1967 Wings.
4. Interior window glazing caulking was found to contain asbestos. The ACM was found at the 1954 and 1967 Wings.
5. 2’x 4’ Suspended acoustical ceiling tile was found to contain asbestos. The ACM was found at the 1967 Wing and gymnasium hallway.
6. Exterior door framing caulking was found to contain asbestos. The ACM was found at the 1927 Wing.
7. Exterior window framing caulking was found to contain asbestos. The ACM was found at the 1954 and 1967 Wings.
8. Exterior window glazing caulking was found to contain asbestos. The ACM was found at the 1967 Wing.
9. Copper tar building flashing on foundation was found to contain asbestos. The ACM was found at the 1954 Wing. The demolition contractor will have to segregate the ACM from non-ACM building surfaces for proper disposal in an EPA approved landfill that does not recycle.
10. Expansion joint caulking was found to contain asbestos. The ACM was found between the 1954 and 1967 Wings.
11. Expansion joint caulking was found to contain asbestos. The ACM was found between the 1927 Wing and Gymnasium.
12. Paper under hardwood floors was assumed to contain asbestos. The ACM was assumed to exist at 1927 Wing and gymnasium.
13. Glue holding blackboard was assumed to contain asbestos.
14. All remaining suspect materials were found not to contain asbestos.
15. Roofing material was assumed to contain asbestos. Roofing material does not have to be removed by a licensed asbestos contractor. However, the General Contractor must comply with OSHA regulation during demolition and with state regulations for proper disposal.
16. Underground sewer pipe was assumed to contain asbestos.
17. Damproofing on foundation walls was assumed to contain asbestos. The demolition contractor will have to segregate the ACM from non-ACM building surfaces for proper disposal in an EPA approved landfill that does not recycle.
18. Painted surfaces were assumed to be LBP. A school is not considered a regulated facility therefore the Massachusetts Lead Law does not apply. All LBP activities performed, including waste disposal, should be in accordance with applicable Federal, State, or local laws, ordinances, codes or regulations governing evaluation and hazard reduction. In the event of discrepancies, the most protective requirements prevail. These requirements can be found in OSHA 29 CFR 1926-Construction Industry Standards, 29 CFR 1926.62-Construction Industry Lead Standards, 29 CFR 1910.1200-Hazards Communication, 40 CFR 261-EPA Regulations. According to OSHA, any amount of LBP triggers compliance.

19. Visual inspection of various equipments such as light fixtures, thermostats, exit signs and switches was performed for the presence of PCB’s and mercury. Ballasts in light fixtures were assumed not to contain PCB’s since there were labels indicating “No PCB’s”. Tubes, thermostats, exit signs and switches were assumed to contain mercury. It would be very costly to test those equipments and dismantling would be required to access. Therefore, the above mentioned equipments should be disposed in an EPA approved landfill as part of the demolition project.

20. Caulking and building materials were assumed to contain PCB’s. PCB’s are manmade chemicals that were widely produced and distributed across the country from the 1950s to 1977 until the production of PCB’s was banned by the EPA law which became effective in 1978. PCB’s are a class of chemicals made up of more than 200 different compounds. PCB’s are non-flammable, stable, and good insulators so they were widely used in a variety of products including: electrical transformers and capacitors, cable and wire coverings, sealants and caulking, and household products such as television sets and fluorescent light fixtures. Because of their chemical properties, PCB’s are not very soluble in water and they do not break down easily in the environment. PCB’s also do not readily evaporate into air but tend to remain as solids or thick liquids. Even though PCB’s have not been produced or used in the country for more than 30 years, they are still present in the environment in the air, soil, and water and in our food. EPA requires that all construction waste including caulking be disposed as PCB’s if PCB’s level exceed 50 mg/kg (ppm). Should PCB’s was found then EPA regulations must be implemented immediately. Therefore, no testing was performed during this survey, but will be performed prior to design development.

COST ESTIMATES:

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

<table>
<thead>
<tr>
<th>Location</th>
<th>Material</th>
<th>Approximate Quantity</th>
<th>Cost Estimate ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Throughout the School</td>
<td>9”x 9” Vinyl Floor tile and Mastic</td>
<td>23,000 SF</td>
<td>92,000.00</td>
</tr>
<tr>
<td></td>
<td>Pipe and Hard Joint Insulation</td>
<td>1,300 LF</td>
<td>26,000.00</td>
</tr>
<tr>
<td></td>
<td>Hidden Pipe and Hard Joint Insulation</td>
<td>Unknown</td>
<td>20,000.00</td>
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<tr>
<td></td>
<td>Ceiling/Walls Demolition to Access ACM</td>
<td>Unknown</td>
<td>25,000.00</td>
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<td></td>
<td>Blackboard and Glue</td>
<td>Unknown</td>
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<tr>
<td></td>
<td>Light Fixtures Tubes</td>
<td>1,600 Total</td>
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<td></td>
<td>Hidden and Miscellaneous ACM</td>
<td>Unknown</td>
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<td>1927 Wing</td>
<td>Paper under Hardwood Flooring</td>
<td>1,700 SF</td>
<td>8,500.00</td>
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<td></td>
<td>Interior Doors</td>
<td>25 Total</td>
<td>2,500.00</td>
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<tr>
<td>1954 Wing</td>
<td>Interior Windows</td>
<td>14 Total</td>
<td>1,400.00</td>
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<td>1967 Wing</td>
<td>Interior Doors</td>
<td>20 Total</td>
<td>2,000.00</td>
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<tr>
<td></td>
<td>Interior Windows</td>
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<td></td>
<td>2’x 4’ Suspended Acoustical Ceiling Tiles</td>
<td>20,000 SF</td>
<td>80,000.00</td>
</tr>
<tr>
<td>Location</td>
<td>Material</td>
<td>Approximate Quantity</td>
<td>Cost Estimate ($)</td>
</tr>
<tr>
<td>---------------------------</td>
<td>----------------------------------------------------</td>
<td>----------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Gymnasium Wing</td>
<td>Paper and Mastic under Hardwood Floor</td>
<td>4,000 SF</td>
<td>40,000.00</td>
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<tr>
<td></td>
<td>2’x 4’ Suspended Acoustical Ceiling Tiles</td>
<td>500 SF</td>
<td>5,000.00</td>
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<tr>
<td>1927 Wing Exterior</td>
<td>Doors with ACM Caulking</td>
<td>9 Total</td>
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<td>1954 Wing Exterior</td>
<td>Windows with ACM Caulking</td>
<td>70 Total</td>
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<tr>
<td>1967 Wing Exterior</td>
<td>Windows with ACM Caulking</td>
<td>135 Total</td>
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<td>Exterior of School</td>
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<td>Transite Sewer Pipes</td>
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<td>Thru-Wall Flashing</td>
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<td>Damproofing on Foundation Walls</td>
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<td>PCB’s Remediation</td>
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<td>Estimated costs for ACM Inspection and Testing Services</td>
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<td>Estimated costs for PCB’s Testing and Abatement Plans Services</td>
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<td>25,000.00</td>
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<tr>
<td>Estimated costs for Design, Construction Monitoring and Air Sampling Services</td>
<td></td>
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<tr>
<td><strong>TOTAL:</strong></td>
<td></td>
<td></td>
<td><strong>830,000.00</strong></td>
</tr>
</tbody>
</table>

1: Part of total demolition.
2: Should results exceed EPA limit.

### 4.0 DESCRIPTION OF SURVEY METHODS AND LABORATORY ANALYSES:

Asbestos samples were collected using a method that prevents fiber release. Homogeneous sample areas were determined by criteria outlined in EPA document 560/5-85-030a.

Bulk material samples were analyzed using PLM and dispersion staining techniques with EPA method 600/M4-82-020.

Inspected By:

Jason Becotte
Asbestos Inspector
5.0 LIMITATIONS AND CONDITIONS:

This report has been completed based on visual and physical observations made and information available at the time of the site visits, as well as an interview with the Owner’s representatives. This report is intended to be used as a summary of available information on existing conditions with conclusions based on a reasonable and knowledgeable review of evidence found in accordance with normally accepted industry standards, state and federal protocols, and within the scope and budget established by the client. Any additional data obtained by further review must be reviewed by UEC and the conclusions presented herein may be modified accordingly.

This report and attachments, prepared for the exclusive use of Owner for use in an environmental evaluation of the subject site, are an integral part of the inspections and opinions should not be formulated without reading the report in its entirety. No part of this report may be altered, used, copied or relied upon without prior written permission from UEC, except that this report may be conveyed in its entirety to parties associated with Owner for this subject study.
Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702
Suite/Apt

RE: Batch 2301
Results of Asbestos Project: Nelson Place, Worcester MA- Interior

Dear Ammar M. Dieb,

Asbestos Identification Laboratory has completed the analysis of the bulk samples Work Received: 1/13/2014 from your office. These results represent the bulk samples from the above-referenced project.

The information and analysis contained in this report have been generated using the EPA /600/R-93/116 Method for the Determination of Asbestos in Bulk Building Materials. Materials or products that contain more than 1% of any kind or combination of asbestos are considered an asbestos containing building material as determined by the EPA. This Polarized Light Microscope (PLM) technique may be performed either by visual estimation or point counting. Point counting provides a determination of the area percentage of asbestos in a sample. If the asbestos is estimated to be less than 10% by visual estimation of friable material, the determination may be repeated using the point counting technique. The results of the point counting supersede visual PLM results. Results in this report only relate to the items tested. This report may not be used by the customer to claim product endorsement by NVLAP or any other U.S. Government Agency.

- NVLAP Lab Code: 200919-0
- Massachusetts Certification License: AA000208
- State of Connecticut, Department of Public Health Approved Environmental Laboratory Registration# PH-0142
- State of Maine, Department of Environmental Protection Asbestos Analytical Laboratory License Number LB-0078(Bulk) LA-0087(Air)
- State of Rhode Island and Providence Plantations Department of Health Certification: AAL-121

Thank you Ammar M. Dieb for your business.

[Signature]

Analyzed by: Michael Manning
Owner/Director
(781)932-9600
# CHAIN OF CUSTODY

**BUILDING/SITE NAME:** Nelson Place  
**TOWN/CITY:** Worcester  
**WORK AREA:** Interior  
**STATE:** MA

<table>
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<th>Analysis Type</th>
<th>Turnaround Time (x)</th>
<th>Specific Project Notes</th>
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</thead>
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<td>12 hr</td>
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<tr>
<td>TEM / AHERA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TEM / Level II</td>
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<td></td>
</tr>
<tr>
<td>TEM / Dust</td>
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<tr>
<td>TEM / Bulk</td>
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<td>TEM / Water</td>
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<td>Other</td>
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</table>

<table>
<thead>
<tr>
<th>SAMPLE ID</th>
<th>MATERIAL DESCRIPTION</th>
<th>SAMPLE LOCATION</th>
<th>START</th>
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**ANALYZED BY:**  
Jason Beckett  
**DATE/TIME RECEIVED BY:** 11-3-14

**RELINQUISHED BY:**  
**DATE/TIME RECEIVED IN LAB BY:** 11-3-14
# CHAIN OF CUSTODY

**BUILDING / SITE NAME:** Nelson Place  
**WORK AREA:** Interior  
**TOWN / CITY:** Worcester  
**STATE:** MA

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**AMENDED BY:** Jason Beute  
**DATE / TIME:** 1-10-14  
**RELINQUISHED BY:**  
**DATE / TIME:**  
**DATE / TIME:** RECEIVED IN LAB BY:
# Chain of Custody

**Building/Site Name:** Nelson Place  
**Work Area:** Interior  
**Town/City:** Worcester  
**State:** MA

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Amended by: Jason Beecle  
Date/Time: 1-10-14  
Received by:  
Date/Time:  
Relinquished by:  
Date/Time:  
Received in Lab by:  
Date/Time:
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Results for Client Project: Nelson Place, Worcester MA- Interior, Batch# 2301

Work Received: 1/13/2014  Date Sampled: 1/10/2014  Results Sent: 1/16/2014 12:30:38 PM

Field_ID: 1 Material: Grey 12x12 VCT Color: Gray Location: 1927 Room 7 Sample# 29816 NON=100 None Detected

Field_ID: 2 Material: Grey 12x12 VCT Color: Gray Location: 1927 Room 8 Sample# 29817 NON=100 None Detected

Field_ID: 3 Material: White 12x12 VCT Color: White Location: 1927 2nd FL Side Room Sample# 29818 NON=100 None Detected

Field_ID: 4 Material: White 12x12 VCT Color: White Location: 1927 2nd FL Middle Room Sample# 29819 NON=100 None Detected

Field_ID: 5 Material: Glue Daub Color: Brown Location: 1927 Basement Room Sample# 29820 NON=100 None Detected

Field_ID: 6 Material: Glue Daub Color: Brown Location: 1927 Basement Room Sample# 29821 NON=100 None Detected

Field_ID: 7 Material: Interior Door Glaze Color: Gray Location: 1927 Room 2 Sample# 29822 NON=100 None Detected

Field_ID: 8 Material: Interior Door Glaze Color: Gray Location: 1927 Room 4 Sample# 29823 NON=098 ASBESTOS DETECTED CHR=002

Field_ID: 9 Material: Black Paper Under HWF Color: Black Location: 1927 Room 2 Closet Sample# 29824 CEL=070 NON=050 None Detected

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Field_ID: 17 Material: Hard Plaster Color: Multi Location: 1927 Hallway Sample# 29832 NON=100 None Detected
Field_ID: 18 Material: Hard Plaster Color: White Location: 1927 Hallway Sample# 29833 NON=100 None Detected
Field_ID: 19 Material: Hard Plaster Color: Multi Location: 1927 Hallway Sample# 29834 NON=100 None Detected
Field_ID: 20 Material: Tan Paper Under HWF Color: Brown Location: 1954 Stage Sample# 29835 CEL=090 NON=010 None Detected
Field_ID: 21 Material: Interior Window Glaze Color: Tan Location: 1954 Hallway Sample# 29836 NON=098 ASBESTOS DETECTED CHR=002
Field_ID: 23 Material: 2x4 SAT Color: Gray Location: 1954 Room 10 Sample# 29838 MNW=030 CEL=060 NON=010 None Detected
Field_ID: 24 Material: 2x4 SAT Color: Gray Location: 1954 Room 12 Sample# 29839 MNW=030 CEL=060 NON=010 None Detected
Field_ID: 25 Material: 1x1 SAT Color: Brown Location: 1954 Lobby Sample# 29840 CEL=098 NON=002 None Detected
Field_ID: 26 Material: 1x1 SAT Color: Brown Location: 1954 Lobby Sample# 29841 CEL=095 NON=005 None Detected
Field_ID: 27 Material: 2x4 SAT Color: Gray Location: 1967 Room 14 Sample# 29842FBG=085 NON=010 ASBESTOS DETECTED CHR=005
Field_ID: 28 Material: 2x4 SAT Color: Gray Location: 1967 Room 19 Sample# 29843FBG=085 NON=010 ASBESTOS DETECTED CHR=005
Field_ID: 29 Material: Interior Window Glaze Color: Gray Location: 1967 Hall Sample# 29844 NON=098 ASBESTOS DETECTED CHR=002
Field_ID: 30 Material: Interior Window Glaze Color: Gray Location: 1967 Library Sample# 29845 NON=098 ASBESTOS DETECTED CHR=002
Field_ID: 31 Material: Interior Door Glaze Color: Gray Location: 1967 Room 14 Sample# 29846 NON=098 ASBESTOS DETECTED CHR=002
Field_ID: 32 Material: Interior Door Glaze Color: Gray Location: 1967 Room 19 Sample# 29847 NON=098 ASBESTOS DETECTED CHR=002
Field_ID: 33 Material: Wall Plaster Color: White Location: 1967 Room 14 Sample# 29848 NON=100 None Detected
Field_ID: 34 Material: Wall Plaster Color: Multi Location: 1967 Room 14 Sample# 29849 NON=100 None Detected
Field_ID: 35 Material: Wall Plaster Color: Multi Location: 1967 Room 19 Sample# 29850 NON=100 None Detected
Field_ID: 36 Material: Wall Plaster Color: Multi Location: 1967 Room 19 Sample# 29851 NON=100 None Detected
Field_ID: 37 Material: Wall Plaster Color: Multi Location: 1967 Room 21 Sample# 29852 NON=100 None Detected
Field_ID: 38 Material: Wall Plaster Color: Multi Location: 1967 Room 21 Sample# 29853 NON=100 None Detected
Field_ID: 39 Material: Wall Plaster Color: Multi Location: 1967 Room 21 Sample# 29854 NON=100 None Detected
Field_ID: 40 Material: 2x4 SAT Color: Gray Location: Gym Hallway Sample# 29855FBG=085 NON=010 ASBESTOS DETECTED CHR=002
Field_ID: 41 Material: 2x4 SAT Color: Gray Location: Gym Hallway Sample# 29856FBG=085 NON=010 ASBESTOS DETECTED CHR=002
Field_ID: 42 Material: Beige 12x12 VCT Color: Tan Location: Gym Hallway Sample# 29857 NON=100 None Detected
Field_ID: 43 Material: Beige 12x12 VCT Color: Tan Location: Gym Hallway Sample# 29858 NON=100 None Detected

**End of Report**

Legend (All sample results represent percentages EX: 001 = 1%) TR(Trace) = < 1%
Asbestos Minerals: Chrysotile=CHR, Amosite=AMO, Crocidolite=CRO, Actinolite=ACT, Tremolite=TRE, Anthophyllite=ANT
Fibrous Materials: Fiberglass=FBG, Mineral Wood=MNW, Cellulose=CEL, Hair=HAR, Synthetic=SYN, Other=OTH, Non-Fibrous=NON
Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702
Suite/Apt

RE: Batch 2310
Results of Asbestos Project: Nelson Place, Wocester MA- Exterior

Dear Ammar M. Dieb,

Asbestos Identification Laboratory has completed the analysis of the bulk samples on 1/13/2014 from your office. These results represent the bulk samples from the above-referenced project:

The information and analysis contained in this report have been generated using the EPA/600/R-93/116 Method for the Determination of Asbestos in Bulk Building Materials. Materials or products that contain more than 1% of any kind or combination of asbestos are considered asbestos-containing building materials as determined by the EPA. This Polarized Light Microscope (PLM) technique may be performed either by visual estimation or point counting. Point counting provides a determination of the area percentage of asbestos in a sample. If the asbestos is estimated to be less than 10% by visual estimation of friable material, the determination may be repeated using the point counting technique. The results of the point counting supersede visual PLM results. Results in this report only relate to the items tested. This report may not be used by the customer to claim product endorsement by NVLAP or any other U.S. Government Agency.

- NVLAP Lab Code: 200919-0
- Massachusetts Certification License: AA000208
- State of Connecticut, Department of Public Health Approved Environmental Laboratory Registration# PH-0142
- State of Maine, Department of Environmental Protection Asbestos Analytical Laboratory License Number LB-0078(Bulk) LA-0087(Air)
- State of Rhode Island and Providence Plantations Department of Health Certification: AAL-121

Thank you Ammar M. Dieb for your business.

Michael Manning

Analyzed by: Michael Manning
Owner/Director
(781)932-9600
**CHAIN OF CUSTODY**

<table>
<thead>
<tr>
<th>Analysis Type</th>
<th>Turnaround Time (h)</th>
<th>Specific Project Notes</th>
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<tr>
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<tr>
<td>TEM / AHERA</td>
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<tr>
<td>TEM / Level II</td>
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<tr>
<td>TEM / Dust</td>
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<td>TEM / Bulk</td>
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<tr>
<td>Other</td>
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**SAMPLE ID** | **MATERIAL DESCRIPTION** | **SAMPLE LOCATION** | **START TIME** | **STOP TIME** | **L/MIN** | **VOLUME**
---|---------------------------|---------------------|----------------|---------------|-----------|-----------
44 | Door Frame caulk | 1927 exterior door |               |               |           |           |
45 | "                | "                   |               |               |           |           |
46 | window Frame caulk | 1927 exterior window |               |               |           |           |
47 | "                | "                   |               |               |           |           |
48 | window glass glaze |                      |               |               |           |           |
49 | "                | "                   |               |               |           |           |
50 | Door Frame caulk | 1954 exterior door |               |               |           |           |
51 | "                | "                   |               |               |           |           |
52 | window Frame caulk | 1954 exterior window |               |               |           |           |
53 | "                | "                   |               |               |           |           |
54 | window glass glaze |                      |               |               |           |           |
55 | "                | "                   |               |               |           |           |
56 | Copper and tar flashing | 1954 foundation cement to brick |               |               |           |           |
57 | Expansion Joint caulk | 1954 - 1967 |               |               |           |           |
58 | "                | "                   |               |               |           |           |
59 | Door Frame caulk | 1967 exterior door |               |               |           |           |
60 | "                | "                   |               |               |           |           |
61 | Door glass glaze | 1967 exterior door |               |               |           |           |
62 | "                | "                   |               |               |           |           |
63 | window glass glaze | 1967 exterior window |               |               |           |           |

SAMPLED BY: Jason Bezak 1-10-19
DATE/TIME: RECEIVED BY:
DATE/TIME: RELINQUISHED BY: AWWC 11-31-19
DATE/TIME: RECEIVED IN LAB BY:
DATE/TIME:
# Chain of Custody

**Building/Site Name:** Nelson Place  
**Work Area:** Exterior  
**Town/City:** Worcester  
**State:** MA

<table>
<thead>
<tr>
<th>Analysis Type</th>
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<td>TEM/Dust</td>
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<td>window frame caulk</td>
<td>Gym exterior window</td>
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Amended By: Jason Beutte  
Date/Time: 1-10-14  
Received By:  
Date/Time:  
Relinquished By:  
Date/Time:  
Received in Lab By:  
Date/Time:
# Results Table

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<td>Chrysotile=3%</td>
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<td>29913</td>
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<td>1954 Exterior Door</td>
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<td>29919</td>
<td>Door Frame Caulk</td>
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<td>29920</td>
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<td>Chrysotile=2%</td>
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<td>29924</td>
<td>Copper and Tar Flashing</td>
<td>1954 Foundation Cement to Brick</td>
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<td>No Asbestos Detected</td>
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Results for Client Project: Nelson Place, Worcester MA- Exterior, Batch# 2310

Work Received: 1/13/2014 Date Sampled: 1/10/2014 Results Sent: 1/16/2014 3:04:50 PM

Field_ID: 44 Material: Door Frame Caulk Color: Gray Location: 1927 Exterior Door Sample# 29912 NON=097
ASBESTOS DETECTED CHR=003

Field_ID: 45 Material: Door Frame Caulk Color: White Location: 1927 Exterior Door Sample# 29913 NON=100 None Detected

Field_ID: 46 Material: Window Frame Caulk Color: Green Location: 1927 Exterior Window Sample# 29914 NON=100 None Detected

Field_ID: 47 Material: Window Frame Caulk Color: Green Location: 1927 Exterior Window Sample# 29915 NON=100 None Detected

Field_ID: 48 Material: Window Glass Glaze Color: Black Location: 1927 Exterior Window Sample# 29916 NON=100 None Detected

Field_ID: 49 Material: Window Glass Glaze Color: Black Location: 1927 Exterior Window Sample# 29917 NON=100 None Detected

Field_ID: 50 Material: Door Frame Caulk Color: Gray Location: 1954 Exterior Door Sample# 29918 NON=100 None Detected

Field_ID: 51 Material: Door Frame Caulk Color: Gray Location: 1954 Exterior Door Sample# 29919 NON=100 None Detected

Field_ID: 52 Material: Window Frame Caulk Color: Gray Location: 1954 Exterior Window Sample# 29920 NON=100 None Detected

Field_ID: 53 Material: Window Frame Caulk Color: Gray Location: 1954 Exterior Window Sample# 29921 NON=097
ASBESTOS DETECTED CHR=003

Field_ID: 54 Material: Window Glass Glaze Color: Gray Location: 1954 Exterior Window Sample# 29922 NON=100 None Detected

Field_ID: 55 Material: Window Glass Glaze Color: Gray Location: 1954 Exterior Window Sample# 29923 NON=098
ASBESTOS DETECTED CHR=002

Field_ID: 56 Material: Copper and Tar Flashing Color: Black Location: 1954 Foundation Cement to Brick Sample# 29924 CEL=010 NON=080 ASBESTOS DETECTED CHR=010
Field_ID: 57 Material: Expansion Joint Caulk Color: Gray Location: 1954->1967 Sample# 29925 NON=097
ASBESTOS DETECTED CHR=003

Field_ID: 58 Material: Expansion Joint Caulk Color: Gray Location: 1954->1967 Sample# 29926 NON=097
ASBESTOS DETECTED CHR=003

Field_ID: 59 Material: Door Frame Caulk Color: Gray Location: 1967 Exterior Door Sample# 29927 NON=100 None Detected

Field_ID: 60 Material: Door Frame Caulk Color: Gray Location: 1967 Exterior Door Sample# 29928 NON=100 None Detected

Field_ID: 61 Material: Door Glass Glaze Color: Gray Location: 1967 Exterior Door Sample# 29929 NON=100 None Detected

Field_ID: 62 Material: Door Glass Glaze Color: Gray Location: 1967 Exterior Door Sample# 29930 NON=100 None Detected

Field_ID: 63 Material: Window Glass Glaze Color: Black Location: 1967 Exterior Window Sample# 29931 NON=100 None Detected

Field_ID: 64 Material: Window Glass Glaze Color: Gray Location: 1967 Exterior Window Sample# 29932 NON=100 None Detected

Field_ID: 65 Material: Window Glass Glaze Color: Black Location: 1967 Exterior Window Sample# 29933 NON=100 None Detected

Field_ID: 66 Material: Window Frame Caulk Color: Gray Location: 1967 Exterior Window Sample# 29934 NON=100 None Detected

Field_ID: 67 Material: Window Frame Caulk Color: Gray Location: 1967 Exterior Window Sample# 29935 NON=097
ASBESTOS DETECTED CHR=003

Field_ID: 68 Material: Window Frame Caulk Color: Multi Location: Gym Exterior Window Sample# 29936 NON=100 None Detected

Field_ID: 69 Material: Window Glass Glaze Color: Gray Location: Gym Exterior Window Sample# 29937 NON=100 None Detected

Field_ID: 70 Material: Door Frame Caulk Color: Gray Location: Gym Exterior Door Sample# 29938 NON=100 None Detected

Field_ID: 71 Material: Door Frame Caulk Color: Gray Location: Gym Exterior Door Sample# 29939 NON=100 None Detected

Field_ID: 72 Material: Expansion Joint Caulk Color: Gray Location: Gym->1927 Sample# 29940 NON=097
ASBESTOS DETECTED CHR=003

Field_ID: 73 Material: Expansion Joint Caulk Color: Gray Location: Gym->1927 Sample# 29941 NON=097
ASBESTOS DETECTED CHR=003
**End of Report**

*Legend* (All sample results represent percentages  EX: 001 = 1%) TR(Trace) = < 1%
Asbestos Minerals: Chrysotile=CHR, Amosite=AMO, Crocidolite=CRO, Actinolite=ACT, Tremolite=TRE, Anthophyllite=ANT
Fibrous Materials: Fiberglass=FBG, Mineral Wood=MNW, Cellulose=CEL, Hair=HAR, Synthetic=SYN, Other=OTH, Non-Fibrous=NON

Page 3 of 3
3.1.4 EVALUATION OF EXISTING CONDITIONS

J. Supporting Documents
1. Water Pressure Documentation
2. Nelson Place Utility Summary by Year 2011-2014
3. Nelson Place Utilities by Month 2011-2014
### Nelson Place Utility Costs

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<tr>
<th>Row Labels</th>
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*2014 Payments through November 2013
## 3.1.4 EVALUATION OF EXISTING CONDITIONS

### J. Supporting Documents

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<th>Building Description</th>
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<th>Months</th>
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## 3.1.4 EVALUATION OF EXISTING CONDITIONS

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## 3.1.4 EVALUATION OF EXISTING CONDITIONS

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3.1.5 SITE DEVELOPMENT REQUIREMENTS

A. Narrative
B. Existing Site Plan
C. Narrative of Swing Space Options
D. Existing vs. Proposed Site
   Program Template
3.1.5 SITE DEVELOPMENT REQUIREMENTS

A. Narrative
FEASIBILITY STUDY

The Design Team discussed site development requirements with representatives of the School District including facilities, transportation, kitchen, and technology personnel (see section 3.1.2, D for program meeting minutes for more details as well as Existing Conditions site and wetlands reports in section 3.1.4, F, 4).

The following comprises the site program:

- There is a desire to accommodate the existing student population on a site separate from the construction site. If at all possible, the entire school population should remain together as separating faculty, administration, and students would degrade the educational experience and would be significant added expense.

- Provide separate bus and parent pick up/drop off vehicular circulation, ideally with 2 separate entry points to the facility:
  10 – 12 buses queued at a time (possibility of staggered arrival/ departure if required due to space considerations) plus 5 after school program vans at dismal time
  10 half size busses to support special education program (same bus schedule as large buses) preferably to a separate entrance from the large buses
  150- 200 parent pick up/drop off vehicles queued off site

- Since Pre-Kindergarten program is half day, a 4 bus pick up is required for the mid day arrival/dismissal for that program. Provide a separate entrance near pre-K (to be monitored by staff) to facilitate.

- Emergency vehicle access full perimeter of the building

- Parking:
  100 staff cars separated as appropriate for various use groups (teachers, kitchen, maintenance, etc.) to discourage visitors from using staff parking
  20 itinerant staff parking spaces
  20 visitor cars
  200 additional, if possible, for event parking (could be parallel parking along drives, at bus circulation, etc. if space allows)
3.1.5 SITE DEVELOPMENT REQUIREMENTS

A. Site Narrative

- 2 fenced separate age appropriate play areas, preferably with close access from the respective classroom wings. Each to have rubberized surface and play structures; older age group to have paved area with basketball hoops. Ideally this would be positioned for community use after hours.

- Athletic fields: flat, multi-purpose athletic fields most desirable as space permits (full size soccer field desirable). If space allows, an additional Little League field would be desirable. Position for community use if possible. Consider irrigation, lighting not required.

- Emergency generator required; size to be determined

- Service/delivery/dumpster area with loading dock:
  - Ideally separate circulation from bus/parent pick up to avoid delivery schedule issues
  - Provide dumpsters for trash, recycling, and compost, ideally to be filled from loading dock; possibly additional dumpster locations on site due to distance to loading dock from various points in the school
  - Primarily tractor trailer and/or box truck deliveries for kitchen as well as general school supply deliveries
  - Separate student activity from service yard

- Additional site features as required for sustainable design features

- Especially due to the high proportion of special education students, it would be extremely desirable to have no more than two stories above grade access for the building plan.
3.1.5 SITE DEVELOPMENT REQUIREMENTS

B. Existing Site Plan
3.1.5 SITE DEVELOPMENT REQUIREMENTS

B. Existing Site Plan Nelson Place School - Site Evaluation

NOTES:
Information compiled in this drawing was taken from several sources including, but not limited to:
1. Worcester GIS
2. Google Maps
3. NStar Gas & National Grid Elec.

IN-S Zoning Requirements
Lot Area Square Footage 418,652 SF
Lot Frontage 864'
Front Yard 15'
Side Yard 10'
Rear Yard 10'
Number Stories NA

LEGEND:
- Project Limit Line
- Slopes > 15%
- Open Water
- Observed Wetland
- 100' Wetland Buffer

Utility Legend
- Gas Main
- Water Main
- Overhead Wire
- Drain Main
- Sewer Main
3.1.5 SITE DEVELOPMENT REQUIREMENTS

C. Narrative of Swing Space Option
Worcester Public Schools (WPS) has reviewed options for the student population during construction including: remaining at the current site, moving to other facilities, or providing options such as modular construction at the existing site, the alternative sites, or other locations within the school district.

WPS reported that the present school population must remain as configured. The population has a district-wide autism/special education program integrated within the school grade levels, and to split the population and disperse it throughout other elementary schools would have an adverse effect on the education and programs. They have also reported that there is presently a student influx into the system, resulting in no available space in other elementary schools to absorb the Nelson Place School population either in whole or part.

The Owner’s team reviewed other potential buildings in the City including, St. Stevens School, the former Fanning School, and other former school buildings; there were no locations that could accommodate the current 500 students with supporting spaces. Additionally, there were no larger facilities identified in the quadrant or district that could be cost effectively converted to school use.

One consideration is the installation of modular classrooms, office and support spaces at the Forest Grove Middle School site, while sharing the gym and cafeteria spaces at either Forest Grove, or the neighboring McGrath Elementary School. The school reports that the current student population at the Forest Grove School is 976, with the McGrath School at 277. Both schools are at design capacity and would not be able to accommodate the lunch, media center, gymnasium or other support space needs of the Nelson Place School population without adversely affecting the programs of either the host school or Nelson Place population, or both.

Based on these hindrances, the design team was advised to review finding a new location that would allow the existing school to remain in place at the existing location, until the new school would be built and ready for occupancy of the entire population.
3.1.5 SITE DEVELOPMENT REQUIREMENTS

D. Existing vs. Proposed Site Program Template
EXISTING PARKING = Approximately 40 Spaces
PROPOSED PARKING = 140 Spaces
+ 200 Spaces for Event parking (overflow spaces)

EXISTING FOOTPRINT 30,400 SF
PROPOSED FOOTPRINT Approximately 60,000-70,000 SF

AFTER SCHOOL VANS
No existing space dedicated - 5 vans proposed

PRE-K DROP OFF
No existing space dedicated - 4 buses proposed

HALF SIZE BUSES
No existing space dedicated - 10 half-size buses proposed

FULL SIZE BUSES
Few existing spaces dedicated - 10 to 12 buses proposed

PARENT PICK UP/DROP OFF
Existing along street, not dedicated - 120 to 150 spaces proposed (separate)

MULTI PURPOSE FIELD
FULL SIZE SOCCER FIELD DESIRABLE

SERVICE AREA
No existing space dedicated, Area required for service, loading & trash.

PLAY AREAS
EXISTING 15,000 SF
EXISTING 15,000 SF

Proposed area to be developed, see Site Development narrative in Section 3.1.5A.
3.1.6 PRELIMINARY EVALUATION OF ALTERNATIVES

A. Narrative
B. Base Repair Option
C. Renovation – Additions Option
D. New Construction on Existing Site Option
E. New Construction on Alternate Site Options
F. Comparative Cost Analysis
G. Recommended Alternatives for Further Development & Evaluation
H. Supporting Documents
3.1.6 PRELIMINARY EVALUATION OF ALTERNATIVES

A. Narrative
LPA worked with the Worcester Public Schools, Central Administration (DAB), City Department of Public Works (WDPW), Local officials, the School Building Committee, and LPA’s consulting engineers to find multiple alternatives that would fulfill the Educational Program requirements and provide for the spaces identified in the MSBA Space Summary. Potential alternatives included the following:

- **Analysis of School District’s Student Assignment Practices:** The City School administration advised that the existing school facilities are at, if not over, capacity and there is no opportunity to absorb the current Nelson Place Elementary School student population. Additionally, there is no place within the school district to house the students temporarily during construction.

- **Tuition Agreement with Adjacent School Districts:** The City School administration advised that the City of Worcester does not currently have tuition agreements with neighboring school districts.

- **Rental or Acquisition of Existing Buildings:** Representatives of the City of Worcester researched properties within the Nelson Place district that might be rented or purchased that would adequately meet the programmatic needs of a learning environment. It was determined that no suitable facilities were available. In addition, the City is seeing a rise in student population, and is currently opening up formerly leased schools to fulfill the population influx, and does not have the capacity in the system to absorb the Nelson Place school population.

- **Base Repair Option:** For purposes of this Feasibility Study, the Base Repair Option was defined as a “No-Build” solution that would maintain the status quo; it would not provide any additional square footage to the existing Middle School. The school presently has maximized all existing available space for the present population; assume being originally designed to serve a significantly smaller population. The Base Repair Option addresses only existing code violations, severe infrastructure and envelope deficiencies and the repair/replacement of existing building systems that have exceeded their life expectancy or are failing. The scope of work for this option is based on a thorough assessment of building systems by LPA and each of its consulting engineers. The Administration has stated that the building cannot remain occupied during renovation. This narrative will address how potentially this might be addressed.

- **Renovation/Addition Option:** The Renovation/Addition Option scope of work includes a complete renovation of the existing School, along with construction of one or more additions, to provide a
solution that meets most, if not all, of the Educational Program requirements, and will outline the
program requirements that cannot be met under this option. The Administration has stated that the
building cannot remain occupied during renovation. This narrative will address how potentially this
might be addressed.

- **New Construction on Existing Site Option:** The New Construction on Existing Site Option is based
  on a new building located on the existing Nelson Place site, and assumes simultaneous construction
  (new building) and occupancy (existing School). The scope of work for this option is to provide a
  solution that meets most, if not all, of the Educational Program requirements, and will outline the
  program requirements that cannot be met under this option.
  In this option, it is assumed that the existing School would be demolished following construction of
  the new building.

- **New Construction on Alternate Site(s) Option:** The New Construction on Alternate Site(s) Option
  assumes construction of a new building on one of three alternate sites shortlisted by the WDPW
  from a number of existing properties within the district. The three candidate sites were identified as
  , The Nelson Place Site with additional land inclusions of the rear parcel owned by Assumption
  College, and abutting residential rear land, The former Indian Hill Elementary School, last used as
  the Salter School (Private junior business college), and abutting School Department fields, And the
  land between the Forest Grove Middle School and the McGrath Elementary School, with potential
  inclusion of vacant abutting privately owned land. Similar to the previous options, this solution
  would fully either satisfy the Educational Program requirements, or identify which sites would not
  satisfy these criteria. At the beginning of the project, under the first phase the City- WDPW, LPA,
  had reviewed parcels and potentially available buildings in the district for use as a replacement
  building, or available buildings and land for the school, and the noted parcels were shortlisted, refer
to the exhibit and description for the reviewed parcels, under 3.1.6 .

A narrative for each option follows, including description, scope of work, degree to which the option fulfills
Educational Program and Space Summary requirements, and construction phasing impact, as well as a site
evaluation graphic for each of the existing/proposed sites. Consulting engineer reports (Site, Structural, Fire
Protection, HVAC/Plumbing, Electrical/Data and order of magnitude preliminary cost data) can be found at
the end of this section.
3.1.6 PRELIMINARY EVALUATION OF ALTERNATIVES

B. Base Repair Option
   1. Narrative
   2. Base Repair Option Diagram
DESCRIPTION: For purposes of this Feasibility Study, the Base Repair Option was defined as a “No-Build” solution that would maintain the status quo; it would not provide any additional square footage to the existing School. The Base Repair Option addresses the existing code violations and the repair/replacement of existing building systems that have exceeded their life expectancy or are failing, and either repairs to the failing 1926 building facade, or replacement of that building. The scope of work for this option is based on a thorough assessment of building systems by LPA and each of its consulting engineers, which are published herein, follows is a brief summary.

Base Repair Option Scope of Work:

- In order to address existing extremely congested site, recommend widening the street to provide parent pick up/drop off area, and re-configure the exiting parking, access to provide some form of bus drop off/pick up area, expand and re-stripe the parking areas
- Provide accessible curb cuts from parking area and marked accessible parking spaces, accessible signage.
- Provide accessible route to all site features open to the public, including athletic field at the rear areas, include rear parking.
- Upgrade the rear field areas to the program requirements.
- Provide full accessibility to meet current code including:
  - Provide lever door hardware throughout
  - Upgrade all accessible entrances, railings and similar required items as required
  - Provide accessible toilet fixtures in all toilet rooms
  - Provide accessible route to cafeteria platform
  - In classrooms provide adequate door reach access
  - Provide accessible millwork including sinks in all areas
  - Provide accessible signage throughout
  - Install elevator or lifts at the 1926, 1967 buildings or apply for a variance with the State access board, lift or accessible route from the Gymnasium to the 1926 Building.
- Replace all exterior window and panel systems with insulated glass units and screens at operable units.
- Replace all existing deteriorated exterior doors and select frames
3.1.6 PRELIMINARY EVALUATION OF ALTERNATES

FEASIBILITY STUDY

B. Base Repair Option

- Provide bituminous overlay at existing parking and driveway areas; restripe parking areas and provide new accessible signage.
- Re-roof existing buildings in their entirety.
- Completely shore, remove and replace the entire front and rear facade at the 1926 building, including all windows.
- Wash, selectively re-point existing exterior masonry walls, re-caulk all exterior joints and junctions at the other buildings.
- Prepare and re-paint existing steel lintels, all exterior metal items.
- Perform interior painting and other finishes work where required due to this scope of work.
- Replace all ceiling tiles and grid throughout, access needed for utilities, and abatement of ACM ceilings
- Provide new toilet partitions.
- Perform hazardous material abatement throughout the building.
- Installation of a full fire protection system per code requirements including new water service from the street, Refer to FP report.
- Replacement of above grade plumbing piping and fixtures, Refer to Plumbing and Mechanical systems report.
- Replacement of HVAC distribution, heating and control systems.
- Provide proper fresh air intakes at the boiler room
- Replace kitchen hood, pot sinks, equipment to meet current code.
- Replace all electrical systems and distribution.
- Upgrade existing electrical emergency systems as required to meet code.
- Replace telephone system, public address system and upgrade surveillance system to address current safety standards.
- Structural: Refer to Structural Report.
- All associated architectural work to address the Base Repair Option including: selective demolition and reconfiguration of spaces, hazardous material abatement of affected areas, and patching and refinishing as required.
- Modular classroom and support space would be required, including connections.

Degree of Educational Program/Space Summary Fulfillment: The Base Repair Option does not satisfy the Educational Program/Space Summary requirements. Significant items of note include the following:
3.1.6 PRELIMINARY EVALUATION OF ALTERNATES

FEASIBILITY STUDY

B. Base Repair Option

- As noted in the SOI, the existing School is overcrowded; this option adds no new space and does nothing to alleviate that problem.
- Classrooms, Administration, SPED, Technology, and support spaces typically do not meet the MSBA space guidelines; most are well below the guidelines.
- The existing configuration of classroom and other spaces does not support the District’s Team Teaching methods and curriculum.
- This option does improve the life safety and structural aspects of the existing building; the result is not as efficient of systems as a new building.
- The existing exterior wall envelope remains essentially unchanged, and will continue to function inefficiently relative to energy use.
- The renovation has limitations on meeting the net zero/sustainable goals, an example of not being able to add solar panels on the roof as the existing structural system is not capable of sustaining additional loads.
- While the Base Repair Option proposes to repair/replace existing obsolete and failing systems, it would do so, in many cases, with “like” systems that do not take full advantage of newer technology.
- The site constriction issues, lack of parking, bus and parent drop off areas would only be partially addressed.
- Refer to the cost analysis on the comparative cost between this work and a new facility, and the cost/benefit discussion.

Impact of Construction Phasing: The owner has stated that phased work on the existing building is not a consideration, however based on the extensive scope required for the renovation, this is not possible, and there is insufficient time for this work to be performed during summer vacation and off hours so as not to impact students, staff and faculty. Impact to students, staff and faculty will be significant. The construction will be performed over multiple phases while the building remains partially occupied. Summer phases will require an extensive amount of planning and execution to perform work that cannot be effectively done with school in session (main circulation corridors/stairs, hazardous material abatement, demolition, steel erection, etc.) second and/or third shifts (at higher costs than typical prevailing wage construction) may be required. Temporary “swing space”, in the form of non-reimbursable modular classrooms located adjacent to the existing building, will be required to replace educational space while it is undergoing renovation. The existing bus and parent pick-up/drop-off areas, already congested and problematic, will be aggravated by the introduction of construction personnel, equipment and materials.
3.1.6 PRELIMINARY EVALUATION OF ALTERNATES

FEASIBILITY STUDY

B. Base Repair Option

**Estimated Preliminary Construction and Project Costs:** Refer to attached AMF order of magnitude cost estimates.
B. Base Repair Option

NOTES:

1. Parking, bus/parent drop off: potential to address some of the high priority site elements with adjustments. However, this would be unlikely to satisfy the program requirements without significant alterations.

2. Renovation does not meet building program.

3. Phased occupancy or independent Swing Space off-site would be required, and is not preferred. Refer to the narrative for construction phasing comments.

4. This sketch is a general graphic; if this scheme is pursued, further study to be developed to respond to program specifics in greater detail.
3.1.6 PRELIMINARY EVALUATION OF ALTERNATIVES

C. Renovation-Additions Option
   1. Narrative
   2. Renovation/Addition Site Diagram
Description: The Renovation/Addition Option scope of work includes a complete renovation of the existing School, along with construction of additions, to provide a solution that meets the Educational Program requirements to the maximum extent possible. This option includes the demolition of the 1926 building, due to the age and deteriorated structure and system, as outlined in this report, and assumes that the existing School will be occupied construction, construction will be phased, and that temporary educational space (i.e. modular classrooms) will be required. Proposed SF area for this option is approximately as follows:

- Renovation (existing building, 1967 classroom building, 1953 building) = 29,200 SF
- New Construction (additions, at location of the demolished portion) = 80,800 SF
- Demolition (1926 building, 1967 Gym) = 26,000 SF

Renovation/Addition Option Scope of Work:

- Generally provide all the work indicated under the No-Build option, except for work noted at the 1926 building.
- The addition would be likely be at the location of the 1926 addition, extending rearward, and would need to be 3 stories plus a basement, which would house the mechanical systems for the complex.
- Temporary heating and power systems would be required, as these systems are presently in the 1926 building.
- Expand parking and install bus drop off area, widen Nelson Place road to accommodate parent drop off and parking
- Modular classroom and support space would be required, including connections.
- Offsite improvements may be warranted, including Nelson Place widening, Turnaround development at the end of Nelson Place

Degree of Educational Program/Space Summary Fulfillment: An Addition/Renovation Option achieves most, but not all, of the Educational Program/Space Summary requirements. The following are significant items of note:

- Refer to the notes under the no build option for the existing building comments.
- Classrooms typically do not meet the MSBA space guidelines of 850-950 SF for General Classrooms and 1200 SF for Science Classrooms; most are well below the guidelines.
- The existing configuration of classroom at the existing building and other spaces does not support the District’s Team Teaching methods and curriculum.
3.1.6 PRELIMINARY EVALUATION OF ALTERNATES

C. Renovation – Additions Option

- Required structural upgrades will improve the life safety of the existing building, but will not bring it into compliance with current Building Code.
- Most existing exterior building walls have no insulation and will perform poorly in terms of energy use, or will require costly modifications to improve their performance.
- The renovation has limitations on meeting the net zero/sustainable goals, an example of not being able to add solar panels on the roof as the existing structural system is not capable of sustaining additional loads.
- Refer to the cost analysis on the comparative cost between this work and a new facility, and the cost/benefit discussion.

Impact of Construction Phasing: As with the No-Build option, the owner has stated that phased work on the existing building is not a consideration, however based on the extensive scope required for the renovation, this is not possible, and there is insufficient time for this work to be performed during summer vacation and off hours so as not to impact students, staff and faculty. Impact to students, staff and faculty will be significant. In particular, the school administrators have noted that the significant special education population at Nelson Place experiences great difficulty with change in the educational environment and many are sensitive to noise and distractions.

The construction will be performed over multiple phases while the building remains partially occupied. Summer phases will require an extensive amount of planning and execution to perform work that cannot be effectively done with school in session (main circulation corridors/stairs, hazardous material abatement, demolition, steel erection, etc.) second and/or third shifts (at higher costs than typical prevailing wage construction) may be required. Temporary “swing space”, in the form of non-reimbursable modular classrooms located adjacent to the existing building, will be required to replace educational space while it is undergoing renovation. The existing bus and parent pick-up/drop-off areas, already congested and problematic, will be aggravated by the introduction of construction personnel, equipment and materials.

Estimated Preliminary Construction and Project Costs: Refer to attached AMF order of magnitude cost estimates.
NOTES:

1. Parking, bus/parent drop off: potential to address some of the high priority site elements, however would be a challenge to fully satisfy the program.

2. Addition would likely need to be three stories, which is not preferred.

3. Phased occupancy or independent Swing Space off-site would be required, and is not preferred. Refer to the narrative for construction phasing comments.

4. This sketch is a general graphic, if this scheme is pursued, further study to be developed to respond to program specifics in greater detail.

Suggested ROW for secondary Emergency Access

Potential location for parking & bus drop-off
Existing 1926 Building and Gym to be demolished
Suggested parent pick-up/drop-off expansion

Complete Renovation of Existing 1967 & 1953 Buildings
Emergency Access around building & to fields
Potential Parking
Suggested turn-around to be developed

Potential location for Addition
Existing property lines

Potential location for Fields & Play Areas

ILSF & Setbacks refer to wetlands report
3.1.6 PRELIMINARY EVALUATION OF ALTERNATIVES

D. New Construction on Existing Site Option
   1. Narrative
   2. New Construction on Existing Site Option Diagram
Description: The New Construction on Existing Site Option is based on a new building located on the rear portion of the existing Nelson Place site, and assumes simultaneous construction (new building at the rear) while maintaining occupancy at the existing building. While there would be temporary construction impact with this option, the end result would be a solution that meets most of the Educational Program requirements. Based on the limited site area, and setbacks required at the side wetlands, at this stage, we feel there will be items on the program that will need to be reduced in scope, primarily some of the site items. The next phase review will be needed to determine the extent, and potential budgets required to accommodate. In this option, it is assumed that the existing School would be demolished following construction of the new building, and that area of the site would be developed though the first semester of occupancy of the new building. Proposed SF area for this option is approximately as follows:

- New Construction (new building) = 110,000 SF
- Demolition (existing building) = 55,400 SF

New Construction on Existing Site Option Scope of Work:

- Provide all new utility services.
- Construct new building.
- Provide all new bus drop off/pick up, parent drop off/pick up, parking areas, service areas and driveways.
- Provide, if possible, a second means of access to/from the site over abutting land, or Red Wing Dive.
- Slope/grading easements should be considered to reduce potential retaining walls at abutters rear land
- Recommendations to negotiate/purchase abutter’s land could provide additional parking/field areas.
- Demolish existing buildings, site features, and utility connections in their entirety.
- Offsite improvements may be warranted, including Nelson Place widening

Degree of Educational Program/Space Summary Fulfillment: A New Construction on Existing Site Option appears to achieve most of the building Educational Program/Space Summary requirements, except that portions of the building may need to be three stories, or developed as a compact footprint. At this stage of review, it appears that the quantity of parking spaces, and quantity of parent drop off requested, may not be able to be accommodated in full. The athletic fields that fit on the site will potentially be limited, and the wish to have a little league field might not be possible.
3.1.6 PRELIMINARY EVALUATION OF ALTERNATES

FEASIBILITY STUDY

D. New Construction on Existing Site Option

Impact of Construction Phasing: This site development would need to be phased to keep the building and simultaneously phased work as far away from the existing school and rear play areas as possible. Access to the construction site would ideally be developed over the Assumption College land and to the south, and this access be later utilized as a second emergency access road. The construction contract could be written to mitigate potential impact on abutters at this point of access. The new construction will be outside of the existing School building footprint, but will nevertheless affect use of the rear site, and the present fields. Parking, drop-off, pick-up, and outdoor space (already congested and problematic) will be at a premium during construction. The project planning and construction documents will have to be written to mitigate potential impact.

Estimated Preliminary Construction and Project Costs: Refer to attached AMF order of magnitude cost estimates.
### NELSON PLACE NEW CONSTRUCTION EXISTING SITE

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>GENERAL INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Property Information</strong></td>
<td>City of Worcester-existing Nelson Place Site</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>HIGH PRIORITY RATING</strong></th>
<th>SCORE 0 to 10 (0 being not responsive, 1 least advantageous, 10 most advantageous)</th>
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</thead>
<tbody>
<tr>
<td><strong>Adjacency to Core District</strong></td>
<td>10</td>
</tr>
<tr>
<td><strong>Neighborhood Adjacency</strong></td>
<td>10</td>
</tr>
<tr>
<td><strong>Access Potential-Traffic</strong></td>
<td>Vehicular: Off-site improvements suggested; generally traffic will be improved greatly over the existing site conditions 8</td>
</tr>
<tr>
<td><strong>Pedestrian &amp; Vehicular</strong></td>
<td>Pedestrian: Access from Nelson Place requires travel along moderate slopes 7</td>
</tr>
<tr>
<td><strong>Meets Program requirements</strong></td>
<td>Building: Portions of the building may need to be three (3) stories, which is not preferred for the building program 8</td>
</tr>
<tr>
<td><strong>(based on comparative analysis sketches- subject to future review)</strong></td>
<td>Site: Bus drop off less than the desired program 7</td>
</tr>
<tr>
<td></td>
<td>Accommodating dedicated parent drop-off/pick-up onsite is significantly less than the desired program; parking along the access road would add to the pick-up area.</td>
</tr>
<tr>
<td></td>
<td>Parking onsite accommodates approximately 60% of desired program</td>
</tr>
<tr>
<td></td>
<td>Separate play areas are provided</td>
</tr>
<tr>
<td></td>
<td>Multi-use fields are not provided</td>
</tr>
<tr>
<td><strong>Project Phasing/Construction Impacts</strong></td>
<td>Construction access would need to be planned and coordinated around the school and school site, this option allows the school to be built well behind the existing school; phasing at the last phase would be required 7</td>
</tr>
<tr>
<td><strong>Orientation, Net Zero options</strong></td>
<td>Generally the same as the other new construction options 8</td>
</tr>
<tr>
<td><strong>Swing Space</strong></td>
<td>Not required 10</td>
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</table>

<table>
<thead>
<tr>
<th><strong>GENERAL COMPARISON RATING</strong></th>
<th>SCORE 0 to 5 (0 being not responsive, 1 least advantageous, 5 most advantageous)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Property Configuration, size, Workable area</strong></td>
<td>Wetlands constraints, slope issues between tiers, generally a very tight site, will limit developable area 3</td>
</tr>
</tbody>
</table>
### NELSON PLACE NEW CONSTRUCTION EXISTING SITE

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topography, Slopes and Orientation</td>
<td>Elevation change from Nelson Place School to field is workable. Slope rises gradually from north, flattens at athletic field and then climbs in adjacent parcel which slopes approximately 10% to 15% toward the south property line</td>
<td>3</td>
</tr>
<tr>
<td>Existing Development/Buildings</td>
<td>Building location temporarily constrains access, would need to be removed</td>
<td>0</td>
</tr>
<tr>
<td>Easements and Other Property Limitations</td>
<td>TBD</td>
<td>5</td>
</tr>
<tr>
<td>Environmental Resources and Hydrology</td>
<td>Wetlands at each side will have setback constraints, limiting development, and grading</td>
<td>4</td>
</tr>
<tr>
<td>Soils and Geologic Factors</td>
<td>Poorly draining soils with the potential for shallow bedrock or rocky soils. May be areas with adequate soils for stormwater control. There may be adequate area for on-site stormwater basin if necessary.</td>
<td>3</td>
</tr>
<tr>
<td>Utility System Availability</td>
<td>Water, Sewer, Electric and Gas is available for the project on Nelson Place, would require lengthy access and connections</td>
<td>4</td>
</tr>
<tr>
<td>Acquisition Cost</td>
<td>Not foreseen w/ this option, potential slope or access easements would be desirable</td>
<td>5</td>
</tr>
<tr>
<td>Community Use</td>
<td>No room for fields development with this option</td>
<td>3</td>
</tr>
<tr>
<td>Expansion Potential</td>
<td>Limited</td>
<td>2</td>
</tr>
<tr>
<td>General Comment</td>
<td>TOTAL</td>
<td>107</td>
</tr>
</tbody>
</table>
NOTES:
1. Parking, bus/parent drop-off: This scheme could satisfy the high priority site program items, but would be challenging to satisfy the full program requirements.
2. Building would potentially need to be three stories, which is not preferred.
3. This sketch is a general graphic, if this scheme is pursued, further study to be developed to respond to program specifics in greater detail.
4. Refer to the narrative for construction phasing comments. Phased construction is not a consideration of the owner.
E. New Construction on Alternate Site Options

1. Nelson Place with Additional Land
   a. Narrative
   b. Landscape- Site Evaluation

2. Salter School Site
   a. Narrative
   b. Landscape- Site Evaluation
   c. Civil- Analysis of Existing Conditions
   d. Civil- Site Evaluation (Utilities)
   e. Narrative- Wetland Delineation
   f. Geotech Report

3. Forest Grove & McGrath School Site
   a. Narrative
   b. Landscape- Site Evaluation
   c. Civil- Analysis of Existing Conditions
   d. Civil- Site Evaluation (Utilities)
   e. Narrative- Wetland Delineation
   f. Geotech Report
Description: The New Construction on Alternate Sites Option is based on a new building located on the selected sites. For the vacant Salter School site there would be no temporary construction impact to the existing students, staff or faculty. At the occupied sites potential impacts are so noted. The result at some of the sites would be a solution that fully meets the Educational Program requirements, except as noted for particular sites and is outlined.

The disposition of the existing Nelson Place School is undetermined for Salter School or Forest Grove sites. No discussions were had as yet as to potential future use of the existing Nelson Place School building, or potential cost involved in gains from sale, or costs from demolition. Each site has a detailed description, comparing to the program criteria, and recommendations follow.

New Construction on Alternative Site Option Scope of Work:

- Provide all new utility services.
- New Construction (new building) = 110,000 SF
- Provide all Site improvements, including parking, bus/parent drop off areas and driveways, as noted in the program documents.
- Provide play fields, athletic fields.

Estimated Preliminary Construction and Project Costs: Refer to attached AMF order of magnitude cost estimates.

Site Selection Process: At the beginning of the project, meetings were held with the City of Worcester DPW+P, Worcester Public Schools and, DAB to review if there was any available City schools or land, private land that would be available for rehabilitation, demolition, or open land for development, as well as buildings that could serve as swing space, if the school was rehabilitated. The DPW+P reviewed assessor’s parcels for any open land above 6 acres within the quadrant for any former school buildings, private schools with diminishing enrollment, or convertible space. The following is a list of reviewed parcels, and brief discussion:

<table>
<thead>
<tr>
<th>REVIEWED SITES</th>
<th>REVIEW NOTES-PARCELS NOT VIABLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>St. Peter Mariam- Middle School</td>
<td>Potential swing space –Quinsigamond Community College reportedly renewed lease</td>
</tr>
<tr>
<td>St. Peter Mariam- Senior High School</td>
<td>Potential Swing Space/ Side Land usage- School is reported at capacity, Side land topography and size not workable</td>
</tr>
<tr>
<td>Gencarelli Land, 109 Holden Street</td>
<td>Access to Grove Street 5.26 acres- Steep slopes, limited usable land at the lots center, topography and size not workable</td>
</tr>
</tbody>
</table>
### FEASIBILITY STUDY

#### 3.1.6 PRELIMINARY EVALUATION OF ALTERNATES

**E. New Construction on Alternate Site Options**

<table>
<thead>
<tr>
<th>Site Evaluation</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>St Georges Church- Rear land</td>
<td>Reviewed property, has a stream through, wetlands throughout, land has good direct access to Ararat Street- City discussed w/ the Diocese, land is not available for sale, wetlands would restrict development, slopes/topography would lead to high development costs, as well as purchase cost.</td>
</tr>
<tr>
<td>Private land, adjacent to Assumption and Nelson Place Site</td>
<td>Limited access, privately held, potential for easement for access/ slopes, as the Assumption land is adjacent and potentially negotiable for use; no further review was made at this time. To be reviewed as noted for potential easement, access as part of the PSR/ future reviews.</td>
</tr>
<tr>
<td>Harlow Street Elementary School</td>
<td>City owed and presently leased, lease was not renewed by the city. City will re-open as a public school to address influx in the population.</td>
</tr>
<tr>
<td>St Stephens Church – School rooms</td>
<td>As potential for swing space; available school classroom area is too small for use as swing space.</td>
</tr>
<tr>
<td>Former Spirit of Knowledge School</td>
<td>As potential for swing space; available school classroom area is too small for use as swing space.</td>
</tr>
<tr>
<td>Higgins Armory Building</td>
<td>As potential for swing space; not set up as a school, not financially feasible to rehab for swing space.</td>
</tr>
</tbody>
</table>

### REVIEWED SITES

<table>
<thead>
<tr>
<th>REVIEWED SITES</th>
<th>REVIEW NOTES-PARCELS SELECTED FOR REVIEW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nelson Place School with added adjacent land</td>
<td>Rear parcel is owned by Assumption College, rear land of 4 adjacent houses w/ extended rear yards (rear land only); other abutting vacant rear land.</td>
</tr>
<tr>
<td>Former Salter School (aka Indian Hill School) and adjacent school fields</td>
<td></td>
</tr>
<tr>
<td>Forest Grove School / Francis McGrath School</td>
<td>With potential abutting vacant land</td>
</tr>
</tbody>
</table>

**Site Evaluation Process:** As part of the Feasibility Study scope of work, LPA was tasked with evaluating, in addition to the existing Nelson Place School site, other sites to determine their suitability for a New Construction option. The three proposed sites were assessed and ranked based on different criteria, which was established through meetings with the City as to the criteria, and the weighted ratings. Refer to the following pages for site evaluations of the existing Nelson Place site along with the alternate sites, and the Nelson Place site with expanded additional land. Information was gathered from a variety of sources including site visits, previous studies and surveys, online mapping (topography, wetlands, soils, etc.), meetings and conversations with City Departments, public utility companies, input from local and state officials, and the observations and experience of the design team. The criteria established for preliminary site analysis can be described as follows:
HIGH PRIORITY CRITERIA

- **Adjacency to Core District:** The existing district is a gerrymander configuration, extending from Chandler Street up to the Indian Hill area, with the McGrath and Flag Street school districts interwoven, and the Special Education/Autism program drawing from the entire quadrant. Priority is given to the existing location, as this is the established location. The Salter School site is at the opposite end of the quadrant, and would be central to the north end of the quadrant.

- **Neighborhood Adjacency:** The proposed siting of the school on the parcel and its impact on the neighborhood, and surrounds.

- **Access Potential/Traffic, Pedestrian/Vehicular:** Access to each site is given a value based on a combination of factors including vehicular and pedestrian access. First, vehicular access considers a site's proximity to major traffic arteries (as opposed to narrower secondary streets). Safe vehicular entry and exit to and from the site, as well as associated sightlines and peak traffic flows, are also rated. Second, pedestrian access considers availability of sidewalks, crosswalks, signals and any other factors that might affect pedestrian use of each site.

- **Meets Program Requirements:** A New Construction on Alternate Site Option should achieve all of the Educational Program/Space Summary requirements, the degree of achievement is outlined under each prospective site.

- **Project Phasing/Construction Impacts:** Outlined under each prospective site, the Administration has advised that the student population must remain together for the duration of construction, and that phased construction at the existing facility is not to be desirable, also that there is no swing space available in the City. Clearly this is an important factor in the alternative site selection decision, as this criteria essentially rules out the renovation or renovation/addition alternatives.

- **Orientation, Net Zero Options:** Based on the ability to orient the building to provide better solar orientation, and to meet the goals set up for the net zero/sustainable criteria.

GENERAL COMPARISON CRITERIA

- **Property Location and Configuration:** Based on the proposed area requirements for the building footprint, driveways, parking areas, athletic fields and other outdoor amenities, we estimate that the project requires a site with at least 10-12 developable acres. The shape of a parcel of land may also make one site more desirable than another; for instance, a parcel with long narrow peninsulas or awkward alignments will be less efficient and more costly to develop than one that is square or rectangular. A larger and simpler lot configuration is better.
3.1.6 PRELIMINARY EVALUATION OF ALTERNATES

E. New Construction on Alternate Site Options

- **Topography, Slopes and Orientation:** Slope is measured as a percentage of vertical rise in elevation divided by horizontal distance. Slopes greater than 15% are considered excessive and will directly impact site development costs, as retaining walls and stepped foundations become a necessity and earthwork quantities increase. Exposure of slopes to solar gain, weather, and prevailing winds are also taken into account for each site.

- **Existing Development, Buildings and Site:** Proposed sites are rated according to the current uses of the subject parcel as well as adjacent properties. Compatible uses for a School include residential, business and publicly owned open space (i.e. parks, recreation fields, etc.).

- **Easements and Other Property Limitations:** Examples of limitations that can impact a site’s development include overhead power lines, underground utilities, access right-or-ways, and agricultural land use.

- **Environmental Resources and Hydrology:** The presence of wetland resource areas, intermittent streams, endangered species, hazardous materials (in both existing buildings as well as underground), and other permitting/regulatory issues have the potential to impact schedules, costs (testing, design and construction) and amount of useable site.

- **Soils and Geologic Factors:** On-site soils are rated according to reports and mapping published by the U.S. Department of Agriculture and State of Massachusetts. Soil limitations include poor drainage, ponding, presence of stones/cobbles, shallow depth to bedrock, and urban soil types that have been altered and/or filled. Impact due to soil type ranges from slight to severe and can significantly affect construction costs. While available information can provide a general sense of soil type, additional geotechnical exploration and testing is highly recommended prior to completion of the design phase.

- **Utility System Availability:** Availability of utilities, including public sewer, water, electrical power and natural gas, determine this criterion. Proposed sites may require utility infrastructure upgrades or longer utility runs (due to lot configuration); these sites received lower marks. A site closer to primary available utility service is better.

- **Acquisition Cost/Site development Cost:** Cost of the sites purchase or purchase of adjacent land is to be factored in this category, if a City owned parcel can be developed at a high cost due to relocation costs, high development costs versus a site that can be purchased with higher purchase.
cost verses lower development cost. Consideration also to be factored in if the adjacent land can be either purchased to fulfill the program needs, or the ability to obtain easements for grading onto adjacent property, eliminating expensive retaining walls.

- **Community Use:** Sites will be reviewed if the fields and other site amenities can be developed and used by the community, such as the addition of a baseball field, or soccer/multi-purpose fields.

- **Expansion Potential:** If there is additional long range expansion capabilities for building additions, or additional site amenities.

- **General Comment:** Any items particular to the noted sites that is not covered in the above criteria, or factors worthy of note and additional points, or negative points.

Each of the above criteria was assigned, for all proposed sites, a numerical ranking between 0 and 10 on topics deemed the highest priority, and between 0 and 5 on other topics and based on the Site Evaluations that follow in this section. A ranking of 0 is non-responsive, 1 is least advantageous; a ranking of 5 is most advantageous. The sum of the criteria represents the score for that particular site; again, a higher score represents that a site can be more easily, and cost-effectively, developed. Refer to notes and table for the alternate sites, summary table of the rankings is indicated below.

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>NP-Base</th>
<th>NP Expanded</th>
<th>Salter School</th>
<th>Forest Grove</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL</td>
<td>107</td>
<td>115</td>
<td>87</td>
<td>78</td>
</tr>
</tbody>
</table>
Shortlisted Sites for PDP Review

Reviewed Sites, Refer to 3.1.6 for review.

Locus Plan

Legend

Nelson Place Elementary School

Salter School

St. George rear land

St. Peter Marian Middle School

Vacant land, Gencarelli

Harlow Street School

Forest Grove

Adjacent Private Land

St. Stephen’s Church & School Space

Former Spirit of Knowledge School

Nitsch Engineering
3.1.6 PRELIMINARY EVALUATION OF ALTERNATIVES

E. New Construction on Alternate Site Options

1. Nelson Place & Additional Land
3.1.6 PRELIMINARY EVALUATION OF ALTERNATES

FEASIBILITY STUDY

E. New Construction on Alternate Site Options

E.1 Nelson Place with Additional Land

Refer to Section 3.1.4 Evaluation of Existing Conditions for the Nelson Place Site analysis, which includes the Nelson Place site with additional land.
3.1.6 PRELIMINARY EVALUATION OF ALTERNATES

FEASIBILITY STUDY

E. New Construction on Alternate Site Options

NELSON PLACE w/ ADDITIONAL LAND

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>GENERAL INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property Information</td>
<td>City of Worcester- existing Nelson Place site</td>
</tr>
<tr>
<td></td>
<td>Assumption College- south parcel, access from Red Wing Drive if necessary.</td>
</tr>
<tr>
<td></td>
<td>McDonough-southwest parcel</td>
</tr>
<tr>
<td></td>
<td>4-house lots- east parcels –potential use in widening access to south.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HIGH PRIORITY RATING</th>
<th>SCORE 0 to 10 (0 being not responsive, 1 least advantageous, 10 most advantageous)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjacency to Core District</td>
<td>10</td>
</tr>
<tr>
<td>Neighborhood Adjacency</td>
<td>10</td>
</tr>
<tr>
<td>Access Potential-Traffic</td>
<td>Vehicular: Off-site Improvements suggested, generally traffic will be improved</td>
</tr>
<tr>
<td>Pedestrian &amp; Vehicular</td>
<td>greatly over the existing site conditions</td>
</tr>
<tr>
<td></td>
<td>Pedestrian: Access from Nelson Place requires travel along moderate slopes</td>
</tr>
<tr>
<td>Meets Program requirements</td>
<td>Building:</td>
</tr>
<tr>
<td></td>
<td>Site:</td>
</tr>
<tr>
<td></td>
<td>▪ Bus drop off accommodates less than the desired program</td>
</tr>
<tr>
<td></td>
<td>▪ Parent drop-off onsite accommodates only the minimum requirements</td>
</tr>
<tr>
<td></td>
<td>▪ Parking onsite accommodates less than the desired program</td>
</tr>
<tr>
<td></td>
<td>▪ Separate play areas are provided</td>
</tr>
<tr>
<td></td>
<td>▪ Multi-use field provided</td>
</tr>
<tr>
<td>Project Phasing/Construction</td>
<td>Construction access would need to be planned and coordinated around the school</td>
</tr>
<tr>
<td>Impacts</td>
<td>and school site, this option allows the school to be built well behind the existing</td>
</tr>
<tr>
<td></td>
<td>school; demolition and site development at the last phase would be required</td>
</tr>
<tr>
<td>Orientation, Net Zero options</td>
<td>Consultants</td>
</tr>
<tr>
<td>Swing Space</td>
<td>Not Required</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GENERAL COMPARISON RATING</th>
<th>SCORE 0 to 5 (0 being not responsive, 1 least advantageous, 5 most advantageous)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property Configuration, size,</td>
<td>Wetlands constraints, slope issues between site tiers, generally a tight site</td>
</tr>
<tr>
<td>Workable area</td>
<td></td>
</tr>
<tr>
<td>Topography, Slopes and</td>
<td>Elevation change from Nelson Place School to field is workable.</td>
</tr>
<tr>
<td>Orientation</td>
<td>Slope rises gradually from north, flattens at athletic field and then</td>
</tr>
</tbody>
</table>
### 3.1.6 PRELIMINARY EVALUATION OF ALTERNATES

#### FEASIBILITY STUDY

E. New Construction on Alternate Site Options

---

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NELSON PLACE w/ ADDITIONAL LAND</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Climbs in adjacent parcel which slopes approximately 10% to 15% toward the south property line, additional land provides a greater opportunity to mitigate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Existing Development/Buildings</td>
<td>Detailed study of the existing site and building to be done as part of the PDP (no build, add reno, etc.)</td>
<td>0</td>
</tr>
<tr>
<td>Easements and Other Property Limitations</td>
<td>TBD</td>
<td>5</td>
</tr>
<tr>
<td>Environmental Resources and Hydrology</td>
<td>Wetlands at each side will have setback constraints, limiting development, and grading</td>
<td>4</td>
</tr>
<tr>
<td>Soils and Geologic Factors</td>
<td>Poorly draining soils with the potential for shallow bedrock or rocky soils. Maybe areas with adequate soils for stormwater control. There may be adequate area for on-site stormwater basin if necessary.</td>
<td>3</td>
</tr>
<tr>
<td>Utility System Availability</td>
<td>Water, Sewer, Electric and Gas is available for the project on Nelson Place, will require a lengthy access connection to street</td>
<td>4</td>
</tr>
<tr>
<td>Acquisition Cost</td>
<td>Requires purchase or negotiation of additional adjacent parcel for full build out, slope and access easements, while advantageous to the project, need to be weighed against potential cost</td>
<td>2</td>
</tr>
<tr>
<td>Community Use</td>
<td>Additional room for fields, which can be used by the community</td>
<td>4</td>
</tr>
<tr>
<td>Expansion Potential</td>
<td>With additional land, there is better potential for expansion</td>
<td>4</td>
</tr>
<tr>
<td>General Comment</td>
<td></td>
<td>115</td>
</tr>
</tbody>
</table>
NOTES:
1. Parking, bus/parent drop-off: This scheme could satisfy the high priority site program items, but would be challenging to satisfy the full program requirements.

2. Building would potentially need to be three stories, which is not preferred.

3. This sketch is a general graphic, if this scheme is pursued, further study to be developed to respond to program specifics in greater detail.

4. Refer to the narrative for construction phasing comments.
E. New Construction on Alternate Sites Option - Nelson Place with Increased Additional Land

Potential off-site road improvements
Potential access drive and parking
Existing property lines
Potential Fields
Potential parent drop-off/pickup and parking
Suggested turn-around to be developed
ILSF & Setbacks refer to wetlands report
Potential School Location
Potential fields or parking
Potential emergency access
Potential land acquisition

NOTES:
1. Parking, bus/parent drop-off: This scheme will potentially satisfy the program requirements, depending on the extent of the land obtained.
2. Building would potentially satisfy the building program.
3. This sketch is a general graphic, if this scheme is pursued, further study to be developed to respond to program specifics in greater detail.
4. Refer to the narrative for construction phasing comments.
E. New Construction on Alternate Site Options

2. Salter School
### CRITERIA

#### GENERAL INFORMATION

Property Information
Salter School Parcel - Indian Hill Road/155 Ararat Street  
Present Owner - 155 Ararat Street - White Picket Fence LLC,  
Book/Page 51383/159 Assessor’s Parcel 37-029-01 +1A,  
Adjacent City of Worcester Field land- 165 Ararat St  
165 Ararat Street – City of Worcester School Dept., Book/Page  
7123/233 Assessor’s Parcel 37-029-0001B (Land is held under article 97-Park land restriction)

#### HIGH PRIORITY RATING

SCORE 0 to 10 (0 being not responsive, 1 least advantageous, 10 most advantageous)

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjacency to Core District</td>
<td>10</td>
</tr>
<tr>
<td>Neighborhood Adjacency</td>
<td>8</td>
</tr>
<tr>
<td>Access Potential-Traffic Pedestrian &amp; Vehicular</td>
<td>4-6</td>
</tr>
<tr>
<td>Meets Program requirements Building:</td>
<td>3</td>
</tr>
<tr>
<td>Building can be placed on the site as a three story building with parking under, the bus drop off, parent pickup will have to be along the street.</td>
<td></td>
</tr>
<tr>
<td>Site:</td>
<td>3</td>
</tr>
<tr>
<td>- Bus drop off only accommodates the minimum requirements</td>
<td></td>
</tr>
<tr>
<td>- Parent drop-off accommodates only the minimum requirements</td>
<td></td>
</tr>
<tr>
<td>- Parking onsite accommodates only the minimum program requirements</td>
<td></td>
</tr>
<tr>
<td>- Play area is not large enough to accommodate desired program</td>
<td></td>
</tr>
<tr>
<td>- No multi-use field provided</td>
<td></td>
</tr>
<tr>
<td>Project Phasing/Construction Impacts Ideal for the existing school, building could be constructed without impact to the existing school, impact to the neighborhood would be a factor, however not different than the other sites.</td>
<td>8</td>
</tr>
<tr>
<td>Orientation, Net Zero options Generally the same as other new construction, however limited site area restricts potential systems</td>
<td>5</td>
</tr>
<tr>
<td>Swing Space</td>
<td>10</td>
</tr>
<tr>
<td>Not required</td>
<td></td>
</tr>
</tbody>
</table>
### SALTER SCHOOL SITE w/ ADJACENT CITY OF WORCESTER PARK

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>SCORE 0 to 5 (0 being not responsive, 1 least advantageous, 5 most advantageous)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GENERAL COMPARISON RATING</strong></td>
<td></td>
</tr>
<tr>
<td>Property Configuration, size, Workable area</td>
<td>Salter school parcel is too small for program and Article 97 parcel adjacent to Salter School is unbuildable park land. Site may be too small for effective drainage control. 1</td>
</tr>
<tr>
<td>Topography, Slopes and Orientation</td>
<td>L shaped, slopes from N/E-S/W about 20 ft in 560’ 4</td>
</tr>
<tr>
<td>Existing Development/Buildings Site</td>
<td>1900, Brick and stone former school, reported as fair/poor condition, 24,000 sf total gross building area, building is in a historic district, and on the MACRIS list. Demolition would likely be an issue with the Historic commission. 1</td>
</tr>
<tr>
<td>Easements and Other Property Limitations</td>
<td>Park is held under article 97-Park land restriction, and cannot be developed for the school building, joint parking might be a consideration 2</td>
</tr>
<tr>
<td>Environmental Resources and Hydrology</td>
<td>Brook appears to have been piped under the fields and through railroad property. No wetlands were identified on this site. 8</td>
</tr>
<tr>
<td>Soils and Geologic Factors</td>
<td>Poorly draining soils on site make drainage control challenging but not impossible. 3</td>
</tr>
<tr>
<td>Utility System Availability</td>
<td>Water, Sewer, Electric and Gas is available for the project 5</td>
</tr>
<tr>
<td>Acquisition Cost</td>
<td>155 Ararat Street-unknown, sold 8/21/2013 -$275,000, valued at $1,385,600 2</td>
</tr>
<tr>
<td>Community Use</td>
<td>Fields would remain a community access 4</td>
</tr>
<tr>
<td>Expansion Potential</td>
<td>None 0</td>
</tr>
<tr>
<td>General Comment</td>
<td>Parcel on first blush is relatively compact compared to the needs field usage</td>
</tr>
<tr>
<td>TOTAL</td>
<td>87</td>
</tr>
</tbody>
</table>
Potential building to be located on former school land only, and potential would need to be multiple stories with parking beneath.

Existing property lines. Field use only (Article 97 Restrictions)

Existing property lines (former school)

Potential field

Potential joint field and school parking

Potential bus drop off road
EXISTING CONDITIONS STUDY – CIVIL
SALTER SCHOOL / ST. GEORGES
NELSON PLACE - WORCESTER, MASSACHUSETTS

Nitsch Engineering has performed research of the existing site conditions and anticipated site permitting requirements for the Nelson Place Elementary School located on Nelson Place in Worcester, Massachusetts. Nitsch Engineering’s research included program information provided by the City of Worcester, as well as information gathered during two site visits conducted by Mr. Steven Ventresca, PE on January 13, 2014. Information included in this report is also based on compiled documents gathered by Nitsch Engineering.

This report lists the existing conditions at the Salter School as a potential location for a new Nelson Place School.

A summary of our observations and findings is summarized below.

EXISTING SITE UTILITIES

The Salter School Figure of this report contains a Geographic Information Systems (GIS) color diagram illustrating the site of the Forest Grove Middle School. The school is located off Ararat Street and is bound by Brattle Street to the west and Indian Hill Road to the east. Information on the water, sewer and drain lines was provided by the Worcester Department of Public Works and Parks.

The Salter School is closed and in disrepair. Additionally, the school is located on a small parcel which cannot accommodate the current elementary school program requested by the City. The parcel adjacent to the Salter school cannot be used for a new school because it is designated as park land by the City and buildings are not allowed on park land. The project is looking at the St. George's site with access off Ararat Street near the current Salter School location. The St. George’s site is a wooded parcel with a perennial stream running on the west side of the site. There is a slight rise on the west side of the property which then slopes down to the east before rising considerably to the rear property line of houses along Ridgewood Avenue. There is a fifty foot right-of-way off Ararat Street for access.

Based on record documents, site observations, and conversations with town officials, the summary descriptions below represent the site utility conditions/assumptions as we understand them at this time.

WATER

The water distribution map provided by the City of Worcester DPW indicates a 16-inch water main (material unknown) in Ararat Street. A water service loop would be brought off the Ararat Street main into the site. There would be work in the Ararat Street right-of-way requiring coordination with the Worcester DPW.

Flow test information is not currently available for the water main in Ararat Street.

SEWER

There is a 10" sanitary sewer main (material unknown) that runs along the perennial stream (un-named) located on the west side of the property. The sewer winds behind a subdivision and private properties before going under Ararat Street and into the Salter School property.

NATURAL GAS
There is a low pressure gas main (size and pipe material unknown) and an eight (8) inch cast iron high pressure gas in Ararat Street. There is no service directly into the St. George’s site. However, the project presumably would be able to tap into either of the Ararat Street gas mains at the direction of the gas company.

UNDERGROUND/ABOVE GROUND TANKS

There are no known tanks above or below ground noted on this site.

ELECTRICAL/TELECOM

Overhead electric service is available on Ararat Street for use on this site.

SITE CONDITIONS

SOILS

Based on the Natural Resources Conservation Service (NRCS) Worcester County Soil Survey (1969), the St George site is an equal combination of Paxton fine sandy loam, Whitman loam, Canton fine sandy loam and a smaller area of Woodbridge fine sandy loam. These areas are associated with a wetland or poorly drained areas. These soils have a hydrologic soil group of C and D for the Paxton, Whitman and Woodbridge soils. The Canton soil, which is located on a higher elevation, has a hydraulic soil group of B.

PRELIMINARY PERMITTING CONSIDERATIONS

WETLANDS PROTECTION ACT (310 CMR 10.00)

The Wetlands Protection Act ensures the protection of Massachusetts’ inland and coastal wetlands, tidelands, great ponds, rivers and floodplains. It regulates activities in coastal and wetlands areas, and contributes to the protection of ground and surface water quality, the prevention of flooding, and storm damage and the protection of wildlife and aquatic habitat.

A review of the Massachusetts Department of Environmental Protection (DEP) wetland layers available on the Massachusetts Geographic Information System (MassGIS), dated April 2007, appear to indicate that the St George’s site has wetlands along the perennial stream. The perennial stream also has a 25-foot Riverfront associated with it. The Riverfront offset is less in the City of Worcester than the standard 200-foot Riverfront based on the Wetland Protection Act.

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 sources.

A review of the Massachusetts DEP resource layers available on the MassGIS, appear to indicate the Middle School is NOT located within a Surface Water Supply Protection Zone.

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 Forest Grove School site is NOT a Priority Habitat of Rare Species or an Estimated Habitat of Rare Wildlife. No such areas appear within close proximity to the site.

**FLOOD PLAIN**

Based on the Flood Insurance Rate Map (FIRM), Community Panel Number 25027C0612E, dated July 4, 2011 it does not appear that the site is within a flood plain.

**ZONING**

The Middle School site is located in the RS-7 (Residential) Zoning District. According to the schedule of permitted uses, schools are considered a permitted principal use. The zoning requirements for the site are based on information in the City of Worcester Zoning Map dated July 17, 2012, and the City of Worcester Zoning Ordinance, amended through January 7, 2014 include the following:

- Minimum Lot Area - 7,000 square foot;
- Frontage, min - 65 linear feet;
- Front Setback - 25 feet;
- Side Setback – 20 feet;
- Rear Setback – 50 feet;
- Max Stories 2+ with max height of 35 feet;
- Floor to Area Ration 0.4 to 1

**USEPA NPDES**

Construction activities that disturb more than one acre are regulated under the United States Environmental Protection Agency’s (EPA) National Pollution Discharge Elimination System (NPDES) Program. In Massachusetts, the USEPA issues NPDES permits to operators of regulated construction sites. Regulated projects are required to develop and implement stormwater pollution prevention plans in order to obtain permit coverage.

**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 of > 50,000 gpd must obtain a MassDEP permit before construction

Nitsch Engineering will review the projected sanitary flows for the Middle School to verify whether the project will exceed the 15,000 gallon per day threshold.
3.1.6 PRELIMINARY EVALUATION OF ALTERNATIVES

E. New Construction on Alternate Sites Option - Salter School Site - Site Evaluation

NOTES:
Information compiled in this drawing was taken from several sources including, but not limited to:
1. Worcester GIS
2. Google Maps
3. NStar Gas & National Grid Elec.

Residential-RS7 Zoning Requirements
- Lot Area Square Footage: 254,941 SF
- Lot Frontage: xx'
- Front Yard: 25'
- Side Yard: 20'
- Rear Yard: 50'
- Number Stories: 2+ (35°)

LEGEND:
- Project Limit Line
- Slopes > 15%
- Observed Wetland
- 100' Wetland Buffer
- Open Water
EXISTING SITE CONDITIONS

Salter School Site

The Site reviewed on January 11, 2014, included the 2.5 acre Salter School parcel and 4.9 acres of City owned land directly west of the school. Both parcels are south of Ararat Street in Worcester, MA (Figure 1). The Site has low relief and drains to the south towards an elevated Conrail track and right-of-way. The developed portion of the Site consists of the Salter School building to the east and a centrally located athletic field on the City owned land. To the west are undeveloped upland woodlands. A perennial stream north of Ararat Street and the Site drains south to the Ararat Street but does not reemerge/daylight on the Site. DPW records indicate that the stream is piped from Ararat Street south to a stormwater system associated with a residential development.

The highest elevations are in the northeastern corner of the Salter School parcel and range from 658 to 640 feet. From this point the land slopes to the south and west. Elevations within the athletic field range from 638 to 634 feet. The woodlands to the east of the athletic field slope from 646 feet in the northwestern corner of the Site to 622 feet to the southeast. Site runoff would generally drain south then southeast along the toe of the elevated Conrail tracks to a box culvert under the tracks. No stream channel or wetland vegetation was observed along the tracks or within the box culvert on the January site visit.

The wooded uplands east of the athletic fields consisted primarily of trees considered noxious weeds in Massachusetts, Norway maple (*Acer platanoides*) and black locust (*Robinia pseudoacacia*). Black cherry (*Prunus serotina*) was also present. The understory dominants were the invasive species, multiflora rose (*Rosa multiflora*), Japanese knotweed (*Polygonum cuspidatum*), and Asian bittersweet (*Celastrus orbiculatus*).
SOILS

The majority of the upland portion of the site is mapped as Urdorthents smoothed, described as made land over firm loamy basal till. Slopes range from 0 to 3% and the groundwater is more than 80 inches below the surface.

Along the southern portion of the property in the vicinity of the Conrail right-of-way are two additional soil series Paxton fine sandy loam over gravelly fine sandy loams with 3 to 8% slopes and Sudbury fine sandy loam with 0 to 3% slopes. Paxton series formed in friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till derived from granite and gneiss. This well drained soil is classified as hydrologic group C, and groundwater is typically between 18 and 30 inches below the surface. Sudbury series formed in friable coarse-loamy eolian deposits over loose sandy glaciofluvial deposits. This moderately well drained soil consists of fine sandy loam soils over gravelly fine sandy loam and gravelly sands. It is classified as hydrologic group B and groundwater is typically between 18 and 36 inches below the surface.

For more detail, reference the attached Natural Resources Conservation Service (NRCS) Worcester Northeastern Part Soil Survey information.

MA WETLANDS PROTECTION ACT, WORCESTER WETLANDS REGULATIONS, AND US ARMY CORPS OF ENGINEERS REGULATORY JURISDICTION

No wetlands were observed on the Site. A perennial stream identified north of the Site and Ararat Street drains south towards the property but does not reemerge on the Site. It is assumed that the stream is piped south from Ararat Street to a storm water system in a large residential development.

Under the Wetlands Protection Act Regulations (WPA) (310 CMR 10.00), the perennial stream across Ararat Street is regulated as Bank and Land Under Water Bodies and Waterways. The top of a Bank of a perennial stream is defined by the regulations within the Riverfront section 310 CMR 10:58(2)(a) as the Mean Annual High-Water Line. The Mean Annual High-Water Line of a river is the line that is apparent from visible markings or changes in the character of soils or vegetation due to the prolonged presence of water, and distinguishes between predominantly aquatic and predominantly terrestrial land. Field indicators of bankfull conditions are used to determine the mean annual high-water line. Bankfull field indicators include but are not limited to: changes in slope, changes in vegetation, stain lines, tops of pointbars, changes in bank materials, or bank undercuts.

The wetland found along the offsite stream drainage would be regulated as Bordering Vegetated Wetlands (BVW). Bordering Vegetated Wetlands are likely to be significant to public or private
water supply, to ground water supply, to flood control, to storm damage prevention, to prevention of pollution, to the protection of fisheries and to wildlife habitat.

A 100-foot buffer Zone extends up-gradient from the limit of Bank and Bordering Vegetated Wetlands, whichever is more inclusive.

There is a 25-foot Riverfront Area and a 100-foot Buffer Zone extending from the Banks of the stream or the extent of the edge of Bordering Vegetated Wetlands whichever is more inclusive.

The City of Worcester's Wetland Protection Ordinance and Wetland Protection Regulations as amended July 1, 2007, also takes jurisdiction: within one hundred (100) feet of any freshwater wetland, bordering vegetated wetland, marsh, wet meadow, bog or swamp; within one hundred (100) feet of any bank; any lake, river, pond, or stream; any land under said waters; any land subject to flooding; or within one hundred (100) feet of any existing or proposed inlet to any storm drain, catch basin, or other storm drain system component discharging to any lake, pond, river, stream, or wetland. Under the Worcester Wetland Protection Regulations there is a 100-foot zone that extends from the limit of the Riverfront Area.

For the Salter School property only the WPA 100-foot buffer zone and the Worcester 100-foot conservation buffer extend onto the property (Figure 1). There are no federally regulated wetlands on the Salter Site.

NATURAL HERITAGE & ENDANGERED SPECIES PROGRAM

A review of the MassGIS NHESP database which references the 13th Edition of the Massachusetts Natural Heritage Atlas prepared by the Natural Heritage and Endangered Species Program (NHESP), and dated October 1, 2008, indicates that the property is not a Priority Habitat of Rare Species or an Estimated Habitat of Rare Wildlife.

FLOOD PLAIN

Based on the Flood Insurance Rate Map (FIRM), Community Panel Number 25027C0612E, dated July 4, 2011 the site is not located within the 100-year 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 sources.
A review of the Massachusetts DEP resource layers available on MassGIS indicates that the property is not located within a Surface Water Supply Protection Zone.

GROUND WATER SUPPLY PROTECTION (310 CMR 22.20)

The Massachusetts Department of Environmental Protection (DEP) ensures the protection of groundwaters used as sources of drinking water supply from contamination by regulating land use and activities within approved Wellhead Protection Areas, Zone II’s and Interim Wellhead Protection Areas.

A review of the Massachusetts DEP resource layers available on the MassGIS, appear to indicate the property is not located within a Groundwater Supply Protection Zone.
Looking east at the rear of the Salter School and ice on the athletic field.

Looking west at upland woods to the west of the athletic fields near where a mapped stream course would be located.
View looking south at the drainage along the north side of the Conrail tracks. Japanese knotweed a weedy upland species lines the swale.

View through the Conrail track box culvert south of the athletic fields. Note the picnic table within the box culvert.
### TABLE 1

**PLANT SPECIES LIST**

**Salter School Property**

**Uplands**

<table>
<thead>
<tr>
<th>Plant Species</th>
<th>Common Name</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acer platanoides</strong></td>
<td>Norway Maple</td>
<td>UPL</td>
</tr>
<tr>
<td><strong>Berberis thunbergii</strong></td>
<td>Japanese Barberry</td>
<td>FACU</td>
</tr>
<tr>
<td><strong>Carya ovata</strong></td>
<td>Shag-Bark Hickory</td>
<td>FACU</td>
</tr>
<tr>
<td><strong>Celastrus orbiculatus</strong></td>
<td>Asian Bittersweet</td>
<td>UPL</td>
</tr>
<tr>
<td><strong>Ligustrum vulgare</strong></td>
<td>European Privet</td>
<td>FACU</td>
</tr>
<tr>
<td><strong>Lonicera morrowii</strong></td>
<td>Morrow's Honeysuckle</td>
<td>FACU</td>
</tr>
<tr>
<td><strong>Pinus strobus</strong></td>
<td>Eastern White Pine</td>
<td>FACU</td>
</tr>
<tr>
<td><strong>Prunus serotina</strong></td>
<td>Black Cherry</td>
<td>FACU</td>
</tr>
<tr>
<td><strong>Quercus alba</strong></td>
<td>Northern White Oak</td>
<td>FACU</td>
</tr>
<tr>
<td><strong>Quercus rubra</strong></td>
<td>Northern Red Oak</td>
<td>FACU</td>
</tr>
<tr>
<td><strong>Reynoutria japonica</strong></td>
<td>Japanese-Knotweed</td>
<td>FACU</td>
</tr>
<tr>
<td><strong>Robinia pseudoacacia</strong></td>
<td>Black Locust</td>
<td>FACU</td>
</tr>
<tr>
<td><strong>Rosa multiflora</strong></td>
<td>Rambler Rose</td>
<td>FACU</td>
</tr>
<tr>
<td><strong>Smilax rotundifolia</strong></td>
<td>Horsebrier</td>
<td>FAC</td>
</tr>
<tr>
<td><strong>Solidago gigantea</strong></td>
<td>Late Goldenrod</td>
<td>FACW</td>
</tr>
<tr>
<td><strong>Toxicodendron radicans</strong></td>
<td>Eastern Poison Ivy</td>
<td>FAC</td>
</tr>
</tbody>
</table>
Custom Soil Resource Report for
Worcester County, Massachusetts, Northeastern Part
St George & Salter School

January 7, 2014
Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://soils.usda.gov/sqi/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the
individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.
Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.
The soil surveys that comprise your AOI were mapped at 1:20,000. Warning: Soil Map may not be valid at this scale.

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

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

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

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

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

Soil Survey Area:  Worcester County, Massachusetts, Northeastern Part

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

Date(s) aerial images were photographed:  Mar 30, 2011—May 1, 2011

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

<table>
<thead>
<tr>
<th>Map Unit Symbol</th>
<th>Map Unit Name</th>
<th>Acres in AOI</th>
<th>Percent of AOI</th>
</tr>
</thead>
<tbody>
<tr>
<td>71B</td>
<td>Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony</td>
<td>8.6</td>
<td>16.5%</td>
</tr>
<tr>
<td>73A</td>
<td>Whitman loam, 0 to 3 percent slopes, extremely stony</td>
<td>0.1</td>
<td>0.2%</td>
</tr>
<tr>
<td>260A</td>
<td>Sudbury fine sandy loam, 0 to 3 percent slopes</td>
<td>2.1</td>
<td>4.1%</td>
</tr>
<tr>
<td>305B</td>
<td>Paxton fine sandy loam, 3 to 8 percent slopes</td>
<td>12.3</td>
<td>23.7%</td>
</tr>
<tr>
<td>305C</td>
<td>Paxton fine sandy loam, 8 to 15 percent slopes</td>
<td>8.0</td>
<td>15.4%</td>
</tr>
<tr>
<td>306C</td>
<td>Paxton fine sandy loam, 8 to 15 percent slopes, very stony</td>
<td>2.3</td>
<td>4.4%</td>
</tr>
<tr>
<td>307C</td>
<td>Paxton fine sandy loam, 8 to 15 percent slopes, extremely stony</td>
<td>4.2</td>
<td>8.1%</td>
</tr>
<tr>
<td>307D</td>
<td>Paxton fine sandy loam, 15 to 25 percent slopes, extremely stony</td>
<td>0.3</td>
<td>0.7%</td>
</tr>
<tr>
<td>311B</td>
<td>Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony</td>
<td>1.3</td>
<td>2.5%</td>
</tr>
<tr>
<td>312B</td>
<td>Woodbridge fine sandy loam, 0 to 8 percent slopes</td>
<td>3.7</td>
<td>7.2%</td>
</tr>
<tr>
<td>420C</td>
<td>Canton fine sandy loam, 8 to 15 percent slopes</td>
<td>3.9</td>
<td>7.5%</td>
</tr>
<tr>
<td>421B</td>
<td>Canton fine sandy loam, 3 to 8 percent slopes, very stony</td>
<td>0.7</td>
<td>1.4%</td>
</tr>
<tr>
<td>651</td>
<td>Udorthents, smoothed</td>
<td>4.4</td>
<td>8.4%</td>
</tr>
<tr>
<td><strong>Totals for Area of Interest</strong></td>
<td></td>
<td><strong>52.1</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

### Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend...
beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a soil series. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into soil phases. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A complex consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An association is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.
An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.
Worcester County, Massachusetts, Northeastern Part

71B—Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony

Map Unit Setting
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days

Map Unit Composition
Ridgebury and similar soils: 75 percent
Minor components: 25 percent

Description of Ridgebury
Setting
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till

Properties and qualities
Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.0 inches)

Interpretive groups
Farmland classification: Not prime farmland
Land capability (nonirrigated): 7s
Hydrologic Soil Group: C

Typical profile
0 to 9 inches: Fine sandy loam
9 to 23 inches: Gravelly fine sandy loam
23 to 60 inches: Fine sandy loam

Minor Components
Whitman
Percent of map unit: 15 percent
Landform: Depressions

Woodbridge
Percent of map unit: 10 percent
73A—Whitman loam, 0 to 3 percent slopes, extremely stony

Map Unit Setting
- *Elevation*: 0 to 2,100 feet
- *Mean annual precipitation*: 32 to 50 inches
- *Mean annual air temperature*: 45 to 50 degrees F
- *Frost-free period*: 145 to 240 days

Map Unit Composition
- *Whitman and similar soils*: 70 percent
- *Minor components*: 30 percent

Description of Whitman

Setting
- *Landform*: Depressions
- *Landform position (two-dimensional)*: Toeslope
- *Landform position (three-dimensional)*: Dip
- *Down-slope shape*: Concave
- *Across-slope shape*: Concave
- *Parent material*: Friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till derived from granite and gneiss

Properties and qualities
- *Slope*: 0 to 3 percent
- *Surface area covered with cobbles, stones or boulders*: 9.0 percent
- *Depth to restrictive feature*: More than 80 inches
- *Drainage class*: Very poorly drained
- *Capacity of the most limiting layer to transmit water (Ksat)*: Very low to moderately high (0.00 to 0.20 in/hr)
- *Depth to water table*: About 0 inches
- *Frequency of flooding*: None
- *Frequency of ponding*: Frequent
- *Available water capacity*: Low (about 4.6 inches)

Interpretive groups
- *Farmland classification*: Not prime farmland
- *Land capability (nonirrigated)*: 7s
- *Hydrologic Soil Group*: D

Typical profile
- *0 to 10 inches*: Fine sandy loam
- *10 to 18 inches*: Fine sandy loam
- *18 to 60 inches*: Fine sandy loam

Minor Components

Ridgebury
- *Percent of map unit*: 15 percent
- *Landform*: Depressions
Swansea
Percent of map unit: 15 percent
Landform: Bogs

260A—Sudbury fine sandy loam, 0 to 3 percent slopes

Map Unit Setting
Elevation: 0 to 2,100 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days

Map Unit Composition
Sudbury and similar soils: 80 percent
Minor components: 20 percent

Description of Sudbury

Setting
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Friable coarse-loamy eolian deposits over loose sandy glaciofluvial deposits

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 6.5 inches)

Interpretive groups
Farmland classification: All areas are prime farmland
Land capability (nonirrigated): 2w
Hydrologic Soil Group: B

Typical profile
0 to 9 inches: Fine sandy loam
9 to 18 inches: Fine sandy loam
18 to 25 inches: Gravelly loamy sand
25 to 60 inches: Gravelly sand
Minor Components

**Walpole**
- *Percent of map unit:* 5 percent
- *Landform:* Terraces

**Merrimac**
- *Percent of map unit:* 5 percent

**Agawam**
- *Percent of map unit:* 5 percent

**Ninigret**
- *Percent of map unit:* 5 percent

---

**305B—Paxton fine sandy loam, 3 to 8 percent slopes**

**Map Unit Setting**
- *Mean annual precipitation:* 32 to 50 inches
- *Mean annual air temperature:* 45 to 50 degrees F
- *Frost-free period:* 145 to 240 days

**Map Unit Composition**
- *Paxton and similar soils:* 85 percent
- *Minor components:* 15 percent

**Description of Paxton**

**Setting**
- *Landform:* Drumlins
- *Landform position (two-dimensional):* Shoulder, backslope, summit
- *Landform position (three-dimensional):* Side slope, nose slope
- *Down-slope shape:* Convex
- *Across-slope shape:* Convex
- *Parent material:* Friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till derived from granite and gneiss

**Properties and qualities**
- *Slope:* 3 to 8 percent
- *Depth to restrictive feature:* More than 80 inches
- *Drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately high (0.00 to 0.20 in/hr)
- *Depth to water table:* About 18 to 30 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Available water capacity:* Low (about 3.6 inches)

**Interpretive groups**
- *Farmland classification:* All areas are prime farmland
- *Land capability (nonirrigated):* 2e
Hydrologic Soil Group: C

Typical profile
0 to 5 inches: Fine sandy loam
5 to 27 inches: Fine sandy loam
27 to 60 inches: Gravelly fine sandy loam

Minor Components
Woodbridge
Percent of map unit: 10 percent

Canton
Percent of map unit: 5 percent

305C—Paxton fine sandy loam, 8 to 15 percent slopes

Map Unit Setting
Mean annual precipitation: 32 to 444 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days

Map Unit Composition
Paxton and similar soils: 85 percent
Minor components: 15 percent

Description of Paxton
Setting
Landform: Drumlins
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till derived from granite and gneiss

Properties and qualities
Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.6 inches)

Interpretive groups
Farmland classification: Farmland of statewide importance
Land capability (nonirrigated): 3e
Hydrologic Soil Group: C
Typical profile
0 to 5 inches: Fine sandy loam
5 to 27 inches: Fine sandy loam
27 to 60 inches: Gravelly fine sandy loam

Minor Components
Woodbridge
Percent of map unit: 10 percent
Canton
Percent of map unit: 5 percent

306C—Paxton fine sandy loam, 8 to 15 percent slopes, very stony

Map Unit Setting
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days

Map Unit Composition
Paxton and similar soils: 85 percent
Minor components: 15 percent

Description of Paxton
Setting
Landform: Drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till derived from granite and gneiss

Properties and qualities
Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.5 inches)

Interpretive groups
Farmland classification: Farmland of statewide importance
Land capability (nonirrigated): 6s
Hydrologic Soil Group: C
Typical profile
0 to 5 inches: Fine sandy loam
5 to 27 inches: Fine sandy loam
27 to 60 inches: Gravelly fine sandy loam

Minor Components
Woodbridge
Percent of map unit: 10 percent
Canton
Percent of map unit: 5 percent

307C—Paxton fine sandy loam, 8 to 15 percent slopes, extremely stony

Map Unit Setting
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days

Map Unit Composition
Paxton and similar soils: 85 percent
Minor components: 15 percent

Description of Paxton
Setting
Landform: Drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till derived from granite and gneiss

Properties and qualities
Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.5 inches)

Interpretive groups
Farmland classification: Not prime farmland
Land capability (nonirrigated): 7s
Hydrologic Soil Group: C
Typical profile
0 to 5 inches: Fine sandy loam
5 to 27 inches: Fine sandy loam
27 to 60 inches: Gravelly fine sandy loam

Minor Components
Woodbridge
Percent of map unit: 10 percent
Canton
Percent of map unit: 5 percent

307D—Paxton fine sandy loam, 15 to 25 percent slopes, extremely stony

Map Unit Setting
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days

Map Unit Composition
Paxton and similar soils: 85 percent
Minor components: 15 percent

Description of Paxton
Setting
Landform: Drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till derived from granite and gneiss

Properties and qualities
Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.5 inches)

Interpretive groups
Farmland classification: Not prime farmland
Land capability (nonirrigated): 7s
Hydrologic Soil Group: C
Typical profile
0 to 5 inches: Fine sandy loam
5 to 27 inches: Fine sandy loam
27 to 60 inches: Gravelly fine sandy loam

Minor Components
Canton
Percent of map unit: 10 percent
Chatfield
Percent of map unit: 5 percent

311B—Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony

Map Unit Setting
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days

Map Unit Composition
Woodbridge and similar soils: 85 percent
Minor components: 15 percent

Description of Woodbridge
Setting
Landform: Drumlins
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till

Properties and qualities
Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.9 inches)

Interpretive groups
Farmland classification: Farmland of statewide importance
Land capability (nonirrigated): 6s
Hydrologic Soil Group: C
Typical profile

0 to 9 inches: Fine sandy loam
9 to 22 inches: Sandy loam
22 to 60 inches: Sandy loam

Minor Components

Paxton
Percent of map unit: 10 percent

Ridgebury
Percent of map unit: 5 percent
Landform: Depressions

312B—Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony

Map Unit Setting
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days

Map Unit Composition
Woodbridge and similar soils: 85 percent
Minor components: 15 percent

Description of Woodbridge

Setting
Landform: Drumlins
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till

Properties and qualities
Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.9 inches)

Interpretive groups
Farmland classification: Not prime farmland
Land capability (nonirrigated): 7s
Hydrologic Soil Group: C

**Typical profile**
- 0 to 9 inches: Fine sandy loam
- 9 to 22 inches: Sandy loam
- 22 to 60 inches: Sandy loam

**Minor Components**

**Paxton**
- Percent of map unit: 10 percent

**Ridgebury**
- Percent of map unit: 5 percent
- Landform: Depressions

---

420C—Canton fine sandy loam, 8 to 15 percent slopes

**Map Unit Setting**
- **Elevation:** 0 to 1,000 feet
- **Mean annual precipitation:** 32 to 50 inches
- **Mean annual air temperature:** 45 to 50 degrees F
- **Frost-free period:** 145 to 240 days

**Map Unit Composition**
- **Canton and similar soils:** 80 percent
- **Minor components:** 20 percent

**Description of Canton**

**Setting**
- **Landform:** Hills, hills
- **Landform position (two-dimensional):** Backslope
- **Landform position (three-dimensional):** Side slope
- **Down-slope shape:** Linear
- **Across-slope shape:** Convex
- **Parent material:** Friable coarse-loamy eolian deposits over friable sandy basal till derived from granite and gneiss

**Properties and qualities**
- **Slope:** 8 to 15 percent
- **Depth to restrictive feature:** 18 to 36 inches to strongly contrasting textural stratification
- **Drainage class:** Well drained
- **Capacity of the most limiting layer to transmit water (Ksat):** High (2.00 to 6.00 in/hr)
- **Depth to water table:** More than 80 inches
- **Frequency of flooding:** None
- **Frequency of ponding:** None
- **Available water capacity:** Low (about 3.5 inches)
Interpretive groups

Farmland classification: Farmland of statewide importance
Land capability (nonirrigated): 3e
Hydrologic Soil Group: B

Typical profile

0 to 4 inches: Fine sandy loam
4 to 13 inches: Fine sandy loam
13 to 26 inches: Gravelly fine sandy loam
26 to 60 inches: Gravelly loamy sand

Minor Components

Paxton
Percent of map unit: 15 percent

Woodbridge
Percent of map unit: 5 percent

421B—Canton fine sandy loam, 3 to 8 percent slopes, very stony

Map Unit Setting

Elevation: 0 to 1,000 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days

Map Unit Composition

Canton and similar soils: 80 percent
Minor components: 20 percent

Description of Canton

Setting

Landform: Hills, hills
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Friable coarse-loamy eolian deposits over friable sandy basal till derived from granite and gneiss

Properties and qualities

Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 18 to 36 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.5 inches)

Interpretive groups
Farmland classification: Farmland of statewide importance
Land capability (nonirrigated): 6s
Hydrologic Soil Group: B

Typical profile
0 to 4 inches: Fine sandy loam
4 to 13 inches: Fine sandy loam
13 to 26 inches: Gravelly fine sandy loam
26 to 60 inches: Gravelly loamy sand

Minor Components
Paxton
Percent of map unit: 15 percent

Woodbridge
Percent of map unit: 5 percent

651—Udorthents, smoothed

Map Unit Setting
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days

Map Unit Composition
Udorthents and similar soils: 80 percent
Urban land: 20 percent

Description of Udorthents
Setting
Parent material: Made land over firm loamy basal till

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Description of Urban Land
Properties and qualities
Depth to restrictive feature: More than 80 inches
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
References


January 31, 2014

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E-mail: rpara@lamoureuxpagano.com

Re: Preliminary Subsurface Data Review
   Proposed Elementary School
   Salter Elementary School Site
   Worcester, Massachusetts
   LGCI Project No. 1402

Dear Mr. Para:

Lahlaf Geotechnical Consulting, Inc. (LGCI) has performed a site visit and completed a preliminary review of the available subsurface data for the Salter Elementary School site. Our services were performed in accordance with our proposal No. 13087 dated January 7, 2014. Mr. Michael Pagano of Lamoureux Pagano Associates (LPA) authorized our services in an e-mail dated January 16, 2014.

This letter includes a summary of our field observations, a summary of the subsurface data we reviewed, our opinion about possible foundation issues during construction, and our recommendations for subsurface explorations should this site be selected for the proposed construction.

Reviewed Documents

LGCI reviewed the following documents:

- Custom Soil Resource Report for Worcester County, Massachusetts, Northern Part (Soil Resource Report) dated October 29, 2013 and provided to us by LPA on November 19, 2013.


- A plan titled: “Nelson Place Elementary School – Salter School Site, St. George Site,” (Site Plan) Provided to us by LPA on December 30, 2013.
Site Location and Project Description

We understand that LPA was selected to conduct a feasibility study for the proposed Nelson Place Elementary School in Worcester, Massachusetts.

We understand that as part of the feasibility study, LPA will be evaluating different options, including: renovation of the existing school, renovation and addition to the existing school, and construction of a new school. You indicated to us that in addition to the Nelson Place School site, LPA will be assessing the feasibility of three additional sites, including Forest Grove site, Salter Elementary School, and St. George Church (rear land). This letter focuses on the Salter Elementary School Site. Our letter reports for these three sites will be submitted separately.

The site is located on Ararat Street as shown in Figure 1. This site is composed of two parcels: the school site and a vacant parcel west of the school. The site is bordered by Ararat Street on the northern side, Indian Hill Road on the eastern side, by railroad tracks on the southern side and by private properties and Bratle Street on the western side. The existing Salter elementary school building, currently vacant, is located on the eastern side of the site with a driveway, parking lot, and a softball field on the western side of the building. The land further to the west is wooded.

Field Observations

An LGCI representative visited the site on January 21, 2014. At the time of our visit, the site was covered with 6 to 10 inches of snow. Surficial features such as rock outcrops were concealed by the snow.

The site is relatively flat with steep slopes near the southern edge. The ground surface slopes down from near the edge of the site then up again to the top of the railroad embankment. Based on the site topography, it appears that the site was filled. Access to the site is available from Indian Hill Road and from Ararat Street. Both access ramps are currently blocked.

Summary of Existing Subsurface Data

Soil Resource Report – Based on the Soil Resource Report, the soils at the site consist mostly of fine sandy loam overlying gravelly loamy sand, gravelly sand, fine sandy loam, and gravelly fine sandy loam. Based on the data in the Soil Resource Report, rock was not encountered in the top 5 feet.

Surficial Geologic Map – The surficial geologic map indicates that the natural soils at the site are mostly thin glacial till deposits consisting of non-sorted, non-stratified matrix of sand, some silt, and little clay, containing scattered gravel clasts and a few large boulders. The surficial geologic
map also show extensive fill just west of the school building and on the southern side of the site near the railroad tracks. The surficial geologic map of the site is shown in Figure 2.

The data summarized above indicate that the subsurface conditions at the site likely consist of topsoil, overlying a thin layer of glacial till consisting of silty sand and gravel with cobbles and boulders. Fill is present at the site both west of the existing building and near the southern boundary of the site.

**Preliminary Recommendations**

Please note that the review of available information summarized in this letter is not a substitute for a subsurface exploration program. The information gathered as part of this review may be incomplete and the recommendations derived therefrom are at best preliminary in nature and must be confirmed with actual subsurface explorations, laboratory testing, and geotechnical analyses.

Based on the available subsurface data, we believe that the subsurface conditions at the site are suitable to support shallow foundations after the surficial topsoil, subsoil, and root balls are removed from the wooded areas. The composition of the fill shown in the surficial geologic map is not known. Depending on its gradation and its organic content, the fill may not be suitable to support shallow foundations. At this time it is prudent in our opinion to conservatively assume that the fill will have to be removed and replaced with Structural Fill.

To explore the thickness and composition of the existing fill, we recommend performing test pits and soil borings at the site. We believe that an exploration program consisting of one day of test pits and one day of borings is sufficient during the schematic design phase. Additional test pits and borings, including rock cores if rock is encountered in the top 20 feet should be performed, and at least two groundwater observation wells should be installed at the site during final design.

**Limitations**

Our letter is based on project information provided to us at the time of this letter. If changes to the type, size, and location of the proposed structures or to the site grading are made, the recommendations contained in this letter shall not be considered valid unless the changes are reviewed and the conclusions and recommendations modified in writing by LGCI. LGCI cannot accept responsibility for designs based solely on these preliminary recommendations.

It is not part of our scope to perform a more detailed site history; therefore, we have not explored for or researched the locations of buried utilities or other structures in the area of the proposed construction. Our scope did not include environmental services or services related to moisture, mold, or other biological contaminates in or around the site.
The recommendations in this letter are based in part on the data obtained from the review of existing subsurface data. The recommendations contained in this letter are at best preliminary in nature and must be confirmed with actual subsurface explorations, laboratory testing, and geotechnical analyses.

Our letter has been prepared in accordance with generally accepted engineering practices and in accordance with the terms and conditions set forth in our agreement. No other warranty, expressed or implied, is made. This report has been prepared for the exclusive use of Lamoureux Pagano & Associates, Inc. for the specific application to the proposed elementary school at the Salter Elementary School site in Worcester, Massachusetts as conceived at this time.

If you have any questions or need further assistance, please contact us at (978) 330-5912.

Very truly yours,

Lahlf Geotechnical Consulting, Inc.

Abdelmadjid M. Lahlaf, Ph.D., P.E.
Principal Engineer

Attachments: Figure 1 – Site Location Map
Figure 2 – Surficial Geologic Map
Note: Figure based on USGS topographic map of North Worcester, MA from http://mapserver.mytopo.com

Client: Lamoureux Pagano Associates, Inc.

Project: Proposed Elementary School

Figure 2 – Surficial Geologic Map – Salter Elem. School Site and St. George Church Parcel

LGCI
Lahlaf Geotechnical Consulting, Inc

Project Location: Worcester, MA
LGCI Project No.: 1402
Date: Jan. 2014
3.1.6 PRELIMINARY EVALUATION OF ALTERNATIVES

E. New Construction on Alternate Site Options

3. Forest Grove
3.1.6 PRELIMINARY EVALUATION OF ALTERNATES

E. New Construction on Alternate Site Options

<table>
<thead>
<tr>
<th>FOREST GROVE &amp; McGrath Schools Site</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CRITERIA</strong></td>
</tr>
<tr>
<td><strong>GENERAL INFORMATION</strong></td>
</tr>
<tr>
<td>Property Information</td>
</tr>
<tr>
<td>City of Worcester owned</td>
</tr>
<tr>
<td>Vacant abutting parcel at east side, 6 Park Ave, Flanders Park Ave Assoc.</td>
</tr>
<tr>
<td>LLP Book/Page 41907/165 Land Value $597,500 Assessor’s Parcel # 20-035-00002</td>
</tr>
<tr>
<td><strong>HIGH PRIORITY RATING</strong></td>
</tr>
<tr>
<td>SCORE 0 to 10 (0 being not responsive, 1 least advantageous, 10 most advantageous)</td>
</tr>
<tr>
<td>Adjacency to Core District</td>
</tr>
<tr>
<td>Neighborhood Adjacency</td>
</tr>
<tr>
<td>Access Potential-Traffic</td>
</tr>
<tr>
<td>Pedestrian &amp; Vehicular</td>
</tr>
<tr>
<td>Vehicular: Site is reported as being very constricted and problematic for the two existing schools. Additional access road either to Forest Street or at the end to Fenimore Road is desirable.</td>
</tr>
<tr>
<td>Pedestrian: Access from public sidewalks along Grove St. would require modification of existing Forest Grove entry drive; access from Chadwick St. is readily available.</td>
</tr>
<tr>
<td>Meets Program requirements</td>
</tr>
<tr>
<td>Building:</td>
</tr>
<tr>
<td>Site:</td>
</tr>
<tr>
<td>- Bus drop off would likely accommodate most of the program</td>
</tr>
<tr>
<td>- Parent drop-off would likely be able to be developed to accommodate most of the program, along the proposed roadways</td>
</tr>
<tr>
<td>- The parking program cannot accommodate all the required athletic fields. Existing field relocation through additional land purchased if available, or reduced parking program would be necessary.</td>
</tr>
<tr>
<td>Separate play areas are provided</td>
</tr>
<tr>
<td>Project Phasing/Construction</td>
</tr>
<tr>
<td>Impacts</td>
</tr>
<tr>
<td>Ideal for the existing school, however issues with phasing and construction disruption would be realized on this site for the Forest Grove and McGrath schools.</td>
</tr>
<tr>
<td>Orientation, Net Zero options</td>
</tr>
<tr>
<td>Generally the same as all the new construction options</td>
</tr>
<tr>
<td>Swing Space</td>
</tr>
<tr>
<td>Not required</td>
</tr>
<tr>
<td><strong>GENERAL COMPARISON RATING</strong></td>
</tr>
<tr>
<td>SCORE 0 to 5 (0 being not responsive, 1 least advantageous, 5 most advantageous)</td>
</tr>
</tbody>
</table>
### FORREST GROVE & McGRATH SCHOOLS SITE

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property Configuration, size, Workable area</td>
<td>South of Forest Grove Middle School, generally rectangular in shape; usable site area about 15 acres, including McGrath Elementary School site; relatively flat at developed areas, slopes off to wetland and south property line. Abutting vacant land to the east should be reviewed for use, potentially 3-4 acres are at the parcel’s west end, and are relatively flat.</td>
<td>2</td>
</tr>
<tr>
<td>Topography, Slopes and Orientation</td>
<td>Site is relatively flat at the developable area, access route to Forest Street requires a wetland crossing, and slope mitigation</td>
<td>4</td>
</tr>
<tr>
<td>Existing Development/Buildings</td>
<td>Forest Grove Middle School at north end of the site, (976 students) was recently renovated; McGrath Elementary School (277 students) at the south end of the proposed site, was built in 1976 and is constructed of rectangular brick/CMU; playing fields in the middle.</td>
<td>1</td>
</tr>
<tr>
<td>Easements and Other Property Limitations</td>
<td>Purchase of adjacent parcel would be required to meet the program and access requirements.</td>
<td>3</td>
</tr>
<tr>
<td>Environmental Resources and Hydrology</td>
<td>Wetland is a major feature at the site center, with pond at the north side, boundary is well defined.</td>
<td>4</td>
</tr>
<tr>
<td>Soils and Geologic Factors</td>
<td>Poorly drained soils on site make drainage control challenging but not impossible. High groundwater elevation may make stormwater control challenging. Need to review field area, type and depth of the fill.</td>
<td>2</td>
</tr>
<tr>
<td>Utility System Availability</td>
<td>Water, Sewer, Electric and Gas is available for the project on Grove Street.</td>
<td>5</td>
</tr>
<tr>
<td>Acquisition Cost</td>
<td>Potential cost if abutter’s land is considered</td>
<td>2</td>
</tr>
<tr>
<td>Community Use</td>
<td>If fields can be developed, good</td>
<td>3</td>
</tr>
<tr>
<td>Expansion Potential</td>
<td>None, new construction is filling the site</td>
<td>1</td>
</tr>
<tr>
<td>General Comment</td>
<td>Suggested that the site be reviewed for modular classrooms, swing space if needed. School to advise if there is capacity at FG or McGrath School for dual use of Gym, Cafeteria, and similar support spaces. Consideration of this site as a building site is not recommended. Both existing schools are currently performing well. Worcester Public Schools does not want to stress the successful balance at this site to the detriment to the students. Furthermore, due to the current vehicular congestion at this site, the addition of 600 students could jeopardize evacuation procedures, and further impede transportation procedures.</td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL** 78
Potential discussion on additional land
Potential play area
Potential parking
Existing property lines
Potential Fields
Potential Service
Potential Building Location
Potential additional site access
EXISTING CONDITIONS STUDY – CIVIL
FOREST GROVE SCHOOL
NELSON PLACE - WORCESTER, MASSACHUSETTS

Nitsch Engineering has performed research of the existing site conditions and anticipated site permitting requirements for the Nelson Place Elementary School located on Nelson Place in Worcester, Massachusetts. Nitsch Engineering’s research included program information provided by the City of Worcester, as well as information gathered during two site visits conducted by Mr. Steven Ventresca, PE on January 13, 2014. Information included in this report is also based on compiled documents gathered by Nitsch Engineering.

This report lists the existing conditions at the Forest Grove School as a potential location for a new Nelson Place School.

A summary of our observations and findings is summarized below.

EXISTING SITE UTILITIES

Figure 2 of this report contains a Geographic Information Systems (GIS) color diagram illustrating the site of the Forest Grove Middle School. The school is located off Grove Street and is bound by Forest Street to the west and Park Ave to the east. The Francis McGrath Elementary School is located south of the Forest Grove School across the athletic fields. Information on the water, sewer and drain lines was provided by the Worcester Department of Public Works and Parks. Based on record documents, site observations, and conversations with town officials, the summary descriptions below represent the site utility conditions/assumptions as we understand them at this time.

STORM DRAINAGE

Based on information gathered on the site visits, the Forest Grove School Building rooftop appears to collect and convey stormwater internally through the plumbing system – no external downspouts were observed, as shown in the photos below. The roof drainage collection system appears to be conveyed below-grade to connect to either the existing City drain system in Grove Street or discharges overland to the wetland south and west of the existing school.

Photos above: Stormwater runoff from the rooftop of the main building is conveyed internally through the building plumbing system.
Photos above: Stormwater runoff from the driveways and parking areas

The site of the Middle School is generally graded in a northerly direction towards Grove Street. Only a handful of catch basins were observed in paved or landscape areas immediately surrounding the School. Catch basin inlets were observed at the school driveway entrances and a couple of catch basins were observed in the parking lot / loading dock areas located east of the School near the driveway. The majority of stormwater landing on site appears to travel as overland flow into adjacent landscape areas, athletic fields or the adjacent wetland. Runoff that is not absorbed within the landscape is assumed to find its way into the catch basins in Grove Street. In general, the landscaped areas appear to be in good condition. School Maintenance personnel did not indicate any major flooding issues immediately surrounding the Middle School and associated parking lot.

Photos above: Stormwater runoff from impervious surfaces is retained on the un-even or potholed pavement

The catch basins observed within the High School rear parking lot, driveway and in the landscape around the school had some standing water in the sumps. It is presumed that the sumps are full of sediment and debris. The pavement is broken and un-even and has large pot holes that hold water. The un-even pavement presumably prevents runoff from sheeting toward catch basins or into the landscaped areas.
Photo above (left): Stand pipe on the east side of the school building
Photo above (right): The only hydrant near the Grove Street School, just south of the building.

Four catch basins were observed along Grove Street adjacent to the Middle School. These catch basins appear to connect to the 12” storm drain main (material unknown) in Grove Street. The 12” storm drain main in Grove Street appears to drain in a south west direction beneath Grove Street towards Route 290. The ultimate discharge point is unclear based on the provided record information.

WATER

The water distribution map provided by the City of Worcester DPW indicates a 12-inch water main (material unknown) in Grove Street. The Middle School water service (size unknown) also feeds the Middle School from the 12-inch Grove Street main and enters at the front of the building and is assumed to feed the Building’s sprinkler system. The water service appears to enter the building west of the main entrance to the Middle School off Grove Street.

One fire hydrant was observed south of the rear parking lot. This hydrant does not appear to be within 300-feet of the Middle School fire department connection. Two fire hydrants are located across Grove Street from the Middle School. One hydrant is located in front of #522 Grove Street and the second hydrant is located at the intersection of Indian Lake Parkway and Grove Street.

Flow test information is not currently available for the water main in Grove Street.

SEWER

A 15” sanitary sewer main (material unknown) is located beneath Grove Street. The Middle School sanitary service(s) is assumed to connect to this main. Based on a sewer manhole located in the landscaped area in front of the main school entrance, the sewer connection appears to travel from the main entrance to the building to the 15-inch sewer main in Grove Street. The 15” sanitary sewer main in Grove Street travels in a south west direction along Grove Street toward the direction of Route 290.
NATURAL GAS

The Middle School is serviced by natural gas off an eight (8) inch cast iron gas main located on the south (school) side in Grove Street. Based on record information from NStar, there is a 2-inch service under the east access drive that services the school at the loading dock. An additional gas service, size and pipe material unknown, enters the west side of the school off the gas main in Grove Street.

UNDERGROUND/ABOVE GROUND TANKS

It does not appear that there are underground tanks within the site based only on site observations. Additional record research is required to determine whether there are underground tanks on site.

ELECTRICAL/TELECOM

Electric service along Grove Street consists of four (4) four inch underground conduits. Electric service is routed to a transformer along Grove Street that then feeds the school with one (1) three inch underground conduit that appears to enter the school at the center of the building entrance. There is a second transformer near the school just south of the loading dock on the east side of the school. This is presumed to be the main electrical feed into the school.
There are two man holes located at the front entrance. The man hole covers indicate telecom and electric. The electric and telecom lines are presumed to enter near the school entrance.

SITE CONDITIONS AND OPERATIONS

SOILS

Based on the Natural Resources Conservation Service (NRCS) Worcester County Soil Survey (1969), the site of the Middle School is unclassified urban area. The nearest classified soils to the Middle School are located west of the school and are classified as Paxton fine sandy loam and Whitman loam respectively. These areas are associated with a wetland, and thus poorly drained (hydrologic soil group C), and may have a high groundwater level and may not be indicative of the original soils that underlay the Middle School.

PAVEMENT

The asphalt pavement in the parking lots, service drives, and walkways adjacent to the school were observed to have a high severity of cracking and degradation. The pavement along the east drive and loading dock area are highly degraded, primarily resulting from stormwater wash off and overall wear-and-tear. Asphalt curbing was observed along the entry drives, the small parking lot at the front of the school. The bituminous curbing appears to be in relatively good condition. Cracking was observed in the cement concrete walkways/plazas immediately surround the Middle School, but appeared to be in fair condition overall.
Photos above: Cracking and degradation in asphalt pavement areas surrounding the Middle School

SNOW REMOVAL

The School Maintenance personnel indicated that snow is not removed from the property; rather, it is moved to the edge of parking lots and walkways into grassy areas. There is currently no salt or sand storage shed located on-site; sand and salt are obtained from the City for use by the School’s sanding/salting/plowing equipment.

DUMPSTER

One trash compactor was observed on a paved area just south of the loading dock off the access drive.

PRELIMINARY PERMITTING CONSIDERATIONS

WETLANDS PROTECTION ACT (310 CMR 10.00)

The Wetlands Protection Act ensures the protection of Massachusetts’ inland and coastal wetlands, tidelands, great ponds, rivers and floodplains. It regulates activities in coastal and wetlands areas, and contributes to the protection of ground and surface water quality, the prevention of flooding, and storm damage and the protection of wildlife and aquatic habitat.

A review of the Massachusetts Department of Environmental Protection (DEP) wetland layers available on the Massachusetts Geographic Information System (MassGIS), dated April 2007, appear to indicate that the Middle School site has a wooded swamp / wetland located on-site just west of the school. There is a pond across Grove Street that has a wetland buffer zone. The wetland layer indicates that the wetland runs south of the school following the property line into the middle of the property.

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 sources.

A review of the Massachusetts DEP resource layers available on the MassGIS, appear to indicate the Middle School is NOT located within a Surface Water Supply Protection Zone.

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 Forest Grove School site is NOT a Priority Habitat of Rare Species or an Estimated Habitat of Rare Wildlife. No such areas appear within close proximity to the site.

FLOOD PLAIN

Based on the Flood Insurance Rate Map (FIRM), Community Panel Number 25027C0612E, dated July 4, 2011 a portion of the site along Grove Street is located within a Zone AE (Flood Zone with an elevation of 542).

ZONING

The Middle School site is located in the RS-10 (Residential) Zoning District. According to the schedule of permitted uses, schools are considered a permitted principal use. The zoning requirements for the site are based on information in the City of Worcester Zoning Map dated July 17, 2012, and the City of Worcester Zoning Ordinance, amended through January 7, 2014 include the following:

- Minimum Lot Area- 10,000 square foot;
- Frontage, min - 80 linear feet;
- Front Setback - 25 feet;
- Side Setback – 20 feet;
- Rear Setback – 50 feet;
- Max Stories 2+ with max height of 35 feet;
- Floor to Area Ration 0.3 to 1

USEPA NPDES

Construction activities that disturb more than one acre are regulated under the United States Environmental Protection Agency’s (EPA) National Pollution Discharge Elimination System (NPDES) Program. In Massachusetts, the USEPA issues NPDES permits to operators of regulated construction sites. Regulated projects are required to develop and implement stormwater pollution prevention plans in order to obtain permit coverage.

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 of > 50,000 gpd must obtain a MassDEP permit before construction

Nitsch Engineering will review the projected sanitary flows for the Middle School to verify whether the project will exceed the 15,000 gallon per day threshold.
NOTES:
Information compiled in this drawing was taken from several sources including, but not limited to:
1. Worcester GIS
2. Google Maps
3. NStar Gas & National Grid Elec.
Residential-RS10 Zoning Requirements
Lot Area Square Footage 1,253,817 SF
Lot Frontage 478’
Front Yard 25’
Side Yard 20’
Rear Yard 50’
Number Stories 2+ (35’)

LEGEND:
- Project Limit Line
- Slopes > 15%
- Observed Wetland
- 100’ Wetland Buffer
- Open Water

Utility Legend
- Gas Main
- Water Main
- Underground Electric
- Drain Main
- Sewer Main

0–100’ 200’ NORTH
EXISTING SITE CONDITIONS
Forest Grove Property

The 36.2 acre parcel south of Grove Street was reviewed on January 11, 2014. The developed portion of the property includes the Forest Grove Middle School along Grove Street, athletic fields in the central portion of the property, and the McGrath Elementary school in the southeastern corner of the Site. Elevations are lowest near Grove Street at an elevation of ~544 feet, the athletic fields are at an elevation of ~560 feet and the land around the McGrath Elementary school ranges from elevation 560 to 580 feet.

Wetlands are present along the western side of the property. An intermittent stream and bordering wetland drain north to Indian Lake. The extent of wetland, as shown on Figure 1, is an estimate based on MassGIS, aerial photography, and the January site visit. Adjacent to the McGrath Elementary school is an area of forested wetland that encircles a shrub swamp. The intermittent stream drains this wetland complex flowing north through a large shrub swamp and offsite into a cove of Indian Lake adjacent to Grove Street and the Forest Grove Middle School. Although the majority of the cove shoreline was developed, pockets of emergent marsh were observed.

The majority of the uplands have been developed for the schools and athletic fields. Uplands adjacent to the developed portion of the Site were found on steep slopes abutting the edge of the wetland. They were dominated by northern red oak (*Quercus rubra*), white oak (*Quercus alba*), white pine (*Pinus strobus*), shagbark hickory (*Carya ovata*), grey birch (*Betula populifolia*), black cherry (*Prunus serotina*), morrow's honeysuckle (*Lonicera morrowii*), privet (*Ligustrum vulgare*) and asian bittersweet (*Celastrus orbiculatus*).
The forested swamp adjacent to the McGrath Elementary School was predominantly red maple \((\textit{Acer rubrum})\), and black tupelo \((\textit{Nyssa sylvatica})\) in the tree canopy with highbush blueberry \((\textit{Vaccinium corymbosum})\) and winterberry \((\textit{Ilex verticillata})\) is the shrub layer. The shrub swamps consisted of grey birch \((\textit{Betula populifolia})\), silky dogwood \((\textit{Cornus amomum})\), pussy willow \((\textit{Salix discolor})\), sensitive fern \((\textit{Onoclea sensibilis})\), bluejoint grass \((\textit{Calamagrostis canadensis})\), spotted touch-me-not \((\textit{Impatiens capensis})\), and soft (lamp) rush \((\textit{Juncus effuses})\).

The intermittent stream that flowed through these wetland cover types to the cove of Indian Lake ranged from 4 to 6 feet wide and 2 to 6 inches deep on January 11, 2014.

**SOILS**

Based on the Natural Resources Conservation Service (NRCS) Worcester Northeastern Part Soil Survey the majority of the upland portion of the site is mapped as Urdorthents, described as made land over firm loamy basal till. Undeveloped portions of the site are Paxton soil series. The Paxton series formed in friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till derived from granite and gneiss. Slopes range from 3% to 25%. This well drained soil consists of fine sandy loam soils over gravelly fine sand loams. It is classified as hydrologic group C, and groundwater is typically between 10 and 30 inches below the surface.

Wetland soils on the site are Whitman Loam with 0% to 3% slopes. This soil series is found in depressions and is comprised of fine sandy loam derived from friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till. It is a very poorly drained hydic soil with a Hydrologic Soil Group classification of D. The attached NRCS soils report provides additional detail.

**MA WETLANDS PROTECTION ACT, CITY OF WORCESTER WETLAND REGULATIONS, US ARMY CORPS OF ENGINEERS REGULATORY JURISDICTION**

The January 11, 2014 site inspection verified the presence of an intermittent stream that flows north through wetland along the western portion of the property to a cove of Indian Lake. Indian Lake is offsite and is regulated as a Great Pond. Any project located in, on, over or under the water of a great pond is within the jurisdiction of the MA DEP Chapter 91 program. Work on the Forest Grove site should not impact Indian Lake.

Under the Massachusetts Wetlands Protection Act Regulations (WPA) 310 CMR 10.00, the intermittent stream is regulated as Bank. The upper boundary of a Bank is the first observable break in slope or the mean annual flood level, whichever is lower. The lower boundary of a Bank is the mean annual low flow level. Banks are likely to be significant to public or private water supply, to ground water supply, to flood control, to storm damage prevention, to the prevention
of pollution and to the protection of fisheries and wildlife habitat. The forested and shrub swamp wetlands bordering the intermittent stream are regulated as *Bordering Vegetated Wetlands* (BVW). Bordering Vegetated Wetlands are likely to be significant to public or private water supply, to ground water supply, to flood control, to storm damage prevention, to prevention of pollution, to the protection of fisheries and to wildlife habitat.

The City of Worcester's Wetland Protection Ordinance and Wetland Protection Regulations as amended July 1, 2007, takes jurisdiction: *within one hundred (100) feet of any freshwater wetland*, bordering vegetated wetland, marsh, wet meadow, bog or swamp; *within one hundred (100) feet of any bank*; *any lake, river, pond, or stream*; *any land under said waters*; *any land subject to flooding*; *or within one hundred (100) feet of any existing or proposed inlet to any storm drain, catch basin, or other storm drain system component discharging to any lake, pond, river, stream, or wetland*.

The US Army Corps of Engineers regulates the BVW and intermittent stream as *waters of the United States* under Section 404 of the Clean Water Act.

Under the WPA and Worcester Regulations a 100-foot Buffer Zone extends up-gradient from *Bank, and Bordering Vegetated Wetlands*, whichever is more inclusive. In addition Worcester takes jurisdiction within 100 feet of the 100-year floodplain. There is also a 30-foot no build zone, and 15-foot no disturbance zone surrounding any resource area regulated by the City of Worcester (Figure 1).

**NATURAL HERITAGE & ENDANGERED SPECIES PROGRAM**

The 13th Edition of the Massachusetts Natural Heritage Atlas prepared by the Natural Heritage and Endangered Species Program (NHESP), dated October 1, 2008, as shown on the MassGIS database indicates that the property is *not* a Priority Habitat of Rare Species or an Estimated Habitat of Rare Wildlife.

**FLOODPLAIN**

Based on the MassGIS database and Flood Insurance Rate Map (FIRM), Community Panel Number 25027C0612E, dated July 4, 2011 a portion of the wetlands and possibly uplands at the southwestern corner of the Middle School is located within the 100-year floodplain. The 100-year flood elevation is 542 feet. The land within the 100 year floodplain that is up-gradient of the boundary of *Bordering Vegetated Wetland* is regulated as *Bordering Land Subject to Flooding* (BLSF) (Figure 1, and FEMA FIRM). Any placement of fill in BLSF requires replacement of the lost flood storage capacity on an incremental basis.
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 sources.

A review of the Massachusetts DEP resource layers available on the MassGIS, appear to indicate the property is not located within a Surface Water Supply Protection Zone.

GROUND WATER SUPPLY PROTECTION (310 CMR 22.20)

The Massachusetts Department of Environmental Protection (DEP) ensures the protection of groundwater used as sources of drinking water supply from contamination by regulating land use and activities within approved Wellhead Protection Areas, Zone II and Interim Wellhead Protection Areas.

A review of the Massachusetts DEP resource layers available on the MassGIS, appear to indicate the property is not located within a Groundwater Supply Protection Zone.
Photographs take January 11, 2014

Forested swamp adjacent to the McGrath Elementary School.

View looking upstream at the intermittent stream which flows north to a cove of Indian Lake.
View of the large shrub swamp adjacent to the athletic fields.

View of upland forest west of the intermittent stream and a fringe of bordering forested swamp.
View of the athletic fields in the central portion of the property looking west. The large shrub swamp is located to the west of the fields.

View looking west from property west of the site and adjacent to the Middle School of the Indian Lake cove. Acattail marsh is located in the foreground.
## TABLE 1
### PLANT SPECIES LIST
#### Forest Grove Property

<table>
<thead>
<tr>
<th>Species</th>
<th>Common Name</th>
<th>NCNE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WETLANDS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acer rubrum</td>
<td>Red Maple</td>
<td>FAC</td>
</tr>
<tr>
<td>Alnus incana</td>
<td>Speckled Alder</td>
<td>FACW</td>
</tr>
<tr>
<td>Betula alleghaniensis</td>
<td>Yellow Birch</td>
<td>FAC</td>
</tr>
<tr>
<td>Betula populifolia</td>
<td>Gray Birch</td>
<td>FAC</td>
</tr>
<tr>
<td>Bidens cernua</td>
<td>Nodding Burr-Marigold</td>
<td>OBL</td>
</tr>
<tr>
<td>Calamagrostis canadensis</td>
<td>Bluejoint</td>
<td>OBL</td>
</tr>
<tr>
<td>Carex stricta</td>
<td>Uptight Sedge</td>
<td>OBL</td>
</tr>
<tr>
<td>Coptis trifolia</td>
<td>Three-Leaf Goldthread</td>
<td>FACW</td>
</tr>
<tr>
<td>Cornus amomum</td>
<td>Silky Dogwood</td>
<td>FACW</td>
</tr>
<tr>
<td>Euthamia graminifolia</td>
<td>Flat-Top Goldentop</td>
<td>FAC</td>
</tr>
<tr>
<td>Frangula alnus</td>
<td>Glossy False Buckthorn</td>
<td>FAC</td>
</tr>
<tr>
<td>Ilex verticillata</td>
<td>Common Winterberry</td>
<td>FACW</td>
</tr>
<tr>
<td>Impatiens capensis</td>
<td>Spotted Touch-Me-Not</td>
<td>FACW</td>
</tr>
<tr>
<td>Juncus effusus</td>
<td>Soft (Lamp) Rush</td>
<td>OBL</td>
</tr>
<tr>
<td>Onoclea sensibilis</td>
<td>Sensitive Fern</td>
<td>FACW</td>
</tr>
<tr>
<td>Osmundastrum cinnamomeum</td>
<td>Cinnamon Fern</td>
<td>FACW</td>
</tr>
<tr>
<td>Rubus hispidus</td>
<td>Bristly Dewberry</td>
<td>FACW</td>
</tr>
<tr>
<td>Rubus idaeus</td>
<td>Common Red Raspberry</td>
<td>FACU</td>
</tr>
<tr>
<td>Salix discolor</td>
<td>Pussy Willow</td>
<td>FACW</td>
</tr>
<tr>
<td>Smilax rotundifolia</td>
<td>Horsebrier</td>
<td>FAC</td>
</tr>
<tr>
<td>Solidago gigantea</td>
<td>Late Goldenrod</td>
<td>FACW</td>
</tr>
<tr>
<td>Solidago rugosa</td>
<td>Wrinkle-Leaf Goldenrod</td>
<td>FAC</td>
</tr>
<tr>
<td>Spiraea latifolia</td>
<td>Broad-Leaf Meadowsweet</td>
<td>FACW</td>
</tr>
<tr>
<td>Symphyotrichum novae-angliae</td>
<td>New England American-Aster</td>
<td>FACW</td>
</tr>
<tr>
<td>Toxicodendron radicans</td>
<td>Eastern Poison Ivy</td>
<td>FAC</td>
</tr>
<tr>
<td>Typha latifolia</td>
<td>Broad-Leaf Cat-Tail</td>
<td>OBL</td>
</tr>
<tr>
<td>Ulmus rubra</td>
<td>Slippery Elm</td>
<td>FAC</td>
</tr>
<tr>
<td>Vaccinium corymbosum</td>
<td>Highbush Blueberry</td>
<td>FACW</td>
</tr>
<tr>
<td>Viburnum dentatum</td>
<td>Southern Arrow-Wood</td>
<td>FAC</td>
</tr>
<tr>
<td>Viburnum lentago</td>
<td>Nanny-Berry</td>
<td>FAC</td>
</tr>
</tbody>
</table>
### TABLE 1 (cont.)

#### UPLANDS

<table>
<thead>
<tr>
<th>Species</th>
<th>Common Name</th>
<th>NCNE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berberis thunbergii</td>
<td>Japanese Barberry</td>
<td>FACU</td>
</tr>
<tr>
<td>Carya ovata</td>
<td>Shag-Bark Hickory</td>
<td>FACU</td>
</tr>
<tr>
<td>Celastrus orbiculatus</td>
<td>Asian Bittersweet</td>
<td>UPL</td>
</tr>
<tr>
<td>Cornus alternifolia</td>
<td>Alternate-Leaf Dogwood</td>
<td>FACU</td>
</tr>
<tr>
<td>Dendrolycopodium obscurum</td>
<td>Princess-Pine</td>
<td>FACU</td>
</tr>
<tr>
<td>Dennstaedtia punctilobula</td>
<td>Hay-Scented Fern</td>
<td>UPL</td>
</tr>
<tr>
<td>Dryopteris intermedia</td>
<td>Evergreen Wood Fern</td>
<td>FAC</td>
</tr>
<tr>
<td>Euonymus alatus</td>
<td>Winged Euonymus</td>
<td>UPL</td>
</tr>
<tr>
<td>Gaylussacia baccata</td>
<td>Black Huckleberry</td>
<td>FACU</td>
</tr>
<tr>
<td>Kalmia latifolia</td>
<td>Mountain-Laurel</td>
<td>FACU</td>
</tr>
<tr>
<td>Ligustrum vulgare</td>
<td>European Privet</td>
<td>FACU</td>
</tr>
<tr>
<td>Lonicera morrowii</td>
<td>Morrow's Honeysuckle</td>
<td>FACU</td>
</tr>
<tr>
<td>Pinus strobus</td>
<td>Eastern White Pine</td>
<td>FACU</td>
</tr>
<tr>
<td>Prunus serotina</td>
<td>Black Cherry</td>
<td>FACU</td>
</tr>
<tr>
<td>Quercus alba</td>
<td>Northern White Oak</td>
<td>FACU</td>
</tr>
<tr>
<td>Quercus rubra</td>
<td>Northern Red Oak</td>
<td>FACU</td>
</tr>
<tr>
<td>Reynoutria japonica</td>
<td>Japanese-Knotweed</td>
<td>FACU</td>
</tr>
<tr>
<td>Robinia pseudoacacia</td>
<td>Black Locust</td>
<td>FACU</td>
</tr>
<tr>
<td>Rosa multiflora</td>
<td>Rambler Rose</td>
<td>FACU</td>
</tr>
<tr>
<td>Toxicodendron radicans</td>
<td>Eastern Poison Ivy</td>
<td>FAC</td>
</tr>
<tr>
<td>Vaccinium angustifolium</td>
<td>Late Lowbush Blueberry</td>
<td>FACU</td>
</tr>
</tbody>
</table>
NOTES:
1) Mass State Plane NAD83 Feet
2) 1/6/2014

Wetland Limits were located using MassGIS databases, aerial photography and onsite review.
Custom Soil Resource Report for
Worcester County, Massachusetts,
Northeastern Part
Forest Grove Middle School

January 7, 2014
Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://soils.usda.gov/sqi/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the
individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.
Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.
The soil surveys that comprise your AOI were mapped at 1:20,000.

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

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

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

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

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

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

Soil Survey Area: Worcester County, Massachusetts, Northeastern Part

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

Date(s) aerial images were photographed: March 30, 2011—May 1, 2011

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

<table>
<thead>
<tr>
<th>Map Unit Symbol</th>
<th>Map Unit Name</th>
<th>Acres in AOI</th>
<th>Percent of AOI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Water</td>
<td>2.4</td>
<td>4.3%</td>
</tr>
<tr>
<td>72A</td>
<td>Whitman loam, 0 to 3 percent slopes</td>
<td>3.2</td>
<td>5.8%</td>
</tr>
<tr>
<td>305B</td>
<td>Paxton fine sandy loam, 3 to 8 percent slopes</td>
<td>24.6</td>
<td>44.0%</td>
</tr>
<tr>
<td>305C</td>
<td>Paxton fine sandy loam, 8 to 15 percent slopes</td>
<td>0.1</td>
<td>0.1%</td>
</tr>
<tr>
<td>305D</td>
<td>Paxton fine sandy loam, 15 to 25 percent slopes</td>
<td>2.7</td>
<td>4.8%</td>
</tr>
<tr>
<td>310A</td>
<td>Woodbridge fine sandy loam, 0 to 3 percent slopes</td>
<td>1.6</td>
<td>2.9%</td>
</tr>
<tr>
<td>622C</td>
<td>Paxton-Urban land complex, 8 to 15 percent slopes</td>
<td>7.0</td>
<td>12.6%</td>
</tr>
<tr>
<td>651</td>
<td>Udorthents, smoothed</td>
<td>14.4</td>
<td>25.7%</td>
</tr>
<tr>
<td><strong>Totals for Area of Interest</strong></td>
<td></td>
<td><strong>56.0</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

## Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the
contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a soil series. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into soil phases. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A complex consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An association is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An undifferentiated group is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include miscellaneous areas. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.
Worcester County, Massachusetts, Northeastern Part

1—Water

Map Unit Setting
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days

Map Unit Composition
Water: 100 percent

Description of Water
Properties and qualities
Depth to restrictive feature: More than 80 inches
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

72A—Whitman loam, 0 to 3 percent slopes

Map Unit Setting
Elevation: 0 to 2,100 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days

Map Unit Composition
Whitman and similar soils: 70 percent
Minor components: 30 percent

Description of Whitman
Setting
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till derived from granite and gneiss

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
**Frequency of ponding:** Frequent  
**Available water capacity:** Low (about 4.6 inches)

**Interpretive groups**  
**Farmland classification:** Not prime farmland  
**Land capability (nonirrigated):** 5w  
**Hydrologic Soil Group:** D

**Typical profile**  
0 to 10 inches: Fine sandy loam  
10 to 18 inches: Fine sandy loam  
18 to 60 inches: Fine sandy loam

**Minor Components**

**Ridgebury**  
**Percent of map unit:** 15 percent  
**Landform:** Depressions

**Swansea**  
**Percent of map unit:** 15 percent  
**Landform:** Bogs

---

**305B—Paxton fine sandy loam, 3 to 8 percent slopes**

**Map Unit Setting**  
**Mean annual precipitation:** 32 to 50 inches  
**Mean annual air temperature:** 45 to 50 degrees F  
**Frost-free period:** 145 to 240 days

**Map Unit Composition**  
**Paxton and similar soils:** 85 percent  
**Minor components:** 15 percent

**Description of Paxton**

**Setting**  
**Landform:** Drumlins  
**Landform position (two-dimensional):** Shoulder, backslope, summit  
**Landform position (three-dimensional):** Side slope, nose slope  
**Down-slope shape:** Convex  
**Across-slope shape:** Convex  
**Parent material:** Friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till derived from granite and gneiss

**Properties and qualities**  
**Slope:** 3 to 8 percent  
**Depth to restrictive feature:** More than 80 inches  
**Drainage class:** Well drained  
**Capacity of the most limiting layer to transmit water (Ksat):** Very low to moderately high (0.00 to 0.20 in/hr)  
**Depth to water table:** About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.6 inches)

Interpretive groups
Farmland classification: All areas are prime farmland
Land capability (nonirrigated): 2e
Hydrologic Soil Group: C

Typical profile
0 to 5 inches: Fine sandy loam
5 to 27 inches: Fine sandy loam
27 to 60 inches: Gravelly fine sandy loam

Minor Components
Woodbridge
Percent of map unit: 10 percent

Canton
Percent of map unit: 5 percent

305C—Paxton fine sandy loam, 8 to 15 percent slopes

Map Unit Setting
Mean annual precipitation: 32 to 444 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days

Map Unit Composition
Paxton and similar soils: 85 percent
Minor components: 15 percent

Description of Paxton
Setting
Landform: Drumlins
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till derived from granite and gneiss

Properties and qualities
Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.6 inches)

Interpretive groups
Farmland classification: Farmland of statewide importance
Land capability (nonirrigated): 3e
Hydrologic Soil Group: C

Typical profile
0 to 5 inches: Fine sandy loam
5 to 27 inches: Fine sandy loam
27 to 60 inches: Gravelly fine sandy loam

Minor Components
Woodbridge
Percent of map unit: 10 percent
Canton
Percent of map unit: 5 percent

305D—Paxton fine sandy loam, 15 to 25 percent slopes

Map Unit Setting
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days

Map Unit Composition
Paxton and similar soils: 85 percent
Minor components: 15 percent

Description of Paxton
Setting
Landform: Drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till derived from granite and gneiss

Properties and qualities
Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.6 inches)

Interpretive groups
Farmland classification: Not prime farmland
Land capability (nonirrigated): 4e
Hydrologic Soil Group: C

Typical profile
0 to 5 inches: Fine sandy loam
5 to 27 inches: Fine sandy loam
27 to 60 inches: Gravelly fine sandy loam

Minor Components
Canton
Percent of map unit: 10 percent

Woodbridge
Percent of map unit: 5 percent

310A—Woodbridge fine sandy loam, 0 to 3 percent slopes

Map Unit Setting
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days

Map Unit Composition
Woodbridge and similar soils: 85 percent
Minor components: 15 percent

Description of Woodbridge
Setting
Landform: Hills, drumlins
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.0 inches)
Interpretive groups
Farmland classification: All areas are prime farmland
Land capability (nonirrigated): 2w
Hydrologic Soil Group: C

Typical profile
0 to 9 inches: Fine sandy loam
9 to 22 inches: Sandy loam
22 to 60 inches: Sandy loam

Minor Components
Paxton
Percent of map unit: 10 percent
Ridgebury
Percent of map unit: 5 percent
Landform: Depressions

622C—Paxton-Urban land complex, 8 to 15 percent slopes

Map Unit Setting
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days

Map Unit Composition
Paxton and similar soils: 45 percent
Urban land: 30 percent
Minor components: 25 percent

Description of Paxton
Setting
Landform: Drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till derived from granite and gneiss

Properties and qualities
Slope: 3 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.6 inches)

Interpretive groups
Farmland classification: Not prime farmland
Land capability (nonirrigated): 3e
Hydrologic Soil Group: C

Typical profile
0 to 5 inches: Fine sandy loam
5 to 27 inches: Fine sandy loam
27 to 60 inches: Gravelly fine sandy loam

Description of Urban Land
Setting
Parent material: Excavated and filled land

Minor Components
Udorthents
Percent of map unit: 10 percent

Ridgebury
Percent of map unit: 5 percent
Landform: Depressions

Woodbridge
Percent of map unit: 5 percent

Canton
Percent of map unit: 5 percent

651—Udorthents, smoothed

Map Unit Setting
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days

Map Unit Composition
Udorthents and similar soils: 80 percent
Urban land: 20 percent

Description of Udorthents
Setting
Parent material: Made land over firm loamy basal till

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Description of Urban Land

Properties and qualities
Depth to restrictive feature: More than 80 inches
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
References


January 31, 2014

Robert Para Jr., AIA  
Lamoureux Pagano Associates  
108 Grove Street, Suite 300  
Worcester, MA 01605  
Tel: (508) 752-2831  
Fax: (508) 757-7769  
E-mail: rpara@lamoureuxpagano.com

Re: Preliminary Subsurface Data Review  
Proposed Elementary School  
Forest Grove Jr. High School and McGrath Elementary School Site  
Worcester, Massachusetts  
LGCI Project No. 1402

Dear Mr. Para:

Lahlaf Geotechnical Consulting, Inc. (LGCI) has performed a site visit and completed a preliminary review of the available subsurface data for the Forest Grove Jr. High School and McGrath Elementary School site. Our services were performed in accordance with our proposal No. 13087 dated January 7, 2014. Mr. Michael Pagano of Lamoureux Pagano Associates (LPA) authorized our services in an e-mail dated January 16, 2014.

This letter includes a summary of our field observations, a summary of the subsurface data we reviewed, our opinion about possible foundation issues during construction, and our recommendations for subsurface explorations should this site be selected for the proposed construction.

Reviewed Documents

LGCI reviewed the following documents:

- Custom Soil Resource Report for Worcester County, Massachusetts, Northern Part (Soil Resource Report) dated October 29, 2013 and provided to us by LPA on November 19, 2013.


- A plan titled: “Nelson Place Elementary School – Site Selection, Forest Grove & McGrath Elementary Site,” (Existing Site Plan) Provided to us by LPA on December 30, 2013.

Site Location and Project Description
We understand that LPA was selected to conduct a feasibility study for the proposed Nelson Place Elementary School in Worcester, Massachusetts.

We understand that as part of the feasibility study, LPA will be evaluating different options, including: renovation of the existing school, renovation and addition to the existing school, and construction of a new school. You indicated to us that in addition to the Nelson Place School site, LPA will be assessing the feasibility of three additional sites, including Forest Grove site, Slater Elementary School, and St. George Church (rear land). This letter focuses on the Forest Grove Jr. High School and McGrath Elementary School site. Our letter reports for these three sites will be submitted separately.

The site is located on Grove Street as shown in Figure 1. This site is composed on two parcels: the Forest Grove Junior High School on the northern side and the McGrath Elementary School on the southern side. The site is bordered by Grove Street on the northern side; by Forest Grove Street, a small pond, and private properties on the western side; by Chadwick Square and private properties on the eastern side; and by Wheeler Avenue and private properties on the southern side. The two existing school buildings are almost at opposite ends of the site with athletic fields between the two buildings. Driveways and parking lots are located around the buildings. The portion of the site west of the athletic field is wooded. The site is generally level except near the southwestern portion where the grade drops to what appears to be stream and rises toward the private properties on the western side.

Field Observations

An LGCI representative visited the site on January 21, 2014. At the time of our visit, the site was covered with 6 to 10 inches of snow. Surficial features such as rock outcrops were concealed by the snow.

The site is generally level. An embankment located near the southwestern portion of the site appears to consist of fill. The site is accessible from either school sites. Explorations at the site would require an all-terrain vehicle to reduce the potential for disturbing the grass field.

Summary of Existing Subsurface Data

Soil Resource Report – Based on the Soil Resource Report, the soils at the site consist mostly of fine sandy loam overlying gravelly loamy sand, gravelly sand, fine sandy loam, and gravelly fine sandy loam. Based on the data in the Soil Resource Report, rock was not encountered in the top 5 feet.
Surficial Geologic Map – The surficial geologic map indicates that the natural soils at the site are mostly glacial till deposits consisting of poorly sorted mixture of pebbles, cobbles and boulders in a matrix of sand or silty sand. The map also indicates that most of the southern portion of the site that coincides with the athletic fields is artificial fill. The surficial geologic map of the site is shown in Figure 2.

The subsurface data summarized above are generally consistent with each other and indicate that the subsurface conditions at the site likely consist of topsoil, overlying glacial till consisting of silty sand and gravel with cobbles and boulders. Although not indicated in the surficial geologic map, organic soils are possibly present near the pond on the northwestern boundary of the site.

Preliminary Recommendations

Please note that the review of available information summarized in this letter is not a substitute for a subsurface exploration program. The information gathered as part of this review may be incomplete and the recommendations derived therefrom are at best preliminary in nature and must be confirmed with actual subsurface explorations, laboratory testing, and geotechnical analyses.

Based on the available subsurface data, we believe that the subsurface conditions at the site are suitable to support shallow foundations after the surficial topsoil, subsoil, and root balls are removed. The composition of the fill shown in the surficial geologic map is not known. Depending on its gradation and its organic content, the fill may not be suitable to support shallow foundations. At this time it is prudent in our opinion to conservatively assume that the fill will have to be removed and replaced with Structural Fill.

To explore the thickness and composition of the existing fill, we recommend performing test pits and soil borings at the site. We believe that an exploration program consisting of one day of test pits and one day of borings will be sufficient during the schematic design phase. Additional test pits and borings, including rock cores if rock is encountered in the top 20 feet should be performed, and at least two groundwater observation wells should be installed at the site during final design.

Limitations

Our letter is based on project information provided to us at the time of this letter. If changes to the type, size, and location of the proposed structures or to the site grading are made, the recommendations contained in this letter shall not be considered valid unless the changes are reviewed and the conclusions and recommendations modified in writing by LGCI. LGCI cannot accept responsibility for designs based solely on these preliminary recommendations.
It is not part of our scope to perform a more detailed site history; therefore, we have not explored for or researched the locations of buried utilities or other structures in the area of the proposed construction. Our scope did not include environmental services or services related to moisture, mold, or other biological contaminates in or around the site.

The recommendations in this letter are based in part on the data obtained from the review of existing subsurface data. The recommendations contained in this letter are at best preliminary in nature and must be confirmed with actual subsurface explorations, laboratory testing, and geotechnical analyses.

Our letter has been prepared in accordance with generally accepted engineering practices and in accordance with the terms and conditions set forth in our agreement. No other warranty, expressed or implied, is made. This report has been prepared for the exclusive use of Lamoureux Pagano & Associates, Inc. for the specific application to the proposed elementary school at the Forest Grove Jr. High School and McGrath Elementary School site in Worcester, Massachusetts as conceived at this time.

If you have any questions or need further assistance, please contact us at (978) 330-5912.

Very truly yours,

Lahlaf Geotechnical Consulting, Inc.

Abdelmadjid M. Lahlaf, Ph.D., P.E.
Principal Engineer

Attachments: Figure 1 – Site Location Map
Figure 2 – Surficial Geologic Map
Approximate Scale: 1:25000
Contour intervals: 3 meters

Note: Figure based on USGS topographic map of North Worcester, MA from http://mapserver.mytopo.com

<table>
<thead>
<tr>
<th>Client: Lamoureux Pagano Associates, Inc.</th>
<th>Project: Proposed Elementary School</th>
<th>Figure 1 – Site Location Map – Forest Grove Jr. High School and McGrath Elementary School</th>
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<td>Project Location: Worcester, MA</td>
<td>LGCI Project No.: 1402</td>
<td>Date: Jan. 2014</td>
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<td>Date: Jan. 2014</td>
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3.1.6 PRELIMINARY EVALUATION OF ALTERNATIVES

F. Comparative Cost Analysis
STUDY
Nelson Place Elementary School
Worcester, MA
20-Feb-14

Designer: Lamoureux Pagano Architects

BASE REPAIR OPTION

<table>
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<th>COST PER S.F.</th>
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<td>RENOVATION</td>
<td>55,398</td>
<td>$180.00</td>
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<td>BUILDING DEMOLITION</td>
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SITUATION

TEMPORARY TRAILERS

HAZARDOUS WASTE REMOVAL

TOTAL DIRECT COST

DESIGN/BID CHPTR 149
GENERAL CONDITIONS 12% $1,506,197
GENERAL REQUIREMENTS 2% $281,157
BUILDING PERMIT 1% $143,390
P&P BOND & INSURANCE 2% $286,780
PROFIT 3% $443,078
DESIGN CONTINGENCY 15% $2,281,836
ESCALATION (bid spring 2015) 5% $874,704

TOTAL CONSTRUCTION COST

COST PER SF $331.58

TOTAL CONSTRUCTION COST

COST BY OTHERS:
TEMPORARY TRAILER $2,000,000
STUDY
Nelson Place Elementary School
Worcester, MA
20-Feb-14

Designer: Lamoureux Pagano Architects

RENOVATION AND ADDITION OPTION

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<td>ADDITION</td>
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<td>BUILDING DEMOLITION</td>
<td>26,000</td>
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<td>SITEWORK</td>
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<td>TEMPORARY TRAILERS</td>
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<td>by owner</td>
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<td>HAZARDOUS WASTE REMOVAL</td>
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TOTAL DIRECT COST: $28,066,000

TOTAL CONSTRUCTION COST: $41,073,367
COST PER SF: $373.39

COST BY OTHERS:
TEMPORARY TRAILER $2,000,000
STUDY
Nelson Place Elementary School
Worcester, MA
20-Feb-14

Designer: Lamoureux Pagano Architects

NEW CONSTRUCTION - EXISTING SITE

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<td>HAZARDOUS WASTE REMOVAL</td>
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TOTAL DIRECT COST $30,562,388

DESIGN/BID CHPTR 149 8% $2,444,991
GENERAL CONDITIONS
GENERAL REQUIREMENTS 2% $660,148
BUILDING PERMIT 1% $336,675
P&P BOND & INSURANCE 2% $673,351
PROFIT 3% $1,040,327
DESIGN CONTINGENCY 15% $5,357,682
ESCALATION (bid spring 2015) 5% $2,053,778

TOTAL CONSTRUCTION COST $43,129,339
COST PER SF $392.08
STUDY
Nelson Place Elementary School
Worcester, MA
20-Feb-14

Designer: Lamoureux Pagano Architects

NEW CONSTRUCTION - EXISTING SITE WITH ADDED LAND

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TOTAL DIRECT COST

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<td>GENERAL REQUIREMENTS</td>
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<td>BUILDING PERMIT</td>
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</tr>
<tr>
<td>P&amp;P BOND &amp; INSURANCE</td>
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<tr>
<td>PROFIT</td>
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<td>DESIGN CONTINGENCY</td>
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<td>ESCALATION ( bid spring 2015 )</td>
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TOTAL CONSTRUCTION COST

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<td>COST PER SF</td>
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STUDY
Nelson Place Elementary School
Worcester, MA
20-Feb-14

Designer: Lamoureux Pagano Architects

NEW CONSTRUCTION - FOREST GROVE SITE

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TOTAL DIRECT COST $33,062,388

DESIGN/BID CHPTR 149
GENERAL CONDITIONS 8% $2,644,991
GENERAL REQUIREMENTS 2% $714,148
BUILDING PERMIT 1% $364,215
P&P BOND & INSURANCE 2% $728,431
PROFIT 3% $1,125,425
DESIGN CONTINGENCY 15% $5,795,940
ESCALATION (bid spring 2015) 5% $2,221,777

TOTAL CONSTRUCTION COST $46,657,314
COST PER SF $424.16
3.1.6 PRELIMINARY EVALUATION OF ALTERNATIVES

G. Recommended Alternatives for Further Development and Evaluation
The City of Worcester, Architect and Consultants considered several improvement alternatives for the Nelson Place School. The following options were determined to be eligible for further evaluation based on programmatic requirements expressed by the school department; location and safety concerns expressed by parents and neighbors. Site reviews conducted to date are comparative in nature and have begun to expose the particular challenges of each potential site. Further evaluation and development of variations for the proposed alternatives will be conducted as indicated.

The budget projections, also comparative in nature, are utilized to evaluate which options will be studied in the Preliminary Schematic Report (PSR) phase and include criteria for that study based on input from the school and the city. Budget projections are part of the next phase of work, and these projections will include system comparisons, payback, life cycle cost comparisons for sustainable design and net zero features. The projected construction budgets for this comparison are established by the project estimator, utilizing historical square foot cost figures for similar projects, with escalation to the projected bid date. These base figures are in line with current MSBA projects of similar nature.

The City of Worcester’s Net Zero Energy Objectives have been outlined within this report and included in the budget as a general recommendation. At this stage of the process, budget projections for specific features cannot be made to a degree of accuracy for comparison purposes, and such reporting would not do justice to selections of any options. As noted above, there will be multiple options and strategies studied during the upcoming phases, and at that time projected life cycle cost, payback values, and added costs can be presented factually and considered comparatively, along with any potential grants, power purchase/partnership agreements, or other strategies to obtain these clean energy features.

The following options are recommended for further development and evaluation:

- Additions and Renovations to the Nelson Place School.
- The new construction on the existing Nelson Place site appears not to provide all the desired site program requirements e.g. number of parent drop off spaces and number of fields. Further study, and the development of variations and refinements are necessary to determine which program requirements can be satisfied.
- New construction on the existing Nelson Place site with additional land from abutting Assumption College property to the south, as well as potential slope easements or partial purchases of abutter’s properties. Two variations of this alternative are presented in this report. Detailed future study will define the amount of land required to satisfy the site and building program. Clearly under this
option, should additional land be acquired, benefits would include a secondary emergency access, temporary construction access, and permanent easement.

<table>
<thead>
<tr>
<th>OPTION</th>
<th>CONSTRUCTION BUDGET (1) (5)</th>
<th>BUILDING PROGRAM Assessment</th>
<th>SITE PROGRAM Assessment</th>
<th>SCHEDULE (4)</th>
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<tr>
<td>Additions and Renovations (2)(3)</td>
<td>$41M $43M w/modular classrooms</td>
<td>Addition will potentially have to be 3 stories, which is not preferred. Phased occupied construction is not desirable.</td>
<td>Potential to address some of the high priority site program elements, but it would be challenging to fully satisfy the full program.</td>
<td>3 years</td>
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<tr>
<td>New Construction NP existing land (2)</td>
<td>$43 M</td>
<td>Building will potentially have to be 3 stories, which is not preferred</td>
<td>Potential to address some high priority site program elements, but would be challenging to fully satisfy the program.</td>
<td>2 years</td>
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<tr>
<td>New Construction NP w/ additional land (2)</td>
<td>$46.5 M</td>
<td>Expected to satisfy program requirements</td>
<td>Expected to satisfy program requirements, depending on amount of land obtained</td>
<td>2 years</td>
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</table>

1. Construction Budget is presented, additional cost to be added for Project soft costs.
2. Cost do not include any land purchase costs or off site improvement costs
3. Cost for additions and renovation includes a placeholder budget of $2.0M for temporary classrooms as a comparison factor to the other schemes, this swing space cost needs to be confirmed, and also note that these costs are not reimbursable
4. Budget is based on Ch. 149 Design-Bid-Build. Additional cost and benefits and will be considered under Ch. 149A Construction Manager at Risk form of bidding.
3.1.6 PRELIMINARY EVALUATION OF ALTERNATIVES

H. Supporting Documents
1. Preliminary Evaluation of Alternatives-Landscape Architecture
2. Structural-Analysis of Alternatives
3. Fire Protection-Evaluation of Alternatives
4. HVAC & Plumbing Narrative-No Build Option
5. HVAC & Plumbing Narrative-Addition & Renovation Option
6. HVAC & Plumbing Narrative-New Construction Option
7. Electrical Systems Recommendations-No Build Option
8. Electrical Systems Recommendations-Addition/Renovation Option
9. Electrical Systems Recommendations-New Building on Existing Site Option
10. Electrical Systems Recommendations-New Building on Alternate Site Option
3.1.6 Preliminary Evaluation of Alternatives: Landscape Architecture

Shadley Associates is providing a preliminary evaluation of each of the site development alternatives for the Nelson Place Elementary School project. This includes the following sites:

1. Nelson Place Site (existing property only)
2. Nelson Place Site plus the Assumption Parcel
3. Salter School Site
4. Forest Grove and McGrath School Site

Based on review of GIS data and on-site review, we evaluated each site for the following elements that may affect their potential development for the Nelson Place Elementary School project:

- Site Topography and Vegetation
- Existing and Potential Pedestrian Access and Circulation
- Existing Development and Site Features

1. NELSON PLACE SITE (EXISTING PROPERTY ONLY)

Site Topography and Vegetation

The site has a high point roughly in the middle of the site which has a moderate slope to the south, east and west. The site falls quickly from the high point to the north with slopes exceeding approximately 2:1 in locations creating two plateaus with roughly 30 feet of grade change between the two. The upper plateau currently contains a baseball/softball field. The northern portion of the site on the lower plateau contains the building, parking and paved play areas and slopes moderately from the southwest to the northeast.

On the lower plateau of site, where the majority of the development has occurred, existing vegetation is minimal and consists of mowed lawn, shrubs and shade trees. The upper portion of the site, surrounding the baseball/softball field, is wooded. Invasive species were not readily identified during the site walk but may be present on the site. The wooded portion of the site does
contain thorny species that may be considered hazardous for children’s play areas and may contain other undesirable nuisance species.

**Existing and Potential Pedestrian Access and Circulation**

The site currently has pedestrian access from the public sidewalks along the length of the northern property line along Nelson Place. Due to the nature of the topography and existing development, the site is divided into two parts. The steep slope bisecting the site will present a significant challenge in connecting the lower and upper portions with accessible pedestrian circulation.

On the lower portion of the site, the pedestrian pavements need significant repair or replacement to meet accessibility codes; however, the slopes on the lower portion of the site should not present major challenges in creating compliant pedestrian circulation. The upper portion of the site currently does not have any accessible site features. The moderate slopes on the upper portion of the site will require grade alteration to achieve compliant circulation.

**Existing Development and Site Features**

The site is currently developed with the existing Nelson Place Elementary School building, parking lot and service areas, paved play areas, playground, and ballfield. The site also contains two wetland areas along the southeast and southwest property lines. The existing development encompasses the majority of the site with little space remaining for expansion to accommodate the desired program.

The existing development is arranged with the parking and building along the northern property line and public right of way with the service area and outdoor play spaces to the south and rear of the building. Vehicular access to the service area appears to be through the paved play space. There is not a line of sight from the public right of way into the outdoor play spaces which potentially presents a challenge for the spaces being used after hours by the community.

**2. NELSON PLACE SITE PLUS THE ASSUMPTION PARCEL**

*Existing wooded Assumption Parcel*

In addition to the findings for the existing Nelson Place property, the addition of the Assumption Parcel is evaluated below.
Site Topography and Vegetation

The Assumption Parcel high point is located along the southern property line. The site falls generally from south to north with an approximate 15% slope. The site is currently heavily wooded.

Existing and Potential Pedestrian Access and Circulation

There is a potential access point along the eastern property line of the Assumption Parcel. Due to the steeper grades across this parcel creating accessible pedestrian circulation will potentially require significant grade alteration and ramping systems to connect the desired programmatic elements.

Existing Development and Site Features

The Assumption Parcel is currently undeveloped. Development on the parcel will require significant vegetation clearing and grading.

3. SALTER SCHOOL SITE

Site Topography and Vegetation

The site slopes from the eastern and western property lines to a stream running north to south in the western third of the site. The western third of the site is wooded with the exception of a narrow parking lot along Ararat Street. In the western third of the site, the slope is generally 10-20% with areas where the slopes exceed 2:1 along the southwestern property line.

The slope is generally moderate and less than 10% across the eastern two thirds of the site. Existing vegetation is minimal, with much of the eastern section of the site being maintained as lawn with sparse shade trees and shrubs surrounding the buildings and parking lot.

Existing and Potential Pedestrian Access and Circulation

The site has pedestrian access from the public sidewalk along Ararat Street the length of the northern property line and from the sidewalk along Indian Hill Road which runs the length of the eastern property line. There is minimal existing pedestrian pavement on site with crushed stone paths connecting the parking lot along Ararat Street, the Little League fields, the concession stand/
Existing Development and Site Features

The Salter School site contains the existing building and parking lots for the Salter School, which is currently closed indefinitely, as well a City Little League field and associated parking lot. The existing development encompasses the majority of the site with undeveloped land lying in the required riverfront setback buffer with little space available for the addition of desired site program elements.

4. FOREST GROVE AND McGrath SCHOOL SITE

Site Topography and Vegetation

The eastern roughly portion of the Forest Grove and McGrath School site, including a potential land acquisition to the east, is gently to moderately sloping from east to west. The western third of the site, surrounding a wetland, has excessive slopes that exceed 2:1 in areas.

Much of the eastern two thirds of the site is cleared of vegetation and maintained as lawn with some shrubs, evergreens and shade trees although the site is wooded from the existing McGrath Elementary School to the southern property line. The western third of the site is heavily wooded.

Existing and Potential Pedestrian Access and Circulation

Currently there is only one connected pedestrian access point from the public right of way at Wheeler Avenue. This access point is located along the southern property line and is connected to the site circulation by a set of stairs which does not meet accessibility code.

Access to Grove Street requires travel through the parking lot of the Forest Grove Middle School and access to Chadwick Street requires pedestrian travel in the street. There is potential for making an accessible connection from the public sidewalk along Chadwick Street to the site circulation that would require a crosswalk and curb ramp.
There is a potential access point along the western property line to Forest Street. Due to the steeper grades from the western potential access point creating accessible pedestrian circulation would potentially require significant grade alteration and ramping systems to connect to the rest of the site.

The on-site circulation consists of bituminous concrete sidewalks, many of which are deteriorated and/or do not meet current accessibility code. However, the slopes on the developed portion of the site should not present major challenges in creating compliant pedestrian circulation and spaces.

**Existing Development**

The site is currently developed with the McGrath Elementary School and Forest Grove Middle School including the parking lots, athletic fields, and paved play areas that serve these schools. The Forest Grove School occupies the northern end of the site while the McGrath School is situated at the southern end of the site. Athletic fields and a portion of the Forest Grove School parking lot are located in the space between the two schools. Incorporating the Nelson Place desired program would require the removal of at least a portion of the existing development, which would likely be existing athletic fields.
General Information

We have reviewed the four basic design options presented for the Nelson Place School feasibility study by Lamoureux Pagano and Associates, and will present a description of each structural system. Also, we will present the basic structural scope and implications of each design option. The three design options are:

1. No Build
2. Addition and Renovation
3. New Construction - Existing Site
4. New Construction - Alternate Site

1. No-Build Option

The “No-Build” option includes completing regular building maintenance, re-roofing the entire building, and updating deficient mechanical systems. Maintenance, re-roofing, and updating the mechanical systems will be completed with fixtures that serve the same purpose. The “No-Build” option will need to conform to Level 1 Work of the International Existing Building Code, 2009 Edition, as modified by the Massachusetts State Building Code, Eighth Edition.

Existing Structural Systems:

1926 Building
- Foundations:
  - Concrete foundation walls (unreinforced) with continuous spread footings.
  - Interior spread footings (unreinforced).
  - 4” Concrete slab on grade.
- Columns:
  - Lally columns (6 5/8” and 7 5/8” dia) below masonry bearing walls at several locations in basement.
- Walls:
  - Brick masonry bearing walls with brick veneer at exterior walls.
  - Clay tile masonry backup at window systems.
  - Interior brick masonry bearing walls and partitions.
- Floors:
  - Classrooms are wood framed with 2 ½”x14” H.P. joists at 16” o.c.
  - Wood sub-floor over wood framing.
  - Corridors, egress areas, and over the boiler room are framed with one-way concrete slabs. Typically 7” or 8” concrete slabs.
  - Cinder concrete fill over slabs with finish floor system (granolithic slab, mastic finish, etc.)
- Roof:
  - Flat roof is framed with 2x8 and 2x12 rafters at 16” o.c. Rafter members are tied to lower ceiling members to create semi-trussed framing. Roof is pitched locally to internal drains.
  - 7/8” board sheathing.

1953 Classroom/Cafeteria Addition:
- Foundations:
- Concrete foundation walls and continuous spread footings.
- Interior spread footings below concrete piers.
- 4" Concrete slab on grade.
- Reinforcing not shown on any concrete sections, unknown if owned in specifications.

**Columns:**
- Steel wide flange columns, typically 5H16 or 5H18.5.

**Roof:**
- Steel joists (B18 & D24 Macomber Joists listed) supported on steel beams and masonry bearing walls.
- 1½" metal roof deck.

**Walls:**
- Exterior walls: 8" unreinforced CMU with 4" brick veneer. Veneer is built integrally with CMU backup using header bricks.
- Exterior walls are bearing walls at Cafeteria.
- Interior CMU partitions on thickened slab.

**1967 Classroom Addition:**

**Foundations:**
- Reinforced concrete foundation walls and continuous spread footings.
- Interior spread footings.
- 4" Concrete slab on grade.

**Columns:**
- Steel tube columns, typically 3"-4" square lally columns.
- Columns at patio are fireproofed.

**Floors:**
- Steel joists at 2'-0" o.c. and wide flange steel girders.
- 2½" concrete slab with form deck and wire fabric reinforcing.
- Concrete encased beams at perimeter of second floor to support brick veneer above to roof.

**Roof:**
- Steel beams on column lines and steel beam girders.
- Roof joists spaced at approximately 4 feet o.c.
- 1½" metal roof deck.
- Roof noted to be designed to support 40 psf live load.

**Walls:**
- Exterior walls: 8" unreinforced CMU with 4" brick veneer. Veneer is built integrally with CMU backup using header bricks.
- Interior partitions are typically stud partitions.
- Some interior unreinforced CMU partitions.

**1967 Gymnasium Addition:**

**Foundations:**
- Reinforced concrete foundation walls and continuous spread footings.
- 4" Concrete slab on grade.

**Columns:**
- Steel wide flange columns, typically 6WF or 8WF.

**Roof:**
- Steel 8B beams and 27WF girders.
- Roof beams spaced at 8 feet o.c.
- 1½" metal roof deck.
- Roof noted to be designed to support 40 psf live load.

**Walls:**
Exterior walls: 8" unreinforced CMU with 4" brick veneer. Veneer is built integrally with CMU backup using header bricks.

Interior unreinforced CMU partitions.

**Structural Scope:**

- Anchorage of the roof diaphragm to the exterior masonry walls will need to be reviewed in accordance with the International Existing Building Code if the building is re-roofed. The wood framed roof of the 1926 building is anchored to the masonry walls through a sill, which was re-built as part of the 1990’s renovations. Condition of anchorage would need to be reviewed as part of re-roofing project. The metal deck roof diaphragms of the 1953 & 1967 buildings are attached to steel beams at the exterior walls, and the steel beams are attached to the walls by the masonry being built around the columns or framing members. Adequate connection would be verified during any significant re-roofing project. Walls built around steel members will likely be adequately anchored. Partitions and other walls built up to the underside, and not around, the steel members will need new anchorage or seismic clips to restrain the walls and/or transfer seismic loads to the masonry walls.

- The 1926 exterior bearing walls that are currently being shored will need to be re-constructed. Shoring was not intended as a long-term solution, and even the “no-build” option would require re-construction of the walls to leave the building safe to use for the extended future. The wood floor members bearing on these exterior walls will need to be reviewed, and likely replaced due to the water infiltration that has taken place and likely deteriorated the ends of the members that would be bearing on the new walls.

- We assume updating deficient mechanical systems will include replacing deficient equipment with similar equipment. The weights should remain unchanged, but should new, or heavier, equipment be required, the structural capacity of existing framing would need to be reviewed. The existing roof framing does not appear capable of supporting new, or heavier, equipment, so supplemental framing would need to be installed for any new equipment required to update the mechanical systems. We would recommend not installing new equipment on the roof unless new structural framing can be installed to support the new equipment and any drifting snow loads caused by the equipment.

- Regular maintenance to the structure will include repointing masonry veneer, painting steel lintels, and re-caulking brick expansion joints. Most of the brick veneer at the 1953 & 1967 appears sound and stable, so maintenance would be limited to select locations only. The veneer at the 1926 will be replaced at the front and rear walls, so re-pointing would be limited to select locations at the corners or side walls of the building.

**Comments:** As part of the “no-build” option, the building will be re-roofed and existing mechanical/electrical equipment will be repaired or replaced with similar equipment. Also, the two exterior bearing walls of the 1926 building that are shored up must be re-constructed to provide long-term structural integrity. The scope of work will be fairly limited through most of the building and will likely need to comply with Level 1 Work, per the Building Code. As part of Level 1 Work, masonry parapets and masonry wall anchorage need to conform to the International Existing Building Code. Based on our review, there are no masonry parapets that need to be corrected, and the roof diaphragm appears to be connected to the exterior framing. Attachment from the exterior framing to the exterior masonry walls will need further review and new attachment may be required.

The building will continue to perform as currently used, but due to lack of renovation, addition, or additional structural improvement, the “No-Build” option will limit future flexibility, such as, installing new roof top equipment or modifying room sizes. Also, since the building will be undergoing regular maintenance as part of the “no-build” option, we would recommend general repair of exterior masonry joints and repointing the brick at deteriorated locations.
2. Addition and Renovation Option

The “Addition and Renovation” option includes partial demolition and renovation of the existing building, and approximately 35,000 ft² of new construction that is structurally isolated from the existing building. Due to the substantial renovation work involved within the existing building, the renovation portion of the “Addition and Renovation” option will need to conform to the International Existing Building Code for Level 3 Work, as modified by Chapter 34 of the Massachusetts State Building Code. The new construction portion of the project will need to conform to the International Building Code, as modified by the Massachusetts State Building Code.

Existing Structural Systems:
- Structural systems of the existing building are similar to “No-Build” option

New Addition Structural Systems:
- Foundations:
  - Interior concrete spread footings
  - Continuous reinforced concrete frost wall and footing at exterior walls
- Columns:
  - Wide flange steel column (W8) or steel tube column (HSS6x6)
- Framed Floors:
  - Wide flange composite steel beams
  - Composite metal deck
  - Concrete fill
- Roof:
  - Wide flange steel beams
  - Metal roof deck
- Lateral Force Resisting System:
  - Ordinary steel moment frames and concentrically braced steel frames

Structural Scope at Existing Buildings:
- Roof diaphragm anchorage must be reviewed similar to the “No-Build” option.
- 1926 Exterior masonry walls at the front and rear of the building must be re-built, similar to the “No-Build” option.
- Support of new or replaced rooftop mechanical equipment will be similar to the “No-Build” option.
- Complete regular maintenance at exterior envelope, including: re-pointing veneer, painting lintels, and caulking brick expansion joints.
- Replace 2-3 existing partitions with new reinforced concrete masonry unit (CMU) shear walls in each orthogonal direction, at the 1953 building and 1967 classroom buildings, including new strip footings to support Massachusetts State Code mandated seismic loads for existing buildings.
- Install new steel framing at corridors to support new fire protection equipment (sprinkler lines).

Comments: From a structural point of view, the “Addition and Renovation” option is the most involved due to the significant renovation of the existing building, phasing of construction, and the integration of the new construction. At a minimum, the existing building will need to be brought into compliance with the International Existing Building Code, as modified by Chapter 34 of the MSBC to increase basic life safety to the minimum requirements of the Code. Also, any modifications to the existing room configurations or change in loading will require significant structural modification to the
building. New roof top mechanical units should be located at the new additions where structural supports can easily be designed.

It should be noted that the renovation will increase the life safety of the existing building, but it will not bring the existing building up to standards of the current Building Code due to lesser quality materials and design practices used at the time of original construction. Also, even though the renovation will extend the life of the existing building, the building should not be expected to last as long or perform as well as the newly constructed additions or a new building. Similar to the “No-Build” option, brick lintels will need to be repaired and the brick veneer will need to be repointed at deteriorated locations. Other water damage or deteriorated conditions may be discovered after finishes are removed for renovation and will need to be corrected at that time.

3. New Construction- Existing Site

The “New Construction” option consists of building an entirely new 110,000 ft² school on the same footprint of the existing school. The school will consist of one-story auditorium and gymnasium wings, and two-story classroom wings. The building will use standard construction methods and materials

**Structural Systems:**

- **Foundations:**
  - Interior concrete spread footings
  - Continuous reinforced concrete frost wall and footing at exterior walls
  - Foundation systems are assumed based on existing conditions and must be verified by a qualified Geotechnical Engineer
- **Columns:**
  - Wide flange steel column (W8) or steel tube column (HSS6x6)
- **Framed Floors:**
  - Wide flange composite steel beams
  - Composite metal deck
  - Concrete fill
- **Roof:**
  - Wide flange steel beams
  - Metal roof deck
  - Designed to support photovoltaic panels.
- **Lateral Force Resisting System:**
  - Ordinary steel moment frames and concentrically braced steel frames

Comments: The “New Construction” option is the most flexible option, from a structural point of view. This option will also allow for increased life safety and more flexibility for sustainable design, relative to the “No-Build” or “Addition and Renovation” options. Construction materials and systems will be designed in compliance with the current Massachusetts State Building Code. Based on the proposed location of the new building, it appears that the foundation and other structural systems cannot be installed until demolition of the existing building is complete.

4. New Construction- Alternate Site

The “New Construction” option consists of building an entirely new 110,000 ft², 2- or 3-story, school on a new site using standard construction methods and materials.

**Structural Systems:**
• Foundations:
  o Interior concrete spread footings
  o Continuous reinforced concrete frost wall and footing at exterior walls
  o Foundation systems are assumed and must be verified by a qualified Geotechnical Engineer

• Columns:
  o Wide flange steel column (W8) or steel tube column (HSS6x6)

• Framed Floors:
  o Wide flange composite steel beams
  o Composite metal deck
  o Concrete fill

• Roof:
  o Wide flange steel beams
  o Metal roof deck
  o Designed to support photovoltaic panels.

• Lateral Force Resisting System:
  o Ordinary steel moment frames and concentrically braced steel frames

Comments: Similar to the Design Option #3, the “New Construction” option is the most flexible option, from a structural point of view. This option will also allow for increased life safety and more flexibility for sustainable design, relative to the “No-Build” or “Addition and Renovation” options. Construction materials and systems will be designed in compliance with the current Massachusetts State Building Code. Based on the proposed location of the new building, it appears that construction of the building will not impair the use of the existing Middle School during the construction process.

Conclusions:

We have reviewed the three design options and it our professional opinion that all three options are structurally feasible, but both the “No-Build” and “Addition and Renovation” will require reusing the existing structure, which does not conform to current building code standards and will require substantial modifications to make the building safe for long-term use. Both the “No-Build” and “Addition and Renovation” options will require demolishing and rebuilding the front and rear bearing walls of the 1926 Building. Completing this work will require abandoning the 1926 Building while the work is being completed, which may not be feasible due to the core utilities that are located in the building. Also, since the existing buildings were constructed in 1926, 1953, and 1967, prior to the development of seismic codes, the “Addition and Renovation” option will require substantial structural modifications just to meet the current Massachusetts State Building Code requirements for existing buildings to reduce seismic hazards caused by the unreinforced masonry walls throughout the building.
BUILDING DESCRIPTION

General:

The Nelson Place Elementary School (NPES) is located at 35 Nelson Place, Worcester, Ma. The building was constructed in 3 phases. The original school was built in 1926, and is a combination masonry block / wood-framed, 2-story-plus-basement building with brick facade.

In 1952, a 1-story block and brick classroom wing was added. Though the original construction documents (OCDs) show that wing is primarily non-combustible, there is also miscellaneous wood blocking above ceilings, and in soffits / overhangs.

In 1968, another 2-story classroom wing was added at the right end, and a gymnasium added at the left end. The 1968 addition classrooms have multiple movable dividers – to allow adjacent classrooms to be combined or separated. The dividers most likely are supported by wood framing above the ceiling, in addition to any miscellaneous wood blocking.

NFPA would consider all spaces containing miscellaneous exposed wood as “combustible concealed spaces” requiring sprinkler protection. Thus, sprinklers would be required both above and below these ceilings – significantly increasing fire protection costs.

Current total building area is 45,000 square feet.

The highest floor level (2nd floor) is less than 30’ above-grade. The building is located within 50 feet of the street.

Fire Protection:

There is no existing fire protection system in the existing school. Per the Worcester Water-Engineering Dept, the Nelson Place street main was upgraded to a 12” line in the mid 1980’s. There have been no flow tests in that area since the upgrade, but static pressure has been measured at a moderate 75 psi. There are 3 city-owned fire hydrants located within approximately 500’ of the building. The closest is across from the main entrance. The 2nd closest is by Nelson Place Drive – approximately across from the gym, and the 3rd is on the corner of Hapgood – about 500’ before the school.

Ceilings:

Ceilings types vary. In the original building, ceilings are plaster – attached directly to the wood framing above. In the 2 newer wings, ceilings are primarily hung, acoustical-tile, with sheetrock in closets and some smaller rooms. The gymnasium has no ceiling. The cafeteria has a hung tile ceiling.
In the original building 1st-floor, new FP piping would have to either be run exposed, or new hung ceilings added through-out to conceal the piping. This would create some aesthetic issues, as there are numerous “arches” at entrances to halls and some rooms. The arches would most likely be partly above and partly below a new hung ceiling which would be “odd looking”. The OCDs show a small attic space above the 2nd floor – approximately 3’ clear. As this attic is wood framed, it would have to be sprinkled using a “dry system”. The 2nd floor could also be protected from this same attic-dry-system piping. Installation costs would be higher than average, due to the difficulty of access.

In the newer wings, if existing ceiling types are maintained, most new FP distribution piping and branches could be run concealed.

**Layout:**

The building is long and narrow, with 1-deep classrooms on each side of a central hall.

Often a proposed new Fire Protection service entrance can be located in the existing boiler or mechanical room. This existing boiler room is smallish – and does not have sufficient space for a new FP service. There is a good sized storage room off the boiler room, however, that could be used. Perhaps because it can only be accessed thru the boiler room, and is a bit damp and musty, this was the only storage room we saw that was under-utilized. It contained a couple dozen desk/chair combinations – scattered over the floor. If these were neatly stacked, they could all fit into 1 end of the room – leaving sufficient space for both new FP and plumbing service entrances.

There are several exterior “canopies”. Some are less than 4’ deep and would not require any fire protection beneath them. Some are over 4’ deep, but could be protected with dry sidewalls piped off the wet system. At the right-front corner, the 2nd floor overhangs a patio below – and this area is too large to protect with dry sidewalls. Because the area above the patio is occupied, this over-hang would require fire protection, whether it was entirely non-combustible or not. It would also require a dry riser / compressor system.

**Hazard Levels:**

Classrooms, offices, hallways, gymnasiums, and cafeterias are generally considered “Light hazard” relative to fire-suppression. Light Hazard areas require the lowest level of sprinkler protection. Being an elementary school, there are no classroom gas supplies (which would raise the hazard level of those rooms).

All storage rooms at NPES are quite small (well under 1,000 sqft). All built-in storage area shelving we saw was 10” deep wood-board-type. Some areas also had free standing shelving, which was a mix of metal, wood, and plastic. We saw no shelving over 30” deep (aisle to aisle), which if it existed, would raise the hazard rating. Most of these areas would be considered “miscellaneous storage”, and designed as an ordinary hazard occupancy.
Other “Ordinary hazard” areas would include (group 1) the boiler room and the main kitchen, kitchen service areas, and (group 2) densely packed storage-areas, and the “stage”. As the existing stage is under 1,000 sqft, it would not require standpipe hose stations. It would simply have a slightly greater level of protection (ordinary hazard group 2) than a platform.

Storage:

Storage is a critical issue that should be addressed as part of any renovation or new construction. When a building has insufficient storage space, other spaces not intended or designed for storage can end up being used for storage. We noted several electrical closets used for storage, which violates code. We also noted several stairways with large items such as pianos or file cabinets stored in the landing area. This also violates code.

Storage height is another important aspect of the storage issue. Sprinklers require between 18” and 3’ clearance between the sprinkler deflector and the top of storage (depending on the type of sprinkler and type of stored material). Several storage rooms have stored materials stacked up to a foot or less below the ceiling/roof structure. Classrooms generally had wooden “cubbies” for students’ coats, back-packs, etc. Many of these had cardboard boxes stacked on top to within a few inches of the ceiling. These stored materials would obstruct a sprinkler’s water flow, potentially keeping it from reaching the fire. This would also be a code violation.

If a new Fire Protection system is to be installed, it is important that the use of every room to be sprinkled be clearly defined. Storage rooms require a higher level of sprinkler protection than offices, classrooms, electrical rooms or non-combustible mechanical spaces, so it is important that storage be confined to designated storage rooms, and not leak into other spaces having a lesser level of protection.

A storage plan should both include an assessment of “who needs to store what” and “how much should be stored”, as well as an assessment of available storage areas, and the maximum storage height permitted in each space.

According to the custodian – Kevin O’Neil, there is no storage of flammable or combustible liquids in the school. This will help minimize Fire Protection hazard levels and costs.

Also according to Kevin O’Neil, all storage is less than 12’ in height. This will also help minimize FP hazard levels and costs.

One storage issue of concern is that a few areas contain over 25% (by volume) group A plastics – in the form of plastic shelving, plastic bins containing smaller materials, and shrink-wrapped materials. According to Kevin O’Neil – the plastic shelving is not the school’s standard, but may have been donated by teacher’s who needed shelving and purchased it themselves. Where exposed group A plastic storage exceeds 5’ in height, this creates an “extra hazard” condition, increasing fire protection costs for that area.
Plastic shelving should be replaced with metal shelving. And plastic storage should be kept below 5’ in height to maintain an “ordinary hazard” rating.

Other than the correctable storage-issue noted above, we did not identify any other areas that would be considered “Extra hazard”.

**Flammability standards:**

527 CMR (State Fire Prevention Code) sets flammability requirements for furniture, and window coverings (drapes, blinds, etc). We noted several rooms with curtains covering the front of open shelving that appeared to be “home-made”. These would likely not meet any flammability standards.

**Local Requirements:**

According to the Worcester Fire Dept.’s Captain Thomas Bull, the City of Worcester does not have any special, local fire protection requirements. They would want an interior hose connection installed and maintained for the duration of any construction / renovation period.

**WHY FIRE PROTECTION?**

The 1st automatic fire suppression system was patented in England in 1723, and consisted of a cask of water, a chamber of gunpowder, and a system of fuses. By the latter half of the 19th century, a multitude of fire protection devices and design methods had come into being, leading people to recognize the need for quality standards. The National Fire Protection Association (NFPA) was formed in 1896. NFPA design and installation standard 13 forms the basis of all US fire-sprinkler system design.

The purpose of NFPA 13 is to “provide a reasonable degree of protection for life and property from fire”. Fire data collected over many years indicates that the chances of dying in a fire are reduced by 50-75%, and average property loss is reduced by 50-67% when sprinklers are present. NFPA feels this simple comparison understates the value of sprinklers, as it lumps all fires together – including those where the sprinkler system failed to operate due to an accidentally closed valve, or where the building hazard had changed without updating the sprinkler system accordingly.

Thus, a fire protection system can be expected to both save lives and reduce property damage in the event of a fire.

**WHEN AND WHAT FIRE PROTECTION IS REQUIRED?**

The Mass. State Building Code (MSBC) and Fire Prevention Regulations primarily define where fire protection systems are required and the required system components.
The current building code (8th edition) requires an NFPA-13-compliant fire protection system “through-out” any Educational (E)-use building over 12,000 sqft., and this requirement would apply if the school were replaced with a new building.

The 8th edition also requires stairwell standpipes if a building’s top floor-level is 30 ft or more above adjacent fire-department access (grade) level, and requires standpipes on both sides of stages over 1,000 sqft in size. The existing building’s top floor level is less than 30’ above grade, and the stage area is under 1,000 sqft, so no standpipes would be required unless “new construction” were the selected option for this building, in which case this requirement could come into play.

When the Nelson Place ES was constructed there was no fire protection system requirement. Buildings constructed prior to a code requirements inception are generally “grand-fathered” and only need to be brought up to current code under certain conditions. For a renovated building, the requirements depend on the level of renovation, and whether any addition is built. Mass General Laws (MGL) 148, Section 26 G specifically states that a fire protection system must be installed through-out an existing building if either:

1. Any addition if built that brings the aggregate building area (existing plus new) over 7,500 sqft. Since the existing school is already well over 7,500 sqft, an addition of any size would trigger a requirement for sprinklers through-out.

2. The building undergoes “major alterations”. This phrase is not strictly defined in any codes, but the Mass. Dept. of Fire Services has issued guidelines to help local Fire Chiefs determine when a renovation is “major” or not. These guidelines have 2 groups of criteria (A and B), and state that if any 1 criteria from both groups is met, it can be reasonably inferred that the renovation is “major”. The criteria are:

   a. **Group A – Does the renovation include:**
      
      i. The demolition or re-construction of ceilings or the installation of new hung ceilings.
      
      ii. The removal or installation of sub-flooring (not merely the installation or replacement of carpeting or finish flooring)
      
      iii. The demolition and/or re-construction or repositioning of walls or stairways or doorways.
      
      iv. The removal or relocation of a significant portion of the buildings HVAC, plumbing, or electrical systems, involving the penetrations of walls, floors, or ceilings.

   b. **Group B**
i. Does the work affect 33% or more of the total building gross square footage?

ii. Is the cost of the renovation 33% or more of the total assessed value of the building, as of the date of permit application?

This study addresses 4 different levels of renovation:

Building Left “As-is”: When a building remains “as is”, any existing level of Fire Protection is required to be maintained, but the system does not need to be extended to any other parts of the building. As there is no existing FP system, none would be required.

Base Repair Option – update equipment and windows with minimal reconfiguration of spaces: This would fall under the IEBC definition of a level 2 renovation, which includes: reconfiguration of any spaces, the addition or elimination of any windows or doors, the reconfiguration or extension of any system, or installation of any additional equipment”. This level of renovation involves 100% of the building area (for window replacement) and would involve ceiling replacement (for mechanical, electrical, and plumbing updating), so sprinklers will be required through-out the entire building.

Full renovation – reconfiguration and additions to building. This would fall under the IEBC definition of a level 3 renovation, which is, the work area exceeds 50% of the aggregate building area. Both because of the addition, and the re-configurations, this would certainly be considered “major alterations”, and would require that all current FP code requirements be met by the existing building as well as any addition.

Summary:

- Leaving the building “as-is” is the only option that would not require a new FP system through-out the building.

- A new FP system would be required through-out the building if the alternations are considered “major” or if any size addition is built. Both the “Base-repair” and “full” renovation / addition” options fall in this category.

- Any new school on any site would require a new FP system thru-out.

FIRE PROTECTION WATER SUPPLIES

The city of Worcester has 3 types of water mains: super high-pressure (generally about 150 psi static), high pressure, and low pressure. The available pressure and flow, and pipe type and age are summarized in the table below for the 5 sites being considered.

<table>
<thead>
<tr>
<th>Site</th>
<th>Street Main Size / Type</th>
<th>Flow and Pressure Data</th>
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Page 6 of 9   Sensible Solutions
Per the Worcester Water Engineering Dept.’s records, the sites near the Forest Grove school and the Salter school all have excellent available water pressure. The recorded flow test data nearest the Salter school sites shows unusually low flow for such high pressure. This is suspected to be an error in the records.

The McGrath school site has more moderate pressure, but good flow. The existing Nelson Place school has the lowest available static pressure, and flow is unknown, as there is no flow test data available.

The three alternate sites are all on streets with “circulating” water mains – which means the main is fed from both directions. Circulating mains can typically provide higher flow rates with less pressure drop than “dead-end” mains.

The existing school site on Nelson Place has a “dead-end” main – which means it is fed from only 1 direction. This typically results in higher pressure drop with high-flow-rates. This might limit the height of any new building if we wanted to avoid fire pumps.

Because the Town has no flow test data for the existing site, and data for the other sites is “old”, a new flow test should be conducted as soon as possible at the preferred site. Water departments will generally not conduct a flow test during the winter, as it would turn all surrounding areas into a “skating rink”. April is most often the start of “flow-test-season”.

If existing flows and pressures are similar to the (old) test data shown, all of the sites have sufficient water pressure for a 1 or 2 story school – without fire pumps. The three alternate sites could also support a 3-story building. If the existing Nelson Place site has
a significant pressure drop with large water flows (currently unknown), this site may not be able to support a 3-story building without fire pumps.

PRELIMINARY RECOMMENDATIONS

The following general recommendations apply to all options being considered:

- Building left “as-is”
- Base-repair renovation,
- Renovation-addition,
- New-construction-existing site
- New-construction-alternate site

General:

- **General Storage issues:** Plan for all storage heights to be less than 12’. Review available storage areas and storage needs. Organize storage to keep it confined to designated storage rooms, with appropriate FP coverage.

- **Special Storage Issues:** Provide listed flammable storage cabinets for the storage of any flammable or combustible liquids or chemicals. Eliminate any plastic shelving, and replace it with metal shelving. Keep storage of plastics below 5 ft to top of storage. Keep the top of storage 18” below the ceiling in all areas.

- **Standpipes:** Not required for existing stage or building. To be determined for any new construction.

- **Flammability Standards:** Ensure that existing and new furniture and window coverings meet 527 CMR flammability standards.

The sprinkler system and fire signaling recommendation varies by option:

- **Sprinkler system:**
  1. **Building left “as-is”:** No Fire Protection work required
  2. **Base repair renovation, Major renovation / addition, or New construction:**
     - Provide a new, NFPA 13 system through-out.
     - Connect new FP system alarms to a new central Fire Alarm Control Panel (FACP) (provided under electrical).

Maintenance:
• **Training and inspections:** Train in-house personnel, and provide required monthly inspections using in-house inspectors.

• **FP Maintenance Contract:** Provide additional code-required maintenance and testing of FP systems alarms and flow via maintenance contract.
The following narrative describes the proposed scope of work pertaining to the heating, ventilation and air conditioning (HVAC) systems and the plumbing systems at the for the Nelson Place Elementary School no build option. As noted in our earlier existing Mechanical conditions report, most all the HVAC systems and the plumbing systems within the existing building have exceeded their useful expected service life and as such we have proposed a replacement of a majority of the systems as described herein.

**HVAC**

**Central Heating Plant:**

1. The buildings heating requirements will be satisfied via a high efficiency (93%+) gas-fired condensing hot water boiler plant. All four existing cast iron boilers and associated pumps and piping shall be removed. Pending final load calculations and system design, initially the boiler plant shall consist of two (2) gas-fired condensing fire-tube style boilers each with a gross input capacity of 1,500,000 BTUH similar to Lochinvar Crest or equal by Aerco or Viessman. Boilers shall be located within the existing lower level mechanical room with combustion air and flue venting for the new boiler running up the inside of the existing chimney to the roof.

2. Provide 2-pipe hydronic hot water system complete with vertical in-line system pumps as manufactured by Armstrong, Grundfos or equal rated for 200 GPM. Hydronic system shall connect to 2-pipe fan coil units, unit ventilators, unit heaters, coils and fin-tube radiation located throughout the building. All terminals shall be designed to operate with a maximum water temperature of 140°F to maximize plant capacity. Pumps shall have premium efficient motors and be fitted with integral variable speed drives so that pump energy matches system flow demand.

3. Due to the desire to achieve net-zero design, further analysis is planned for several options all of which would provide hot water for the building which could support heating as well as domestic hot water needs. The options for further consideration area as follows:
• Fuel Cell Cogeneration Plant which would supplement both power and hot water for building heating and domestic hot water. In addition fuel cell hot water could be used to support a hot water fired absorption chiller to augment the buildings cooling needs.

• Micro-Turbine Cogeneration Plant as manufactured by Captone® or equal which would supplement both power and hot water for building heating and domestic hot water heating using natural gas. In addition the micro-turbine hot water could be used to support a hot water fired absorption chiller plan to augment the buildings cooling needs.

• Geothermal chiller/heater which could supplement both hot water for building heating and domestic hot water in the winter and chilled water to support the buildings cooling needs.

• Solar thermal panels incorporating vacuum tube technology. These panels could supplement both the heating plant as well as domestic hot water heating needs.

Central Cooling Plant:

As the intent of the school department is to provide year-round cooling to all areas of the building and to attempt to obtain a net-zero design additional consideration has been given to utilizing highly efficient cooling systems. Being that chilled water requires less power to distribute through a building than air does it is expected that the building shall incorporate some type of chilled water based cooling system.

1. As a minimum the school shall incorporate a high efficiency water chiller for use in providing chilled water to the various cooling coils and active and passive chilled beams located throughout the building. A chiller plant of approximately 125-tons is anticipated pending final load calculations and building thermal improvements. Further life cycle analysis is required on whether the chiller plant should be air cooled, evaporative style, water cooled, geothermal chiller/heater or an absorber supported off one of the cogeneration options.

2. Chiller system shall incorporate a free cooling cycle where outdoor air can be used to cool the chilled water loop to design temperatures when outdoor air conditions allow. This shall vary based on the final chiller type selected however all would include a heat exchanger between the chilled water medium and the outdoor air or tower water.

3. A 2-pipe hydronic chilled water system shall be complete with vertical in-line system pumps as manufactured by Armstrong, Grundfos or equal rated for 250 GPM. Hydronic system shall connect to 2-pipe fan coil units, unit ventilators, unit heaters, coils and fin-tube radiation located throughout the building. It is preferred to have the plant segregated into a higher chilled water temperature for the chilled beams so as to maximize chiller efficiency and a lower chilled water segment for dehumidification and general cooling purposes when needed. This may require additional pumps to achieve. Chiller pumps may
also be provided pending final chiller selection. All pumps shall have premium efficient motors and be fitted with integral variable speed drives so that pump energy matches system flow demand.

4. If a water cooled machine is selected a cooling tower shall be provided with variable speed fan and variable speed condenser water pumps (chiller dependant) and a reduced chemical treatment system.

Distribution and Ventilation:

1. Most of the buildings classrooms, library and office spaces shall be ventilated and dehumidified via several 100% outdoor air rooftop air handling units. The units shall have total energy recovery wheels, hot water coil, chilled water coils, controllable heat pipe and bypass segments for cooling and dehumidification control. Units shall incorporate premium efficiency direct drive plenum fans on variable speed drives to optimize air delivery volumes based on space temperature and air quality demand as determined by CO2 sensors. The units shall be as manufactured by McQuay, Trane, Aaon or equal. The systems shall supply tempered and dehumidified air to the chilled beam systems located throughout the building.

2. Throughout the buildings classrooms, library and office spaces provide active chilled beams tied to the ventilation system. Chilled beams on interior spaces and areas where fin-tube radiation is not present shall be 4-pipe style with both chilled water coil and hot water coil. Chilled beams on exterior interior spaces where fin-tube radiation is present shall be 2-pipe style with chilled water coils. Units shall be typically 6 feet long by 2 feet wide with 5” air intake Price model #ACBL-HE or equal.

3. For high occupancy areas such as the café and gym provide high efficiency air handling units on the roof and within the existing mechanical rooms. The units shall have total energy recovery wheels, hot water coil, chilled water coils, controllable heat pipe and bypass segments for heating, cooling and dehumidification control. Units shall incorporate premium efficiency direct drive plenum fans on variable speed drives to optimize air delivery volumes based on space temperature and air quality demand as determined by CO2 sensors. The units shall be as manufactured by McQuay, Trane, Aaon or equal.

4. The computer classrooms as well as the MDF room shall be cooled via high efficiency ductless split units (one per room) with fan coil mounted within ceiling and condensing unit on roof.

5. Kitchen ventilation system shall include exhaust hoods with hood monitors and variable flow fans to control exhaust volume from hoods based on smoke and heat demand.

Controls:

1. The school shall incorporate a direct digital control (DDC) energy management system (EMS) that monitors and controls the HVAC equipment for efficient use. The system is designed on PC based architecture and adjustments are made on a graphics based
presentation of building systems. The system also supports maintenance and record keeping needs of the facility. Occupancy of the school is based on the standard school year with occupied/unoccupied conditions based on current school day practice. This is an adjustable feature that can be made to reflect additional operating needs and use of the school building by staff or others.

2. The HVAC systems are generally operated on a school day basis coinciding with the occupied/unoccupied schedule of the standard 180-day school year. Adjustments can be made through the DDC system to allow for usage during periods other than the usual school operating periods.

3. Space temperature is monitored by individual space sensors that transmit data to the central monitoring and control station. Space conditions are adjustable through DDC system and can be modified to meet individual needs. Local control of space conditions is limited to predefined adjustments in space temperature and to facilitate a 3-hour occupied override feature.

4. All classroom systems shall incorporate space occupancy sensors to reset ventilation levels when room is unoccupied during a regularly scheduled occupied period. Systems serving high occupancy areas such as the cafeteria and gymnasium also include carbon dioxide (CO₂) indoor air quality (IAQ) sensors which optimize the fresh outdoor air ventilation levels in response to variations in space occupancies.

5. The system shall incorporate many energy-saving features such as 1) hot water and chilled water temperature reset controls, 2) static pressure reset controls, 3) occupancy based controls and 4) ventilation reset controls to name just a few.

6. Depending on if a cogeneration system is selected and what type, the energy management system shall also optimize the operation of this plant.

7. The building shall be connected to emergency power source for operation of heating boilers and pumps during loss of primary power.

**Sustainable Opportunities:**

Many of the proposed system and control sequences noted above minimize energy consumption however, further optimization may be obtained by investigating the use of water cooled cooling equipment which has an inherent better energy performance than air cooled equipment as well as the cogeneration plants referenced earlier. A life cycle evaluation must be performed as size and length of cooling system run time will impact overall value.

In addition to the water cooled cooling option, consideration could also be given to a geothermal based option. A geothermal chiller/heater could support building cooling loads in the summer as well as provide supplemental heating to the building by preheating both the heating water and domestic hot water thereby reducing the demand on the building fossil fuel boilers. A
geothermal well field analysis as well as a life cycle cost would need to be performed to verify economic viability.

Two solar based options to consider would be passive solar wall design using air passing through a wall assembly facing South to preheat air and/or vacuum tube thermal solar panels mounted on the roof to directly supplement the building heating and domestic hot water systems.

**Plumbing**

**Distribution & Conveying Systems**

As noted in the conditions report, the water distribution system have been experiencing numerous failures and most likely have some lead containing piping, fittings and/or solder. As such, we suggest the entire domestic water distribution system be replaced in its entirety. The new distribution system would consist of copper piping and lead-free fittings and products.

All sanitary sewer and rain water conductors located above the grade floor slab shall be replaced in their entirety. Underground waste piping shall be examined via camera inspection and if found to be in good condition shall be retained and reused.

All waste from the kitchen shall be piped to a large (1,500 gallon+/-) exterior grease trap prior to discharge to the municipal sewer system.

**Domestic Hot Water**

High efficiency (93%+) gas-fired condensing boiler/water heaters coupled to tanks shall be used to support the buildings domestic hot water needs. In addition, this system shall be coupled to the heat output of the cogeneration system, if selected, and/or thermal solar panels. The use of these supplemental systems will be dependent on their life cycle cost and require further study.

Duel water tempering valve stations shall be provided at the water heater to maintain water heater temperatures above 140°F to prevent bacterial growth in the tank while delivering 125°F water to service fixtures for sanitation and 110°F hot water to public lavatory sinks and other student and public use fixtures to prevent scalding.

**Fixtures**

Planned renovations will most likely require removal of the existing fixtures. Once removed the fixtures should be replaced with code compliant water conserving fixtures. In addition, to achieve improved LEED® compliance and further water savings we highly recommend ultra low flush water closets and urinals be utilized. The ultra low flush water closets use 1.28 gallons per flush as opposed to the 1.6 gallon per flush allowed by today’s code and the urinals use 1 pint (0.13 gallons) per flush as opposed to the current 1 gallon per flush allowed. The combination of these two can result in substantial savings overtime.
Lavatory faucets shall be of the low flow metered type controlled by either a wired or battery powered sensor operated faucet. Use of these faucets promotes good hygiene as well as water conservation.

Natural Gas Service:

The existing gas service to the building currently supports a BTU load of 8,743,000. The projected new load with gas-fired heating boilers, water heaters and cooking equipment would be estimated at 4,000,000 BTUs. As such the current gas service is more than adequate to support the building and allows for approximately 300kW of cogeneration capacity if desired. However, we would not anticipated this size cogeneration system be utilized as a proper balance between year-round waste heat demand and power should be reached.

Sustainable Opportunities:

Many of the proposed fixtures and control sequences noted above minimize water usage and conserve energy however, further optimization may be obtained by investigating the use of storm water recovery systems. These systems collect, filter and utilize storm water to supply water to water closets and urinals throughout the building. A life cycle evaluation must be performed to ascertain the initial first costs, annual operating costs and projected savings associated with such a system.

Use of cogeneration waste heat, as applicable, as well as vacuum tube thermal solar panels shall be further considered as part of a life cycle study analysis.

End of HVAC & Plumbing Narrative
The following narrative describes the proposed scope of work pertaining to the heating, ventilation and air conditioning (HVAC) systems and the plumbing systems at the for the Nelson Place Elementary School addition & renovation option. As noted in our earlier existing Mechanical conditions report, most all the HVAC systems and the plumbing systems within the existing building have exceeded their useful expected service life and as such we have proposed a replacement of a majority of the systems as described herein.

**HVAC**

**Central Heating Plant:**

1. The buildings heating requirements will be satisfied via a high efficiency (93%+) gas-fired condensing hot water boiler plant. All four existing cast iron boilers and associated pumps and piping shall be removed. Pending final load calculations and system design, initially the boiler plant shall consist of two (2) gas-fired condensing fire-tube style boilers each with a gross input capacity of 2,500,000 BTUH similar to Lochinvar Crest or equal by Aerco or Viessman. Boilers shall be located within the existing lower level mechanical room with combustion air and flue venting for the new boiler running up the inside of the existing chimney to the roof.

2. Provide 2-pipe hydronic hot water system complete with vertical in-line system pumps as manufactured by Armstrong, Grundfos or equal rated for 400 GPM. Hydronic system shall connect to 2-pipe fan coil units, unit ventilators, unit heaters, coils and fin-tube radiation located throughout the building. All terminals shall be designed to operate with a maximum water temperature of 140°F to maximize plant capacity. Pumps shall have premium efficient motors and be fitted with integral variable speed drives so that pump energy matches system flow demand.

3. Due to the desire to achieve net-zero design, further analysis is planned for several options all of which would provide hot water for the building which could support heating as well as domestic hot water needs. The options for further consideration area as follows:
• Fuel Cell Cogeneration Plant which would supplement both power and hot water for building heating and domestic hot water. In addition fuel cell hot water could be used to support a hot water fired absorption chiller to augment the buildings cooling needs.

• Micro-Turbine Cogeneration Plant as manufactured by Captone® or equal which would supplement both power and hot water for building heating and domestic hot water heating using natural gas. In addition the micro-turbine hot water could be used to support a hot water fired absorption chiller plan to augment the buildings cooling needs.

• Geothermal chiller/heater which could supplement both hot water for building heating and domestic hot water in the winter and chilled water to support the buildings cooling needs.

• Solar thermal panels incorporating vacuum tube technology. These panels supplement both the heating plant as well as domestic hot water heating needs.

Central Cooling Plant:

As the intent of the school department is to provide year-round cooling to all areas of the building and to attempt to obtain a net-zero design additional consideration has been given to utilizing highly efficient cooling systems. Being that chilled water requires less power to distribute through a building than air does it is expected that the building shall incorporate some type of chilled water based cooling system.

1. As a minimum the school shall incorporate a high efficiency water chiller for use in providing chilled water to the various cooling coils and active and passive chilled beams located throughout the building. A chiller plant of approximately 250-tons is anticipated pending final load calculations and building thermal improvements. Further life cycle analysis is required on whether the chiller plant should be air cooled, evaporative style, water cooled, geothermal chiller/heater or an absorber supported off one of the cogeneration options.

2. Chiller system shall incorporate a free cooling cycle where outdoor air can be used to cool the chilled water loop to design temperatures when outdoor air conditions allow. This shall vary based on the final chiller type selected however all would include a heat exchanger between the chilled water medium and the outdoor air or tower water.

3. A 2-pipe hydronic chilled water system shall be complete with vertical in-line system pumps as manufactured by Armstrong, Grundfos or equal rated for 500 GPM. Hydronic system shall connect to 2-pipe fan coil units, unit ventilators, unit heaters, coils and fin-tube radiation located throughout the building. It is preferred to have the plant segregated into a higher chilled water temperature for the chilled beams so as to maximize chiller efficiency and a lower chilled water segment for dehumidification and general cooling purposes when needed. This may require additional pumps to achieve. Chiller pumps may
also be provided pending final chiller selection. All pumps shall have premium efficient motors and be fitted with integral variable speed drives so that pump energy matches system flow demand.

4. If a water cooled machine is selected a cooling tower shall be provided with variable speed fan and variable speed condenser water pumps (chiller dependant) and a reduced chemical treatment system.

Distribution and Ventilation:

1. Most of the buildings classrooms, library and office spaces shall be ventilated and dehumidified via several 100% outdoor air rooftop air handling units. The units shall have total energy recovery wheels, hot water coil, chilled water coils, controllable heat pipe and bypass segments for cooling and dehumidification control. Units shall incorporate premium efficiency direct drive plenum fans on variable speed drives to optimize air delivery volumes based on space temperature and air quality demand as determined by CO2 sensors. The units shall be as manufactured by McQuay, Trane, Aaon or equal. The systems shall supply tempered and dehumidified air to the chilled beam systems located throughout the building.

2. Throughout the buildings classrooms, library and office spaces provide active chilled beams tied to the ventilation system. Chilled beams on interior spaces and areas where fin-tube radiation is not present shall be 4-pipe style with both chilled water coil and hot water coil. Chilled beams on exterior interior spaces where fin-tube radiation is present shall be 2-pipe style with chilled water coils. Units shall be typically 6 feet long by 2 feet wide with 5” air intake Price model #ACBL-HE or equal.

3. For high occupancy areas such as the café and gym provide high efficiency air handling units on the roof. The units shall have total energy recovery wheels, hot water coil, chilled water coils, controllable heat pipe and bypass segments for heating, cooling and dehumidification control. Units shall incorporate premium efficiency direct drive plenum fans on variable speed drives to optimize air delivery volumes based on space temperature and air quality demand as determined by CO2 sensors. The units shall be as manufactured by McQuay, Trane, Aaon or equal.

4. The computer classrooms as well as the MDF room shall be cooled via high efficiency ductless split units (one per room) with fan coil mounted within ceiling and condensing unit on roof.

5. Kitchen ventilation system shall include exhaust hoods with hood monitors and variable flow fans to control exhaust volume from hoods based on smoke and heat demand.

Controls:

1. The school shall incorporate a direct digital control (DDC) energy management system (EMS) that monitors and controls the HVAC equipment for efficient use. The system is designed on PC based architecture and adjustments are made on a graphics based
presentation of building systems. The system also supports maintenance and record keeping needs of the facility. Occupancy of the school is based on the standard school year with occupied/unoccupied conditions based on current school day practice. This is an adjustable feature that can be made to reflect additional operating needs and use of the school building by staff or others.

2. The HVAC systems are generally operated on a school day basis coinciding with the occupied/unoccupied schedule of the standard 180-day school year. Adjustments can be made through the DDC system to allow for usage during periods other than the usual school operating periods.

3. Space temperature is monitored by individual space sensors that transmit data to the central monitoring and control station. Space conditions are adjustable through DDC system and can be modified to meet individual needs. Local control of space conditions is limited to predefined adjustments in space temperature and to facilitate a 3-hour occupied override feature.

4. All classroom systems shall incorporate space occupancy sensors to reset ventilation levels when room is unoccupied during a regularly scheduled occupied period. Systems serving high occupancy areas such as the cafeteria and gymnasium also include carbon dioxide (CO2) indoor air quality (IAQ) sensors which optimize the fresh outdoor air ventilation levels in response to variations in space occupancies.

5. The system shall incorporate many energy-saving features such as 1) hot water and chilled water temperature reset controls, 2) static pressure reset controls, 3) occupancy based controls and 4) ventilation reset controls to name just a few.

6. Depending on if a cogeneration system is selected and what type, the energy management system shall also optimize the operation of this plant.

7. The building shall be connected to emergency power source for operation of heating boilers and pumps during loss of primary power.

Sustainable Opportunities:

Many of the proposed system and control sequences noted above minimize energy consumption however, further optimization may be obtained by investigating the use of water cooled cooling equipment which has an inherent better energy performance than air cooled equipment as well as the cogeneration plants referenced earlier. A life cycle evaluation must be performed as size and length of cooling system run time will impact overall value.

In addition to the water cooled cooling option, consideration could also be given to a geothermal based option. A geothermal chiller/heater could support building cooling loads in the summer as well as provide supplemental heating to the building by preheating both the heating water and domestic hot water thereby reducing the demand on the building fossil fuel boilers. A
geothermal well field analysis as well as a life cycle cost would need to be performed to verify economic viability.

Two solar based options to consider would be passive solar wall design using air passing through a wall assembly facing South to preheat air and/or vacuum tube thermal solar panels mounted on the roof to directly supplement the building heating and domestic hot water systems.

**Plumbing**

**Distribution & Conveying Systems**

As noted in the conditions report, the water distribution system have been experiencing numerous failures and most likely have some lead containing piping, fittings and/or solder. As such, we suggest the entire domestic water distribution system be replaced in its entirety. The new distribution system would consist of copper piping and lead-free fittings and products.

All sanitary sewer and rain water conductors located above the grade floor slab shall be replaced in their entirety. Underground waste piping shall be examined via camera inspection and if found to be in good condition shall be retained and reused.

All waste from the kitchen shall be piped to a large (1,500 gallon+/-) exterior grease trap prior to discharge to the municipal sewer system.

**Domestic Hot Water**

High efficiency (93%+) gas-fired condensing boiler/water heaters coupled to tanks shall be used to support the buildings domestic hot water needs. In addition, this system shall be coupled to the heat output of the cogeneration system, if selected, and/or thermal solar panels. The use of these supplemental systems will be dependent on their life cycle cost and require further study.

Duel water tempering valve stations shall be provided at the water heater to maintain water heater temperatures above 140°F to prevent bacterial growth in the tank while delivering 125°F water to service fixtures for sanitation and 110°F hot water to public lavatory sinks and other student and public use fixtures to prevent scalding.

**Fixtures**

Planned renovations will most likely require removal of the existing fixtures. Once removed the fixtures should be replaced with code compliant water conserving fixtures. In addition, to achieve improved LEED® compliance and further water savings we highly recommend ultra low flush water closets and urinals be utilized. The ultra low flush water closets use 1.28 gallons per flush as opposed to the 1.6 gallon per flush allowed by today’s code and the urinals use 1 pint (0.13 gallons) per flush as opposed to the current 1 gallon per flush allowed. The combination of these two can result in substantial savings overtime.
Lavatory faucets shall be of the low flow metered type controlled by either a wired or battery powered sensor operated faucet. Use of these faucets promotes good hygiene as well as water conservation.

Natural Gas Service:

The existing gas service to the building currently supports a BTU load of 8,743,000. The projected new load with gas-fired heating boilers, water heaters and cooking equipment would be estimated at 6,000,000 BTUs. As such the current gas service is more than adequate to support the building and allows for approximately 180kW of cogeneration capacity if desired. However, we would not anticipated this size cogeneration system be utilized as a proper balance between year-round waste heat demand and power should be reached.

Sustainable Opportunities:

Many of the proposed fixtures and control sequences noted above minimize water usage and conserve energy however, further optimization may be obtained by investigating the use of storm water recovery systems. These systems collect, filter and utilize storm water to supply water to water closets and urinals throughout the building. A life cycle evaluation must be performed to ascertain the initial first costs, annual operating costs and projected savings associated with such a system.

Use of cogeneration waste heat, as applicable, as well as vacuum tube thermal solar panels shall be further considered as part of a life cycle study analysis.

End of HVAC & Plumbing Narrative
The following narrative describes the proposed scope of work pertaining to the heating, ventilation and air conditioning (HVAC) systems and the plumbing systems at the for the Nelson Place Elementary School new construction option which involves construction on the existing site, or placement of the school at one of three different sites, 1) rear of current Nelson Place site, 2) Salter School site and 3) Forest Grove & McGrath School site.

The proposed mechanical systems for all the sites are very similar. The only variable of biggest concern on the mechanical side would be access to natural gas of which early indications from the gas utility appear to reflect that getting gas to either site is not a major obstacle. However amounts may restrict the size of a possible cogeneration plant if chosen.

**HVAC**

**Central Heating Plant:**

1. The building’s heating requirements will be satisfied via a high efficiency (93%+) gas-fired condensing hot water boiler plant. Pending final load calculations and system design, initially the boiler plant shall consist of two (2) gas-fired condensing fire-tube style boilers each with a gross input capacity of 2,000,000 BTUH similar to Lochinvar Crest or equal by Aerco or Viessman. Boilers shall be located within a mechanical room with combustion air and flue venting for the new boiler running up to the roof.

2. Provide 2-pipe hydronic hot water system complete with vertical in-line system pumps as manufactured by Armstrong, Grundfos or equal rated for 350 GPM. Hydronic system shall connect to 2-pipe fan coil units, unit ventilators, unit heaters, coils and fin-tube radiation located throughout the building. All terminals shall be designed to operate with a maximum water temperature of 140°F to maximize plant capacity. Pumps shall have premium efficient motors and be fitted with integral variable speed drives so that pump energy matches system flow demand.

3. Due to the desire to achieve net-zero design, further analysis is planned for several options all of which would provide hot water for the building which could support heating as well as domestic hot water needs. The options for further consideration area as follows:
Fuel Cell Cogeneration Plant which would supplement both power and hot water for building heating and domestic hot water. In addition fuel cell hot water could be used to support a hot water fired absorption chiller to augment the buildings cooling needs.

Micro-Turbine Cogeneration Plant as manufactured by Captone® or equal which would supplement both power and hot water for building heating and domestic hot water heating using natural gas. In addition the micro-turbine hot water could be used to support a hot water fired absorption chiller plan to augment the buildings cooling needs.

Geothermal chiller/heater which could supplement both hot water for building heating and domestic hot water in the winter and chilled water to support the buildings cooling needs.

Solar thermal panels incorporating vacuum tube technology. These panels could supplement both the heating plant as well as domestic hot water heating needs.

Central Cooling Plant:

As the intent of the school department is to provide year-round cooling to all areas of the building and to attempt to obtain a net-zero design additional consideration has been given to utilizing highly efficient cooling systems. Being that chilled water requires less power to distribute through a building than air does it is expected that the building shall incorporate some type of chilled water based cooling system.

1. As a minimum the school shall incorporate a high efficiency water chiller for use in providing chilled water to the various cooling coils and active and passive chilled beams located throughout the building. A chiller plant of approximately 225-tons is anticipated pending final load calculations and building thermal improvements. Further life cycle analysis is required on whether the chiller plant should be air cooled, evaporative style, water cooled, geothermal chiller/heater or an absorber supported off one of the cogeneration options.

2. Chiller system shall incorporate a free cooling cycle where outdoor air can be used to cool the chilled water loop to design temperatures when outdoor air conditions allow. This shall vary based on the final chiller type selected however all would include a heat exchanger between the chilled water medium and the outdoor air or tower water.

3. A 2-pipe hydronic chilled water system shall be complete with vertical in-line system pumps as manufactured by Armstrong, Grundfos or equal rated for 450 GPM. Hydronic system shall connect to 2-pipe fan coil units, unit ventilators, unit heaters, coils and fin-tube radiation located throughout the building. It is preferred to have the plant segregated into a higher chilled water temperature for the chilled beams so as to maximize chiller efficiency and a lower chilled water segment for dehumidification and general cooling purposes when needed. This may require additional pumps to achieve. Chiller pumps may also be provided pending final chiller selection. All pumps shall have premium efficient
motors and be fitted with integral variable speed drives so that pump energy matches system flow demand.

4. If a water cooled machine is selected a cooling tower shall be provided with variable speed fan and variable speed condenser water pumps (chiller dependant) and a reduced chemical treatment system.

Distribution and Ventilation:

1. Most of the building’s classrooms, library and office spaces shall be ventilated and dehumidified via several 100% outdoor air rooftop air handling units. The units shall have total energy recovery wheels, hot water coil, chilled water coils, controllable heat pipe and bypass segments for cooling and dehumidification control. Units shall incorporate premium efficiency direct drive plenum fans on variable speed drives to optimize air delivery volumes based on space temperature and air quality demand as determined by CO2 sensors. The units shall be as manufactured by McQuay, Trane, Aaon or equal. The systems shall supply tempered and dehumidified air to the chilled beam systems located throughout the building.

2. Throughout the building’s classrooms, library and office spaces provide active chilled beams tied to the ventilation system. Chilled beams on interior spaces and areas where fin-tube radiation is not present shall be 4-pipe style with both chilled water coil and hot water coil. Chilled beams on exterior interior spaces where fin-tube radiation is present shall be 2-pipe style with chilled water coils. Units shall be typically 6 feet long by 2 feet wide with 5” air intake Price model #ACBL-HE or equal.

3. For high occupancy areas such as the café and gym provide high efficiency air handling units on the roof. The units shall have total energy recovery wheels, hot water coil, chilled water coils, controllable heat pipe and bypass segments for heating, cooling and dehumidification control. Units shall incorporate premium efficiency direct drive plenum fans on variable speed drives to optimize air delivery volumes based on space temperature and air quality demand as determined by CO2 sensors. The units shall be as manufactured by McQuay, Trane, Aaon or equal.

4. The computer classrooms as well as the MDF room shall be cooled via high efficiency ductless split units (one per room) with fan coil mounted within ceiling and condensing unit on roof.

5. Kitchen ventilation system shall include exhaust hoods with hood monitors and variable flow fans to control exhaust volume from hoods based on smoke and heat demand.

Controls:

1. The school shall incorporate a direct digital control (DDC) energy management system (EMS) that monitors and controls the HVAC equipment for efficient use. The system is designed on PC based architecture and adjustments are made on a graphics based presentation of building systems. The system also supports maintenance and record keeping needs of the facility. Occupancy of the school is based on the standard school year with
occupied/unoccupied conditions based on current school day practice. This is an adjustable feature that can be made to reflect additional operating needs and use of the school building by staff or others.

2. The HVAC systems are generally operated on a school day basis coinciding with the occupied/unoccupied schedule of the standard 180-day school year. Adjustments can be made through the DDC system to allow for usage during periods other than the usual school operating periods.

3. Space temperature is monitored by individual space sensors that transmit data to the central monitoring and control station. Space conditions are adjustable through DDC system and can be modified to meet individual needs. Local control of space conditions is limited to predefined adjustments in space temperature and to facilitate a 3-hour occupied override feature.

4. All classroom systems shall incorporate space occupancy sensors to reset ventilation levels when room is unoccupied during a regularly scheduled occupied period. Systems serving high occupancy areas such as the cafeteria and gymnasium also include carbon dioxide (CO2) indoor air quality (IAQ) sensors which optimize the fresh outdoor air ventilation levels in response to variations in space occupancies.

5. The system shall incorporate many energy-saving features such as 1) hot water and chilled water temperature reset controls, 2) static pressure reset controls, 3) occupancy based controls and 4) ventilation reset controls to name just a few.

6. Depending on if a cogeneration system is selected and what type, the energy management system shall also optimize the operation of this plant.

7. The building shall be connected to emergency power source for operation of heating boilers and pumps during loss of primary power.

**Sustainable Opportunities:**

Many of the proposed system and control sequences noted above minimize energy consumption however, further optimization may be obtained by investigating the use of water cooled cooling equipment which has an inherent better energy performance than air cooled equipment as well as the cogeneration plants referenced earlier. A life cycle evaluation must be performed as size and length of cooling system run time will impact overall value.

In addition to the water cooled cooling option, consideration could also be given to a geothermal based option. A geothermal chiller/heater could support building cooling loads in the summer as well as provide supplemental heating to the building by preheating both the heating water and domestic hot water thereby reducing the demand on the building fossil fuel boilers. A geothermal well field analysis as well as a life cycle cost would need to be performed to verify economic viability.
Two solar based options to consider would be passive solar wall design using air passing through a wall assembly facing South to preheat air and/or vacuum tube thermal solar panels mounted on the roof to directly supplement the building heating and domestic hot water systems.

**Plumbing**

**Distribution & Conveying Systems**

As noted in the conditions report, the water distribution system have been experiencing numerous failures and most likely have some lead containing piping, fittings and/or solder. As such, we suggest the entire domestic water distribution system be replaced in its entirety. The new distribution system would consist of copper piping and lead-free fittings and products.

All sanitary sewer and rain water conductors located above the grade floor slab shall be replaced in their entirety. Underground waste piping shall be examined via camera inspection and if found to be in good condition shall be retained and reused.

All waste from the kitchen shall be piped to a large (1,500 gallon+/-) exterior grease trap prior to discharge to the municipal sewer system.

**Domestic Hot Water**

High efficiency (93%+) gas-fired condensing boiler/water heaters coupled to tanks shall be used to support the buildings domestic hot water needs. In addition, this system shall be coupled to the heat output of the cogeneration system, if selected, and/or thermal solar panels. The use of these supplemental systems will be dependent on their life cycle cost and require further study.

Duel water tempering valve stations shall be provided at the water heater to maintain water heater temperatures above 140°F to prevent bacterial growth in the tank while delivering 125°F water to service fixtures for sanitation and 110°F hot water to public lavatory sinks and other student and public use fixtures to prevent scalding.

**Fixtures**

To achieve improved LEED® compliance and improved water savings we highly recommend ultra low flush water closets and urinals be utilized. The ultra low flush water closets use 1.28 gallons per flush as opposed to the 1.6 gallon per flush allowed by today’s code and the urinals use 1 pint (0.13 gallons) per flush as opposed to the current 1 gallon per flush allowed. The combination of these two can result in substantial savings overtime.

Lavatory faucets shall be of the low flow metered type controlled by either a wired or battery powered sensor operated faucet. Use of these faucets promotes good hygiene as well as water conservation.
Natural Gas Service:

Nelson Place Site
The existing gas service to the building currently supports a BTU load of 8,743,000. The projected new load with gas-fired heating boilers, water heaters and cooking equipment would be estimated at 5,000,000 BTUs. As such the current gas service is more than adequate to support the building and allows for approximately 250kW of cogeneration capacity if desired. However, we would not anticipated this size cogeneration system be utilized as a proper balance between year-round waste heat demand and power should be reached.

Salter School Site
Further analysis by the local gas utility is required to confirm adequacy of gas supply for the proposed site however it was inferred during preliminary meetings that the proposed site would be capable of supporting the normal gas load. Available gas supply for cogeneration is unknown pending further review.

Forest Grove/McGrath Site
Further analysis by the local gas utility is required to confirm adequacy of gas supply for the proposed site however it was inferred during preliminary meetings that the proposed site would be capable of supporting the normal gas load. Available gas supply for cogeneration is unknown pending further review.

Sustainable Opportunities:

Many of the proposed fixtures and control sequences noted above minimize water usage and conserve energy however, further optimization may be obtained by investigating the use of storm water recovery systems. These systems collect, filter and utilize storm water to supply water to water closets and urinals throughout the building. A life cycle evaluation must be performed to ascertain the initial first costs, annual operating costs and projected savings associated with such a system.

Use of cogeneration waste heat, as applicable, as well as vacuum tube thermal solar panels shall be further considered as part of a life cycle study analysis.

End of HVAC & Plumbing Narrative
February 12, 2014

Recommendations – Electrical Systems

No Build Option

Nelson Street Elementary School

Worcester, MA

Prepared by: Azim Rawji, P.E.

The electrical systems included in our study were found to have fair or poor overall ratings. There are many reasons for this, including the age and systems and that they do not meet current code requirements. The majority of the electrical systems in the building are either obsolete or outdated; however, these systems are functioning as originally designed and operate under “grandfathered” code conditions.

1.1 No Build Option

A. Electrical Service:
   1. Upgrade electrical service; provide new switchboard and distribution panelboards.
   2. The existing service will remain operational; and the existing panelboards will be replaced during subsequent renovation phases.
   3. Once all the existing panelboards are replaced, the existing service will be disconnected and removed.

B. Net Zero Strategies:
   1. Building/ground mounted photovoltaic system can be utilized to offset the electrical power consumption from the utility company to contribute towards a net zero building. The size of the system will depend on the available space on the roof and the orientation of the building.
   2. The existing building will have very limited options for roof mounted photovoltaic system due to the age of the building and the load bearing capacity of the roof; the existing site and will have very limited options for ground mounted photovoltaic system.

C. Emergency Power:
   1. Provide new emergency/standby generator, transfer and power equipment. Emergency equipment must be separated from normal and standby power equipment per the Massachusetts Electrical Code.
   2. All emergency equipment and feeders must be installed in 2-hour rated rooms or must be 2-hour rated.

D. Lighting:
1. Provide new emergency egress and exit lighting.
2. Provide new ambient lighting utilizing light fixtures with high efficient LED lamps.
3. Provide new lighting control system including programmable low voltage switching, vacancy sensors and daylight harvesting.
4. Integrate lighting controls with HVAC system to optimize energy performance of the building.

E. Fire Alarm:
1. Provide new voice evacuation fire alarm system.
2. Provide new public safety radio distributed antenna system.

F. Data Communications:
1. Provide new telecommunications cabling infrastructure per the BICSI standards. Utilize Category 6 cabling infrastructure. Install telecommunications equipment in dedicated rooms.
2. Provide new wired and wireless data communications equipment.
3. Provide new VoIP telephone system with digital/analog handsets.

G. Audio-Video Systems:
1. Provide new public address and clock systems.
2. Provide new media distribution system.
3. Provide new audio-video systems in classrooms and common areas.
4. Provide new sound system in the gym/cafetorium.

H. Security Systems:
1. Provide new video surveillance, access control and intrusion detection systems.
February 12, 2014

Recommendations – Electrical Systems
Addition/Renovation Option
Nelson Street Elementary School
Worcester, MA

Prepared by: Azim Rawji, P.E.

The electrical systems included in our study were found to have fair or poor overall ratings. There are many reasons for this, including the age and systems and that they do not meet current code requirements. The majority of the electrical systems in the building are either obsolete or outdated; however, these systems are functioning as originally designed and operate under “grandfathered” code conditions.

1.1 Renovation/Addition Option

A. Temporary Power:
   1. Provide power for new temporary classrooms to facilitate renovation/addition of the structure in phases.

B. Electrical Service:
   1. Upgrade electrical service; provide new switchboard and distribution panelboards.
   2. The existing service will remain operational; and the existing panelboards will be replaced during subsequent renovation phases.
   3. Once all the existing panelboards are replaced, the existing service will be disconnected and removed.

C. Net Zero Strategies:
   1. Building/ground mounted photovoltaic system can be utilized to offset the electrical power consumption from the utility company to contribute towards a net zero building. The size of the system will depend on the available space on the roof and the orientation of the building.
   2. The existing building will have very limited options for roof mounted photovoltaic system due to the age of the building and the load bearing capacity of the roof; the existing site and will have very limited options for ground mounted photovoltaic system.
   3. The addition will provide roof areas for the photovoltaic system; however, the size of the system will depend on the available space on the roof and the orientation of the addition.
D. **Emergency Power:**
   1. Provide new emergency/standby generator, transfer and power equipment. Emergency equipment must be separated from normal and standby power equipment per the Massachusetts Electrical Code.
   2. All emergency equipment and feeders must be installed in 2-hour rated rooms or must be 2-hour rated.

E. **Lighting:**
   1. Provide new emergency egress and exit lighting.
   2. Provide new ambient lighting utilizing light fixtures with high efficient LED lamps.
   3. Provide new lighting control system including programmable low voltage switching, vacancy sensors and daylight harvesting.
   4. Integrate lighting controls with HVAC system to optimize energy performance of the building.

F. **Fire Alarm:**
   1. Provide new voice evacuation fire alarm system.
   2. Provide new public safety radio distributed antenna system.

G. **Data Communications:**
   1. Provide new telecommunications cabling infrastructure per the BICSI standards. Utilize Category 6 cabling infrastructure. Install telecommunications equipment in dedicated rooms.
   2. Provide new wired and wireless data communications equipment.
   3. Provide new VoIP telephone system with digital/analog handsets.

H. **Audio-Video Systems:**
   1. Provide new public address and clock systems.
   2. Provide new media distribution system.
   3. Provide new audio-video systems in classrooms and common areas.
   4. Provide new sound system in the gym/cafetorium.

I. **Security Systems:**
   1. Provide new video surveillance, access control and intrusion detection systems.
February 12, 2014

Recommendations – Electrical Systems
New Building on Existing Site Option
Nelson Street Elementary School
Worcester, MA

Prepared by: Azim Rawji, P.E.

1.1 New Building on Existing Site – Nelson Place with added back land:

A. Electrical Service:
   1. The power lines feeding the site currently do not have the capacity to handle the additional electrical load of the new school per our conversations with the utility company. The power lines will have to be upgraded by the utility company.
   2. The primary distribution/telecommunications duct banks will have to be installed to bring power to the building site. Provide new electrical, switchboard and distribution panelboards.

B. Net Zero Strategies
   1. Building/ground mounted photovoltaic system can be utilized to offset the electrical power consumption from the utility company to contribute towards a net zero building.
   2. The size of the roof mounted system will depend on the available space and the orientation of the building. The size of the ground mounted system will depend on open area available for the installation.
   3. The estimated kWh consumption for the new Nelson Place school is 7kWh per sq. ft. which yields 770,000kWh of annual power consumption. To achieve net zero goal for electric power a 650kW photovoltaic system will have to be provided. A roof mounted photovoltaic system with contribute approximately 20-30% towards the net zero goal. The remainder of the system will have to be ground mounted.
   4. The site appears to have adequate land for a ground mounted solar photovoltaic system to contribute towards the net zero goals.

C. Emergency Power:
   1. Provide new emergency/standby generator, transfer and power equipment. Emergency equipment must be separated from normal and standby power equipment per the Massachusetts Electrical Code.
   2. All emergency equipment and feeders must be installed in 2-hour rated rooms or must be 2-hour rated.
D. Lighting:
   1. Provide new emergency egress and exit lighting.
   2. Provide new ambient lighting utilizing light fixtures with high efficient LED lamps.
   3. Provide new lighting control system including programmable low voltage switching, vacancy sensors and daylight harvesting.
   4. Integrate lighting controls with HVAC system to optimize energy performance of the building.

E. Fire Alarm:
   1. Provide new voice evacuation fire alarm system.
   2. Provide new public safety radio distributed antenna system.

F. Data Communications:
   1. Provide new telecommunications cabling infrastructure per the BICSI standards. Utilize Category 6 cabling infrastructure. Install telecommunications equipment in dedicated rooms.
   2. Provide new wired and wireless data communications equipment.
   3. Provide new VoIP telephone system with digital/analog handsets.

G. Audio-Video Systems:
   1. Provide new public address and clock systems.
   2. Provide new media distribution system.
   3. Provide new audio-video systems in classrooms and common areas.
   4. Provide new sound system in the gym/cafetorium.

H. Security Systems:
   1. Provide new video surveillance, access control and intrusion detection systems.
February 12, 2014

Recommendations – Electrical Systems
New Building on Alternate Site Option
Nelson Street Elementary School
Worcester, MA

Prepared by: Azim Rawji, P.E.

1.1 Salter School/City Land
   A. ART is unaware of any deficiencies related to power or telecommunications availability at the site. The primary power and telecommunications services are available on the street.

1.2 Forest Grove/McGrath School
   A. ART is unaware of any deficiencies related to power or telecommunications availability at the site. The primary power and telecommunications services are available on the street.

1.3 New Building Requirements
   A. Electrical Service:
      1. Provide electrical primary and telecommunications underground duct bank system and utility company services.
      2. Provide new electrical, switchboard and distribution panelboards.
   B. Net Zero Strategies
      1. Building/ground mounted photovoltaic system can be utilized to offset the electrical power consumption from the utility company to contribute towards a net zero building.
      2. The size of the roof mounted system will depend on the available space and the orientation of the building. The size of the ground mounted system will depend on open area available for the installation.
      3. The estimated kWh consumption for the new Nelson Place school is 7kWh per sq. ft. which yields 770,000kWh of annual power consumption. To achieve net zero goal for electric power a 650kW photovoltaic system will have to be provided. A roof
mounted photovoltaic system with contribute approximately 20-30% towards the net zero goals. The remainder of the system will have to be ground mounted.

4. The Forest Grove/McGrath School and the Salter School sites appear to have limited opportunities for ground mounted solar. Both sites will contribute 20-30% from a roof mounted photovoltaic system if adequate roof space is available and the building is oriented for photovoltaic panels.

C. Emergency Power:
1. Provide new emergency/standby generator, transfer and power equipment. Emergency equipment must be separated from normal and standby power equipment per the Massachusetts Electrical Code.
2. All emergency equipment and feeders must be installed in 2-hour rated rooms or must be 2-hour rated.

D. Lighting:
1. Provide new emergency egress and exit lighting.
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1. Provide new telecommunications cabling infrastructure per the BICSI standards. Utilize Category 6 cabling infrastructure. Install telecommunications equipment in dedicated rooms.
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G. Audio-Video Systems:
1. Provide new public address and clock systems.
2. Provide new media distribution system.
3. Provide new audio-video systems in classrooms and common areas.
4. Provide new sound system in the gym/cafetorium.

H. Security Systems:
1. Provide new video surveillance, access control and intrusion detection systems.
3.1.7 LOCAL ACTIONS AND APPROVALS

A. Narrative
B. Local Actions & Approvals
   Certification
3.1.7 LOCAL ACTIONS AND APPROVAL

A. Narrative
The Owner and OPM have taken a proactive approach to involve the local community in the Feasibility Study process. Key steps include the following:

- **Building Committee Meetings:** All meetings have been conducted in accordance with the state’s open meeting law.
- **A project web site has been established on Nelson Place School’s homepage ([http://nelsonplace.worcesterschools.org](http://nelsonplace.worcesterschools.org)).** The intent will be to make public documents available for review on this web site.
- **Sustainable Design charrette was held on January 14, 2014 and included industry leaders, design team members, representatives of the City of Worcester and the OPM.**

The following public information meetings are scheduled at Nelson Place Elementary School:

- **Monday, March, 3, 2014**
- **Thursday, April 17, 2014**

The Local Actions and Certifications form, signed by the City Manager, Superintendent of Schools, and School Committee Chairperson is included in this section.
3.1.7 LOCAL ACTIONS AND APPROVAL

B. Local Actions & Approvals Certification
   1. Local Approval of PDP
   2. Certified copy of SBC Meeting Minutes
   3. SBC Meeting Agendas
   4. Public Meeting Agendas and Minutes
   5. Local Actions and Approvals Certification
February 28, 2014

Ms. Diane Sullivan
Senior Capital Program Manager
40 Broad Street
Boston, Massachusetts 02109

Dear Ms. Sullivan:

The City of Worcester Nelson Place School Building Committee (SBC) has completed its review of the Preliminary Design Program (PDP) for the Nelson Place School feasibility study. On February 24, 2014 the SBC voted to approve and authorize the Owner’s Project Manager to submit the feasibility study related materials to the Massachusetts School Building Authority (MSBA) for its consideration. A certified copy of the SBC meeting minutes, which includes the specific language of the vote and the number of votes in favor, opposed, and abstained, are attached.

Since the MSBA’s Board of Directors approved the District to proceed into schematic design on November 6, 2013, the SBC has held two meetings regarding the project, in compliance with the state Open Meeting Law; see attached agendas.

In summary these meetings included:

- Project Team Introductions
- Presentation of the Feasibility Study process, including the Preliminary Design Program and the Preferred Schematic Report by the Architect, Lamoureux Pagano Associates.
- Proposed Project Schedule summarized by the Owner’s Project Manager, Tishman Construction.
- Presentation of the Preliminary Design Program and a vote to approve the submittal of the PDP to the MSBA.

In addition to the SBC meetings listed above, the District has scheduled two Public Hearings on March 3, 2014 and April 17, 2014. The presentation materials for each meeting, meeting minutes, and supporting materials related to the project are available for public review on the
Nelson Place School homepage quicklink at: (http://nelsonplace.worcesterschools.org); a hardcopy will be available for review at Worcester City Hall and the Nelson Place School Main Office.

To the best of my knowledge and belief, each of the meetings listed above complied with the requirements of the Open Meeting Law, M.G.L. c. 30A, §18-25 and 940 CMR et seq.

By signing this Local Action and Approval Certification, I hereby certify that, to the best of my knowledge and belief, the information supplied by the District in this Certification is true, complete and accurate.

Sincerely,

Edward M. Augustus, Jr., City Manager
Chief Executive Officer
March 25, 2013

Massachusetts School Building Authority
40 Broad Street, Suite 500
Boston, MA 02109

To Whom It May Concern:

Certification of Legal Counsel for the City of Worcester

I, Michael E. Traynor, duly appointed legal counsel for the City of Worcester, hereby certify that:

1. The City of Worcester is validly organized and existing under and by virtue of the laws of the Commonwealth, has full power and authority to own its properties and carry on its business as now conducted, and has full power and authority to execute, deliver and perform its obligations under the Feasibility Study Agreement, and any amendments thereto, between the City of Worcester and the Massachusetts School Building Authority for the Proposed Project at the Nelson Place School (the “Feasibility Study Agreement”) and all other related documents.

2. The City of Worcester has duly obtained all necessary votes, resolutions, authorizations, appropriations and local approvals, in accordance with the formats prescribed by the Authority, and has taken all actions necessary or required by law to authorize the execution and delivery of the Feasibility Study Agreement, and any amendments thereto, and to fund and perform the obligations of the City of Worcester under the Feasibility Study Agreement, and any amendments thereto.

3. The Feasibility Study Agreement, and any amendments thereto, constitute a valid and binding obligation of the City of Worcester, enforceable in accordance with its terms, except as such enforceability may be limited by bankruptcy, insolvency, moratorium, reorganization or other laws heretofore or hereafter enacted and general equity principles.

4. The following appointed governmental officer has the full legal authority under the laws of the Commonwealth of Massachusetts and all applicable local charters, and ordinances to execute and deliver the Feasibility Study Agreement, and any amendments thereto, on behalf of the City of Worcester and to bind the City of Worcester to its terms and conditions:

E-MAIL: law@worcesterma.gov
Michael V. O’Brien, City Manager
Worcester City Hall, Room 307
Worcester, Massachusetts 01608
508-799-1175

5. The following appointed governmental officers have the full legal authority under the laws of the Commonwealth of Massachusetts and all applicable local charters, ordinances and by-laws to make final, binding decisions on behalf of the City of Worcester with respect to the Proposed Project described in the Feasibility Study Agreement, and any amendments thereto.

Michael V. O’Brien
City Manager
Worcester City Hall, Room 309
Worcester, Massachusetts 01608
508-799-1175

Thomas F. Zidelis
Chief Financial Officer
Worcester City Hall, Room 201
Worcester, Massachusetts 01608
508-799-1180

Robert L. Moylan, Jr, P.E.
Commissioner, Department of Public Works & Parks
2C East Worcester Street
Worcester, Massachusetts
508-799-1430

I hereby further certify that, to the best of my knowledge and belief, the above-listed certifications are true, complete and accurate.

IN WITNESS WHEREOF, signed this ___ day of March, 2013.

[Signature]

Michael E. Traynor
Name (Print or Type)

Deputy City Solicitor
Office Title (Print or Type)
February 25, 2014

Ms. Diane Sullivan
Senior Capital Program Manager
40 Broad Street
Boston, Massachusetts 02109

Dear Ms. Sullivan,

This letter serves to certify that the attached Nelson Place School Building Committee meeting minutes dated January 6, 2014 and February 24, 2014, sign in sheet and roll call vote form to approve the Preliminary Design Program at the School Building Committee meeting on February 24, 2014 are accurate to the best of my knowledge.

Sincerely,

[Signature]

Julie A. Lynch
City of Worcester, Architectural Services
Registered Architect, MCPPO Design and Construction

Dated: 2/25/14
City of Worcester

[Notary Seal]

[Notary Signature]
Commonwealth of Massachusetts
Nelson Place School

Building Committee Meeting Agenda

Meeting Date
February 24, 2014, 7:00pm

1. WELCOME and INTRODUCTIONS
   Mayor Petty

2. PROJECT OVERVIEW
   Paul Moe, Commissioner DPW+P

3. PROJECT ACTIVITY UPDATE
   Julie Lynch, DPW+P, Architectural Services

4. SCHEDULE SUMMARY
   Tishman Construction, Owner’s Project Manager

5. PRELIMINARY DESIGN PROGRAM (PDP)
   Lamoureux Pagano Associates, Architect

6. SCHOOL BUILDING COMMITTEE
   Question and Answer
   Eugene Caruso, Moderator, Tishman Construction

7. SCHOOL BUILDING COMMITTEE VOTE

Meeting Schedule:

Monday, March 3, 2014 at 7:00 – 8:00pm
Public Hearing, Nelson Place School
Topic: Project Overview including schedule, Preliminary Design Program, and site selection process.

Thursday, April 10, 2014 at 7:00 – 8:30pm
NPS Building Committee Meeting, Nelson Place School
Topic: Preferred Schematic Solution with Vote by NPS Building Committee

Thursday, April 17, 2014 at 7:00 – 8:00pm
Public Hearing, Nelson Place School
Topic: Preferred Schematic Solution review
City Of Worcester

NELSON PLACE SCHOOL BUILDING COMMITTEE - MEETING MINUTES

Nelson Place School Project – February 24, 2014 - 7:00 PM

School Building Committee members Present:
Mayor Joseph Perry, DPW Commissioner Paul Moosey, DPW Architect Julie Lynch, City Manager Edward Augustus, SBC Member John Foley, Facilities Director James Bedard, NPS Principal Monica Poitras, Chief Academic Officer Marco Rodrigues, Chief Financial Officer Brian Allen, City Councilor Tony Economou, Neighbor Phil Giarusso, Parent Pam Landry, VP Assumption College Christian McCarthy, Neighbor Jessica McGuire, NPS Staff Elizabeth O’Connell, Parent Allison Viganti, CFO Thomas Zidelis.

School Building Committee members Absent:
Superintendent Melinda Boone, NPS Staff Bettany Emery, Parent Palmira Padilha

The following Agenda items were presented and discussed;

- **Introduction:** Mayor Petty welcomed all attendees and thanked everyone for coming. He noted that there was a Public neighborhood meeting scheduled for March 3, 2014.

- **Project Overview:** Paul Moosey noted that a lot of work has been put into the project by the City and School personnel. Paul indicated that the City was still working on a budget cost for the program and that will be established shortly. The project is on schedule and ready to submit the Preliminary Design Program (PDP) to the MSBA which is going to be presented tonight. The Committee will be asked to vote on approving the PDP for submission.

- **Project Activity:** Julie Lynch also stated that the School department worked hard on providing information for the submission. The vote by the Committee this evening was important to allow the project to continue with submitting the PDP to the MSBA as the first step in the process.

- **Schedule Summary:** Tishman identified the various schedule milestone dates for District votes and MSBA submission requirements for the project.

- **Preliminary Design Program (PDP):** Lamoureux Pagano (LPA) made a power point presentation of the various activities that have been done during the PDP phase of the Feasibility Study. Information was provided on the educational program, site selection, parking needs, student drop off requirements, energy options, existing building conditions, possibilities for new construction and space summaries of the proposed school.
- **Questions and Answers:** Numerous questions were asked concerning the following:
  - Potential impact of nearby wetlands
  - Roadway access and emergency vehicle access
  - Space summary amounts for Core and Special Education components
  - Staff increases based on 600 students

Various responses from the Project team and City personnel noted that all the questions and concerns were very important and are being resolved during this preliminary phase.

**CLOSING:**
Paul Moosey asked for a roll call vote to approve the PDP and each member made a motion as indicated on the sign in sheet attached.
School Building Committee Member Sign-In Sheet
Nelson Place School Project

| Meeting Date: 24-Feb-14 | Time: 7:00 PM |

SCHOOL BUILDING COMMITTEE VOTE

At the School Building Committee meeting held on Monday, February 24, 2014, at 7:00pm at the Nelson Place School, the committee members are asked to vote their approval of the Nelson Place Elementary School, Preliminary Design Program (PDP) as presented at the meeting by the Project team. The approved PDP will be submitted to the Massachusetts School Building Authority (MSBA) on March 3, 2014. The School Building Committee votes are indicated below.

<table>
<thead>
<tr>
<th>Member Designation</th>
<th>Name and Title</th>
<th>Attendance Signature</th>
<th>VOTE</th>
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<tbody>
<tr>
<td>Co-Chair SBC</td>
<td>Joseph Petty, MAYOR</td>
<td></td>
<td>YES</td>
</tr>
<tr>
<td>Co-Chair SBC</td>
<td>Paul Moosey, DPW + P Commissioner</td>
<td></td>
<td>NO</td>
</tr>
<tr>
<td>SBC Member</td>
<td>Julie Lynch, Architect, MCPPO, DPW+P</td>
<td></td>
<td>Abstention</td>
</tr>
<tr>
<td>Local CEO</td>
<td>Edward Augustus, City Manager</td>
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<tr>
<td>SBC Member</td>
<td>John Foley, WPS School Committee</td>
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<tr>
<td>Superintendent of Schools</td>
<td>Melinda Boone WPS, Superintendent</td>
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<td></td>
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<tr>
<td>Local Official</td>
<td>James Bedard, WPS Facilities Director</td>
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<td></td>
</tr>
<tr>
<td>School Principal</td>
<td>Monica Poitras, WPS Principal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SBC Member</td>
<td>Marco Rodrigues, WPS Chief Academic Officer</td>
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<tr>
<td>SBC Member</td>
<td>Brian Allen WPS Chief Financial Officer</td>
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NPS SBC VOTE PDP  
Feb. 24, 2014
# School Building Committee Member Sign-In Sheet

**Nelson Place School Project**

<table>
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## SCHOOL BUILDING COMMITTEE VOTE

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<th>VOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBC Member</td>
<td>Tony Economou, City Councillor</td>
<td>□ YES □ NO □ Abstention</td>
<td>□ YES □ NO □ Abstention</td>
</tr>
<tr>
<td>SBC Member</td>
<td>Bettany Emery, NPS Staff</td>
<td>□ YES □ NO □ Abstention</td>
<td>□ YES □ NO □ Abstention</td>
</tr>
<tr>
<td>SBC Member</td>
<td>Phil Giarusso, Neighbor</td>
<td>□ YES □ NO □ Abstention</td>
<td>□ YES □ NO □ Abstention</td>
</tr>
<tr>
<td>SBC Member</td>
<td>Pam Landry, Parent</td>
<td>□ YES □ NO □ Abstention</td>
<td>□ YES □ NO □ Abstention</td>
</tr>
<tr>
<td>SBC Member</td>
<td>Christian McCarthy, Exe VP Assumption College</td>
<td>□ YES □ NO □ Abstention</td>
<td>□ YES □ NO □ Abstention</td>
</tr>
<tr>
<td>SBC Member</td>
<td>Jessica McGuire, Neighbor</td>
<td>□ YES □ NO □ Abstention</td>
<td>□ YES □ NO □ Abstention</td>
</tr>
<tr>
<td>SBC Member</td>
<td>Elizabeth O'Connell NPS Staff</td>
<td>□ YES □ NO □ Abstention</td>
<td>□ YES □ NO □ Abstention</td>
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<td>SBC Member</td>
<td>Palmira Padilha, Parent</td>
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<td>SBC Member</td>
<td>Thomas Zidelis, CFO, CoW</td>
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Building Committee Meeting Agenda

Meeting Date
January 6, 2014

1. INTRODUCTIONS
   Mayor Petty

2. NELSON PLACE PROJECT TEAM
   1. City of Worcester
   2. OPM - Tishman
   3. Designer - Lamoureux Pagano

3. OVERVIEW OF MSBA REQUIREMENTS - TCCMA
   a. Preliminary Design Program
   b. Preferred Schematic Design

4. ACTIVITIES FOR MSBA SUBMISSIONS - LPA
   a. Preliminary Design Program
   b. Preferred Schematic Design

5. SCHEDULE

6. NEXT MEETING

7. QUESTIONS
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<tr>
<td>Eugene Caruso</td>
<td>Tishman</td>
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<td>Bob Portrait</td>
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<td>Jack Foley</td>
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<td>Joe Petty</td>
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<td>Phil Girrusso</td>
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City Of Worcester

NELSON PLACE SCHOOL BUILDING COMMITTEE

MEETING MINUTES

Nelson Place School Project – January 6, 2014 - 7:00 PM

School Building Committee members Present:

School Building Committee members Absent:
City Manager Edward Augustus, Chief Academic Officer Marco Rodrigues, Superintendent Melinda Boone, NPS Staff Bettany Emery, Parent Palmira Padilha

The following Agenda items were presented and discussed;

- **Introduction:** Mayor Petty welcomed all attendees and asked for a self-introduction from each; a sign in sheet was also distributed. The Mayor noted the Nelson Place project is moving forward and is on schedule. The OPM, Tishman Construction, and Designer, Lamoureux Pagano Associates, have both been selected. Paul Moosey explained that the handout provided is the schedule being followed and introduced the OPM and Designer to provide for further details on the project and process.

- **Overview of the Massachusetts School Building Authority (MSBA) Requirements and Schedule:** Tishman noted that the City is now working on the MSBA Module 3 for the Feasibility Study which consists of two phases of work. The Preliminary Design Program, (PDP) involves gathering information on the Educational Program, spatial requirements, existing facility (Nelson Place School), site selection and alternative design. The second step for the Feasibility Study is a refinement process of the information gathered to help determine a preferred solution for the new school project. This preferred solution will be submitted for approval to the MSBA and is referred to as the Preferred Schematic Report, (PSR).

- **Activities for MSBA Submission:** Lamoureux Pagano Associates (LPA) is currently working with Worcester Public Schools to gather program information necessary to complete the PDP. Mike Pagano noted that their firm is an 18 person organization and they have a team formed for this project. They have also completed five school projects in the City of Worcester in the past 20 years. They are in the process of forming the program and gathering information for what the Nelson Place school needs. Review of various sites and
considering options for a no-build solution, renovation/addition or new construction alternatives are being developed. Mike noted the best solution would be submitted for approval by the MSBA, upon completion of the PSR, followed by Module 4; Schematic Design. This step is when all the details are defined and every building system is designed for the State to review and approve.

Katie Crocket (LPA) explained the linear process the MSBA uses to help develop the right school at the right location. As LPA gathers information they try to use as many groups as possible. Meetings with the Central administration and facilities personnel and faculty questionnaire are ongoing to help LPA get the “big” picture. There is a meeting scheduled for a comprehensive review of the sustainable design / LEED components for the project including a Net Zero energy discussion. This is defined for this project as the energy consumption utilized over the course of one year being offset by, or equal to, energy generated on site. The project is being designed for 600 students which translates to a building approximately 87,000 SF using the MSBA template for design. This is almost double what the school is now. The Special Education requirements, including a growing Autism program, will be incorporated in the design. LPA continues to work with WPS and the City of Worcester DPW+P to prepare a draft of the program requirements by Jan. 20, in order for this information to be applied to the site selection process.

Mike Pagano noted this is a comprehensive programming approach where the thoughts, concerns and interests of various stakeholders are important. The safety of the students during the process of construction is a paramount concern.

Rob Para (LPA) spoke about the special requirements and the process of reviewing the existing facility. Concerns like bus and parental drop off areas, play areas and mechanical systems are all being evaluated. Rob noted they are looking at four sites, including the existing Nelson Place School, Forest Grove, Salter and a vacant site in the City. Further review of the sites will narrow the selection down to two sites to be studied in more detail. Swing space potential usage is also being reviewed.

• **Questions and Answers:** Paul Moosley noted the City has searched for sites that have a potential 5 acre area to be considered. He also thanked several members of the Building Committee for their involvement on particular tasks. State Rep. Mahoney noted the site at the Old YMCA may be an option as well. Concern was raised about having neighborhood and PTO involvement to help get everyone know the progress. The PTO representative indicated there was a PTO meeting scheduled for Jan. 27th. Mayor Petty suggested he review this with his staff and determine next steps for public meetings. The School Department stated they could put a piece on the website about the project.

**CLOSING:**

The Mayor thanked everyone for coming and participating and the Committee agreed to the next meeting to be held on Feb. 24, 2014.
PDP APPENDICES

A. Current Statement of Interest (SOI)
B. MSBA Board Action Letter
C. Executed Design Enrollment Certification
A. Current Statement of Interest (SOI)
Massachusetts School Building Authority

School District    Worcester
District Contact    Gene Olearczyk TEL: (508) 799-3151
Name of School    Nelson Place
Submission Date    11/29/2011

*** Note: This is a recertified Statement of Interest ***

SOI CERTIFICATION

To be eligible to submit a Statement of Interest (SOI), a district must certify the following:

☒ The district hereby acknowledges and agrees that this SOI is NOT an application for funding and that submission of this SOI in no way commits the MSBA to accept an application, approve an application, provide a grant or any other type of funding, or places any other obligation on the MSBA.
☒ The district hereby acknowledges that no district shall have any entitlement to funds from the MSBA, pursuant to M.G.L. c. 70B or the provisions of 963 CMR 2.00.
☒ The district hereby acknowledges that the provisions of 963 CMR 2.00 shall apply to the district and all projects for which the district is seeking and/or receiving funds for a portion of a municipally-owned or regionally-owned school facility from the MSBA pursuant to M.G.L. c. 70B.
☒ The district hereby acknowledges that this SOI is for one existing municipally-owned or regionally-owned public school facility in the district that is currently used or will be used to educate public PreK-12 students.
☒ After the district completes and submits this SOI electronically, the district must sign the required certifications and submit one signed hard copy of the SOI to the MSBA, with all of the required documentation described under the "Vote" tab, on or before the deadline.
☒ The district will schedule and hold a meeting at which the School Committee voted, using the specific language contained in the "Vote" tab, to authorize the submission of this SOI.
☒ The district will schedule and hold a meeting at which the City Council/Board of Aldermen, Board of Selectmen/equivalent governing body voted, using the specific language contained in the "Vote" tab, to authorize the submission of this SOI.
☒ On or before the SOI deadline, the district will submit the minutes of the meeting at which the School Committee votes to authorize the Superintendent to submit this SOI. The MSBA's vote template, which contains specific reference to the school and the priorities for which the SOI is being submitted, will be used, and the minutes will be signed by the Chair.
☒ The district has arranged with the City/Town Clerk to certify the vote of the City Council/Board of Aldermen or Board of Selectmen/equivalent governing body to authorize the Superintendent to submit this SOI. The district will use the MSBA's vote template and submit the full text of this vote, which will specifically reference the school and the priorities for which the SOI is being submitted, to the MSBA on or before the SOI deadline.
☒ The district hereby acknowledges that this SOI submission will not be complete until the MSBA has received all of the required vote documentation and certification signatures in a format acceptable to the MSBA.

LOCAL CHIEF EXECUTIVE OFFICER/DISTRICT SUPERINTENDENT/SCHOOL COMMITTEE CHAIR
(E.g., Mayor, Town Manager, Board of Selectmen)
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Massachusetts School Building Authority

School District    Worcester
District Contact    Gene Olearczyk TEL: (508) 799-3151
Name of School    Nelson Place
Submission Date    11/29/2011

Note

The following Priorities have been included in the Statement of Interest:

1.☑ Replacement or renovation of a building which is structurally unsound or otherwise in a condition seriously jeopardizing the health and safety of school children, where no alternative exists.
2.☐ Elimination of existing severe overcrowding.
4.☐ Prevention of severe overcrowding expected to result from increased enrollments.
5.☑ Replacement, renovation or modernization of school facility systems, such as roofs, windows, boilers, heating and ventilation systems, to increase energy conservation and decrease energy related costs in a school facility.
7.☐ Replacement of or addition to obsolete buildings in order to provide for a full range of programs consistent with state and approved local requirements.
8.☐ Transition from court-ordered and approved racial balance school districts to walk-to, so-called, or other school districts.

Potential Project Scope:    Potential New School

Is this SOI the District Priority SOI?    YES

School name of the District Priority SOI:    2012 Nelson Place

District Goal for School: Please explain the educational goals of any potential project at this school

As noted in previous MSBA report and site visit.

District's Proposed Schedule: What is the District's proposed schedule to achieve the goal(s) stated above?

Once project is approved by MSBA, the design development process will begin.

Is this part of a larger facilities plan?    NO

If "YES", please provide the following:

Facilities Plan Date:
Planning Firm:
  Please provide an overview of the plan including as much detail as necessary to describe the plan, its goals and how the school facility that is the subject of this SOI fits into that plan:

Please provide the current student to teacher ratios at the school facility that is the subject of this SOI: 24 students per teacher
Please provide the originally planned student to teacher ratios at the school facility that is the subject of this SOI: 24 students per teacher.

Is there overcrowding at the school facility? NO

If "YES", please describe in detail, including specific examples of the overcrowding.

Has the district had any recent teacher layoffs or reductions? YES

If "YES", how many teaching positions were affected? 32
At which schools in the district? Burncoat High, Doherty High, North High, South High and Burncoat Middle Schools.
Please describe the types of teacher positions that were eliminated (e.g., art, math, science, physical education, etc.).

Math, English, Science and Social Studies.

Has the district had any recent staff layoffs or reductions? YES

If "YES", how many staff positions were affected? 18
At which schools in the district? Various schools within the district.
Please describe the types of staff positions that were eliminated (e.g., guidance, administrative, maintenance, etc.).

Clerical.

Please provide a description of the program modifications as a consequence of these teacher and/or staff reductions, including the impact on district class sizes and curriculum.

The reduction of positions did not result in a reduction of course offerings at any of the schools. The purpose of the reductions was to balance a budget deficit in a way that consolidated the number of course sections to match student course selections. In most cases, the impact was an increase in secondary class size from 21 to 23 students per section.

Please provide a detailed description of your most recent budget approval process including a description of any budget reductions and the impact of those reductions on the district's school facilities, class sizes, and educational program.

The budget process is a zero-based approach with a focus on student achievement. Budget reductions were based on maximizing contractual class size without reducing programs or services to students. There was no reduction in funds available for the upkeep and maintenance of school facilities. School support positions (mostly clerical) were reduced based on increasing dependence on technology and equity in the allocation of positions.
General Description

BRIEF BUILDING HISTORY: Please provide a detailed description of when the original building was built, and the date(s) and project scopes(s) of any additions and renovations (maximum of 5000 characters).

The original building was constructed in 1927. Additions were then built in 1952 (classrooms and administrative space) and 1968 (gymnasium). In 1992, rehabilitation took place on the original building (built in 1927).

TOTAL BUILDING SQUARE FOOTAGE: Please provide the original building square footage PLUS the square footage of any additions.

44963

SITE DESCRIPTION: Please provide a detailed description of the current site and any known existing conditions that would impact a potential project at the site (maximum of 5000 characters).

No known restrictions.

BUILDING ENVELOPE: Please provide a detailed description of the building envelope, types of construction materials used, and any known problems or existing conditions (maximum of 5000 characters).

Brick facade structural failure of exterior walls.

Has there been a Major Repair or Replacement of the EXTERIOR WALLS? NO
Year of Last Major Repair or Replacement: 1992
Description of Last Major Repair or Replacement:
Masonry repairs.

Has there been a Major Repair or Replacement of the ROOF? NO
Year of Last Major Repair or Replacement: 1992
Type Of ROOF: EPDM.
Description of Last Major Repair or Replacement:
Partial re-roof.

Has there been a Major Repair or Replacement of the WINDOWS? NO
Year of Last Major Repair or Replacement: 0
Type Of WINDOWS:
Description of Last Major Repair or Replacement:
N/A

MECHANICAL and ELECTRICAL SYSTEMS: Please provide a detailed description of the current mechanical and electrical systems and any known problems or existing conditions (maximum of 5000 characters).

Boiler plant replaced three years ago. Remaining HVAC and electrical systems date back to original building construction (1927).

Has there been a Major Repair or Replacement of the BOILERS? NO
Year of Last Major Repair or Replacement: 2007
Description of Last Major Repair or Replacement:
Full replacement.

Has there been a Major Repair or Replacement of the HVAC SYSTEM? NO
Year of Last Major Repair or Replacement: 0
Description of Last Major Repair or Replacement:
N/A
Has there been a Major Repair or Replacement of the ELECTRICAL SERVICES AND DISTRIBUTION SYSTEM? NO
Year of Last Major Repair or Replacement: 0
Description of Last Major Repair or Replacement: N/A

BUILDING INTERIOR: Please provide a detailed description of the current building interior including a description of the flooring systems, finishes, ceilings, lighting, etc. (maximum of 5000 characters).

Please refer to MSBA report.

PROGRAMS and OPERATIONS: Please provide a detailed description of the current programs offered and indicate whether there are program components that cannot be offered due to facility constraints, operational constraints, etc. (maximum of 5000 characters).

Please refer to MSBA report.

CORE EDUCATIONAL SPACES: Please provide a detailed description of the Core Educational Spaces within the facility, a description of the number and sizes (in square feet) of classrooms, a description of science rooms/labs including ages and most recent updates, and a description of the media center/library (maximum of 5000 characters).

Please refer to MSBA report.

CAPACITY and UTILIZATION: Please provide a detailed description of the current capacity and utilization of the school facility. If the school is overcrowded, please describe steps taken by the administration to address capacity issues. Please also describe in detail any spaces that have been converted from their intended use to be used as classroom space (maximum of 5000 characters).

Please refer to MSBA report.

MAINTENANCE and CAPITAL REPAIR: Please provide a detailed description of the district’s current maintenance practices, its capital repair program, and the maintenance program in place at the facility that is the subject of this SOI. Please include specific examples of capital repair projects undertaken in the past, including any override or debt exclusion votes that were necessary (maximum of 5000 characters).

Please refer to MSBA report.
Priority 1

Please provide a detailed description of the perceived health and safety problem(s) below. Attach copies of orders or citations from state and/or local building and/or health officials.

The Nelson Place Elementary School was built in 1927 and is experiencing structural failure of the brick facade and associated wall-backing materials.
Priority 1

Please describe the measures the district has taken to mitigate the problem(s) described above.

Temporary shoring has been installed to control structural failure, and protective staging and covering has been installed to shield staff and children from falling debris. Barring a full replacement of this building, permanent repair and reconstruction measures are needed to mitigate this situation.
Priority 1

*Please provide a detailed explanation of the impact of the problem described in this priority on your district's educational program. Please include specific examples of how the problem prevents the district from delivering the educational program it is required to deliver and how students and/or teachers are directly affected by the problem identified.*

Current condition of stabilizing building is presently maintaining a safe condition. Should further deterioration occur, building accessibility could be jeopardized.

Please also provide the following:

**Name of Firm that performed the Study/Report:**
City of Worcester

**Date of Study/Report:** 10/21/2003

**Synopsis of Study/Report:**
Installation of temporary shoring.

Is the perceived Health and Safety problem related to asbestos?: NO

If "YES", please describe the location in the facility, if it is currently friable, and the mitigation efforts that the district has undertaken to date.:

Is the perceived Health and Safety problem related to an electrical condition?: NO

If "YES", please describe the electrical condition, any imminent threat, and the mitigation efforts that the district has undertaken to date.:

Is the perceived Health and Safety problem related to a structural condition?: YES

If "YES", please describe the structural condition, any imminent threat, and the mitigation efforts that the district has undertaken to date.:

Failure is occurring in structural load carrying walls causing sagging condition to exterior building envelope. Temporary shoring has been installed to stabilize condition.

Is the perceived Health and Safety problem related to the building envelope?: YES

If "YES", please describe the building envelope condition, any imminent threat, and the mitigation efforts that the district has undertaken to date.:

Failure is occurring in structural load carrying walls causing sagging condition to exterior building envelope. Temporary shoring has been installed to stabilize condition.

Is the perceived Health and Safety problem related to the roof?: NO

If "YES", please describe the roof condition, any imminent threat, and the mitigation efforts that the district has undertaken to date.:

Is the perceived Health and Safety problem related to accessibility?: NO

If "YES", please describe the areas that lack accessibility and the mitigation efforts that the district has undertaken to date. In addition, please submit to the MSBA copies of any federally-required ADA Self-Evaluation Plan and Transition Plan.:
Priority 5

Please provide a detailed description of the issues surrounding the school facility systems (e.g., roof, windows, boilers, HVAC system, and/or electrical service and distribution system) that you are indicating require repair or replacement. Please describe all deficiencies to all systems in sufficient detail to explain the problem.

Barring a full replacement of the Nelson Place Elementary School, the energy conservation measures that are needed to optimize energy consumption and control of the building environment includes the complete replacement of the original HVAC distribution system (built in 1927) with a state-of-the-art HVAC distribution system including heat recovery, as well as the addition of a state-of-the-art building automation system and energy-efficient window system. The estimated energy savings are on the order of 20-25%.
Priority 5

*Please describe the measures the district has already taken to mitigate the problem/issues described in Question 1 above.*

In an effort to reduce energy consumption at Nelson Place Elementary School, the Worcester Public Schools district has upgraded the building's lighting system utilizing utility rebates to provide better lighting with greater efficiency.
Priority 5

Please provide a detailed explanation of the impact of the problem/issues described in Question 1 above on your district's educational program. Please include specific examples of how the problem prevents the district from delivering the educational program it is required to deliver and how students and/or teachers are directly affected by the problem identified.

Not applicable.

Please also provide the following:

Have the systems identified above been examined by an engineer or other trained building professional?: YES
 If "YES", please provide, the name of the individual and his/her professional affiliation: Harvey & Tracy Associates (Structural Engineers)
 The date of the inspection: 8/11/2010
 A summary of the findings:
Priority 7

Please provide a detailed description of the programs not currently available due to facility constraints, the state or local requirement for such programs, and the facility limitations precluding the programs from being offered.

The Nelson Place Elementary School is experiencing structural failure, in addition to the internal facility constraints that inhibit the school from implementing programs at a satisfactory level in the Technology, Music and Art rooms, as well as the Health/Nursing Suite.

Barring a full replacement of this school building, permanent repair and reconstruction measures would incorporate the programmatic needs of this site. Please note that photographs of this school are attached for your review.
Priority 7

Please describe the measures the district has taken or is planning to take in the immediate future to mitigate the problem(s) described above.

The district continues to monitor the condition of the facility utilizing the services of a structural engineering firm. Minor repairs have been completed to minimize the infiltration of water into the masonry wall cavities. These ongoing measures are being conducted to ensure the facility provides a safe environment for students and staff.
Priority 7

*Please provide a detailed explanation of the impact of the problem described in this priority on your district's educational program. Please include specific examples of how the problem prevents the district from delivering the educational program it is required to deliver and how students and/or teachers are directly affected by the problem identified.*

The Nelson Place Elementary School is experiencing structural failure, in addition to the internal facility constraints that inhibit the school from implementing programs at a satisfactory level in the Technology, Music and Art rooms, as well as the Health/Nursing Suite.
Vote

Vote of Municipal Governing Body  YES: 9  NO: 0  Date: 1/4/2011

Vote of School Committee  YES: 7  NO: 0  Date: 12/16/2010

Vote of Regional School Committee  YES:  NO:  Date:
Required Form of Vote

The following Form of Vote should be used by both the City Council/Board of Aldermen, Board of Selectmen/equivalent governing body AND the School Committee in voting to approve this Statement of Interest.

If a regional school district, the regional school committee should use the following Form of Vote.

Resolved: Having convened in an open meeting on ___________________, the [City Council/Board of Aldermen, Board of Selectmen/Equivalent Governing Body, School Committee] of __________________________ [City/Town/School District], in accordance with its charter, by-laws, and ordinances, has voted to authorize the Superintendent to submit to the Massachusetts School Building Authority the Statement of Interest dated _____________ for the __________________________ [Name of School] located at __________________________________________ [Address] which describes and explains the following deficiencies and the priority category(s) for which __________________________ [Name of City/Town/District] may be invited to apply to the Massachusetts School Building Authority in the future

____________________________________________________________________________________
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[Insert a description of the priority(s) checked off on the Statement of Interest and a brief description of the deficiency described therein for each priority]: and hereby further specifically acknowledges that by submitting this Statement of Interest, the Massachusetts School Building Authority in no way guarantees the acceptance or the approval of an application, the awarding of a grant or any other funding commitment from the Massachusetts School Building Authority, or commits the __________________________ [Name of City/Town/District] to filing an application for funding with the Massachusetts School Building Authority.
CERTIFICATIONS
The undersigned hereby certifies that, to the best of his/her knowledge, information and belief, the statements and information contained in this statement of Interest and attached hereto are true and accurate and that this Statement of Interest has been prepared under the direction of the district school committee and the undersigned is duly authorized to submit this Statement of Interest to the Massachusetts School Building Authority. The undersigned also hereby acknowledges and agrees to provide the Massachusetts School Building Authority, upon request by the Authority, any additional information relating to this Statement of Interest that may be required by the Authority.

LOCAL CHIEF EXECUTIVE OFFICER/DISTRICT SUPERINTENDENT/SCHOOL COMMITTEE CHAIR
(E.g., Mayor, Town Manager, Board of Selectmen)

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C. Executed Design Enrollment Certification
January 25, 2013

The Honorable Joseph M. Petty, Mayor
City of Worcester
City Hall, Room 206
455 Main Street
Worcester, MA 01608

Re: Worcester Public Schools, Nelson Place School

Dear Mayor Petty:

I would like to thank your team for speaking with the Massachusetts School Building Authority ("MSBA") staff on January 3, 2013 regarding enrollment projections and methodologies. As discussed, the next critical step is for the MSBA and the District to agree on the design enrollment for the proposed project at the Nelson Place School.

The Nelson Place School serves grades K-6 and accordingly, this enrollment analysis will be focused on the enrollment projections for those grades. Included below is a table that charts Worcester’s district-wide enrollment over the last 10 years. The table indicates that over the last five years Worcester’s K-6 and 6-8 enrollments have steadily increased. During this same period, the high school grades have experienced a declining enrollment trend as the smaller class sizes from the previous decade progress through the system. While District-wide total enrollment decreased from 2002 to 2007, total enrollment has been increasing each year subsequently. The 2011-2012 school year showed an increase of approximately 640 students over the 2007-2008 school year.

<table>
<thead>
<tr>
<th>Year</th>
<th>K-6</th>
<th>6-8</th>
<th>8-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>12,211</td>
<td>5,993</td>
<td>6,589</td>
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<tr>
<td>2003</td>
<td>11,758</td>
<td>5,832</td>
<td>6,760</td>
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<tr>
<td>2005</td>
<td>10,906</td>
<td>5,284</td>
<td>7,240</td>
</tr>
<tr>
<td>2006</td>
<td>10,736</td>
<td>5,011</td>
<td>7,117</td>
</tr>
<tr>
<td>2007</td>
<td>10,590</td>
<td>4,689</td>
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<td>2008</td>
<td>10,745</td>
<td>4,712</td>
<td>6,882</td>
</tr>
<tr>
<td>2009</td>
<td>11,029</td>
<td>4,798</td>
<td>6,736</td>
</tr>
<tr>
<td>2010</td>
<td>11,228</td>
<td>4,760</td>
<td>6,860</td>
</tr>
<tr>
<td>2011</td>
<td>11,236</td>
<td>4,800</td>
<td>6,651</td>
</tr>
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</table>
The enrollment for the 2011-2012 school year at the Nelson Place School was reported at 467 students, not including pre-kindergarten, as of October 1, 2011. The MSBA understands that the District is proposing a design enrollment to accommodate approximately 600 students, in grades K-6, at the Nelson Place School.

With respect to future enrollments, the MSBA’s base enrollment forecast indicates Worcester’s K-6 enrollment will experience an increasing trend over the next six years with an average K-6 enrollment of approximately 13,189 students. This average over the next six years is approximately 138 students greater than the K-6 enrollment for the 2011-2012 school year.

As a result of discussions with the District the following factors have been considered in order to further inform the MSBA’s recommended design enrollment for this facility:

- **Expansion of Existing Special Education Program**
  - Currently, approximately 30 Special Education students from the Nelson Place neighborhood district attend school at other facilities within the quadrant. The District has stated that a priority of the proposed project is to expand the existing Special Education program at the Nelson Place School in order to accommodate the return of these students to their neighborhood school.

- **Voluntary Transfer Within Doherty Quadrant**
  - Based on discussions with the District, and the Policies Handbook for the Worcester Public Schools, the MSBA understands that students in Worcester attend school within their neighborhood district lines. However, students are also eligible to attend one of the City’s six magnet schools or transfer to any school within their quadrant of residence as permitted by the “Voluntary Controlled Transfer Policy.” This policy allows for choice to take place within quadrants subject to District-wide policies on diversity and the capacity of the receiving schools. The Nelson Place School is located within the Doherty Quadrant of the District’s school system. The Doherty Quadrant contains ten elementary schools that house approximately 30% of the total K-6 enrollment in the District.

The current 2012-2013 Nelson Place School enrollment, exclusive of pre-school students, was reported to the MSBA as 474 students. A design enrollment of 600 students for the school would accommodate an expansion of the special education program, as well as provide the additional capacity the District seeks as a result of the voluntary transfer policy within the Doherty Quadrant.

Based on the MSBA enrollment forecast, capacity analysis and discussions with the District described above, the MSBA recommends a design enrollment of 600 students for the Nelson Place School project. The MSBA believes this design enrollment positions the District to efficiently meet space capacity needs throughout future enrollment variations. Attached is the certification to confirm agreement on design enrollment.
The MSBA believes that the proposed design enrollment will position the District to efficiently meet space capacity needs throughout future enrollment variations. Please sign and return the attached certification within 21 calendar days to confirm agreement on this design enrollment. If the District feels that the proposed design enrollment does not meet the needs of the District, please respond to this letter via e-mail to Diane Sullivan, and propose three meeting/conference call times for which the District can be available to discuss enrollment.

If you have any questions, please do not hesitate to contact myself or Diane Sullivan (Diane.Sullivan@MassSchoolBuildings.org) at 617-720-4466.

Sincerely,

Mary Richetti
Director of Capital Planning

cc:    District Legislators
       Michael V. O'Brien, City Manager, City of Worcester
       Dr. Melinda Boone, Superintendent, Worcester Public Schools
       Brian A. O'Connell, Esq, Chair, Worcester School Committee
       File: Letters 10.2 (Region 2)
MASSACHUSETTS SCHOOL BUILDING AUTHORITY

NELSON PLACE SCHOOL
DESIGN ENROLLMENT CERTIFICATION

As a result of a collaborative analysis with the Massachusetts School Building Authority ("MSBA") of enrollment projections and space capacity needs for the Proposed Project at the Nelson Place School, the City of Worcester hereby acknowledges and agrees that the design of the Proposed Project at the Nelson Place School shall be based on an enrollment of no more than 600 students. The City of Worcester further acknowledges and agrees that, pursuant to 963 CMR 2.00 et seq., the MSBA shall determine the square feet per student space allowance and total square footage for a K-6 school serving 600 students. The City of Worcester acknowledges and agrees that it has no right or entitlement to any particular design enrollment, square feet per student space allowance, or total square footage and that it has no right or entitlement to a design enrollment any greater than 600 students for the Nelson Place School, and further acknowledges and agrees that it shall not bring any claim or action, legal or equitable, against the MSBA, or any of its officers or employees, for the purpose of obtaining an increase in the design enrollment of the Nelson Place School that it has acknowledged and agreed to herein. The City of Worcester further acknowledges and agrees that, among other things, the design enrollment, square feet per student space allowance, and total square footage of the Nelson Place School shall be subject to the approval of the MSBA's Board and that the final approval of a Proposed Project at the Nelson Place School shall be within the sole discretion of the MSBA's Board.

The undersigned, for themselves and City of Worcester, hereby certify that that they have read and understand the contents of this Design Enrollment Certification and that each of the above statements is true, complete and accurate. The undersigned also hereby certify that they have been duly authorized by the appropriate governmental body to execute this Certification on behalf of the City of Worcester and to bind the City of Worcester to its terms.

Chief Executive Officer

Duly Authorized Representative of School Committee

Date

Date

Superintendent of Schools

Date