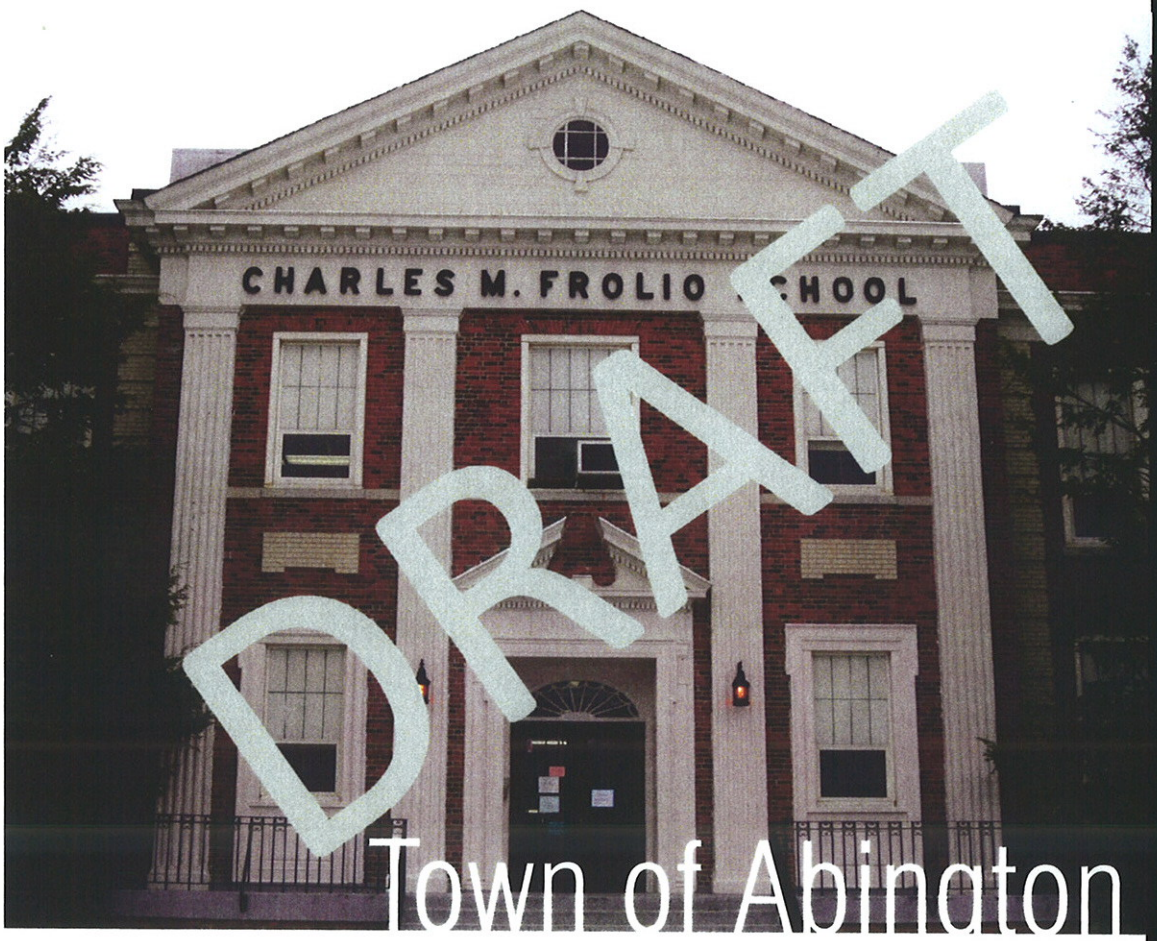
Feasibility Study
Abington Public Schools



DRAFT

Town of Abington

August 26, 2013

1	Major Milestones Timeline
2	Facilities Evaluation
3	Site Evaluations Summary
4	Educational Visioning Summary Document
5	Educational Programming Document
6	Introduction Document
7	Space Summary Documents
8	Options Considered Document
9	Evaluation Matrix
10	Draft of Cost Analysis Options
11	Cost of New School vs. Renovation Document
12	Review of Major Milestones

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Abington School District
Feasibility Study & Schematic Design
Major Submissions to MSBA
Town Actions and Approvals
Ai3 Architects, LLC
August 14, 2013

	Item	Task	Date
STEP 1		**Preliminary Design Program**	
		Educational Program	
		Initial Space Summary	
		Evaluation of Existing Conditions	
		Site Development Requirements	
		Preliminary Evaluation of Alternatives	
		Local Actions and Approvals (Joint School Committee / Board of Selectmen)	9/9/13
		Local Actions and Approvals (Building Committee Meeting)	9/19/13
		Date of Submission to MSBA	9/20/13
STEP 2		**Preferred Schematic Study and Report**	
		Final Evaluation of Existing Conditions	
		Final Evaluation of Alternatives	
		Preferred Solution	
		Local Actions and Approvals (School Committee / Building Committee / Board of Selectmen)	Week of 11/25/13
		Date of Submission to MSBA	12/2/13
STEP 3		**Schematic Design Submittal Requirements**	
		Final Design Program	
		Traffic Analysis	
		Environmental & Existing Building Assessment	
		Geotechnical & Geo-environmental Analysis	
		Utility Analysis & Soils Analysis for On-Site Septic/Sewage Treatment Facilities	
		Massing Study	
		Narrative Building Systems Description	
		LEED-S Documents	
		Compliance with ADA and MAAB	
		Anticipated Reimbursement Rate & Incentive Points	
		Total Project Budget	
		Designers Construction Cost Estimate	
		Project Schedule	
		Schematic Design Drawings	
		Local Actions and Approvals (School Committee / Building Committee / Board of Selectmen)	Week of 7/28/14
		Date of Submission to MSBA	8/11/14

MSBA Project Scope and Budget Meeting with Town	September 2014
MSBA Board of Directors Vote	October 2014
Abington Town Meeting and Debt Exclusion	within 120 days of MSBA B.O.D. vote

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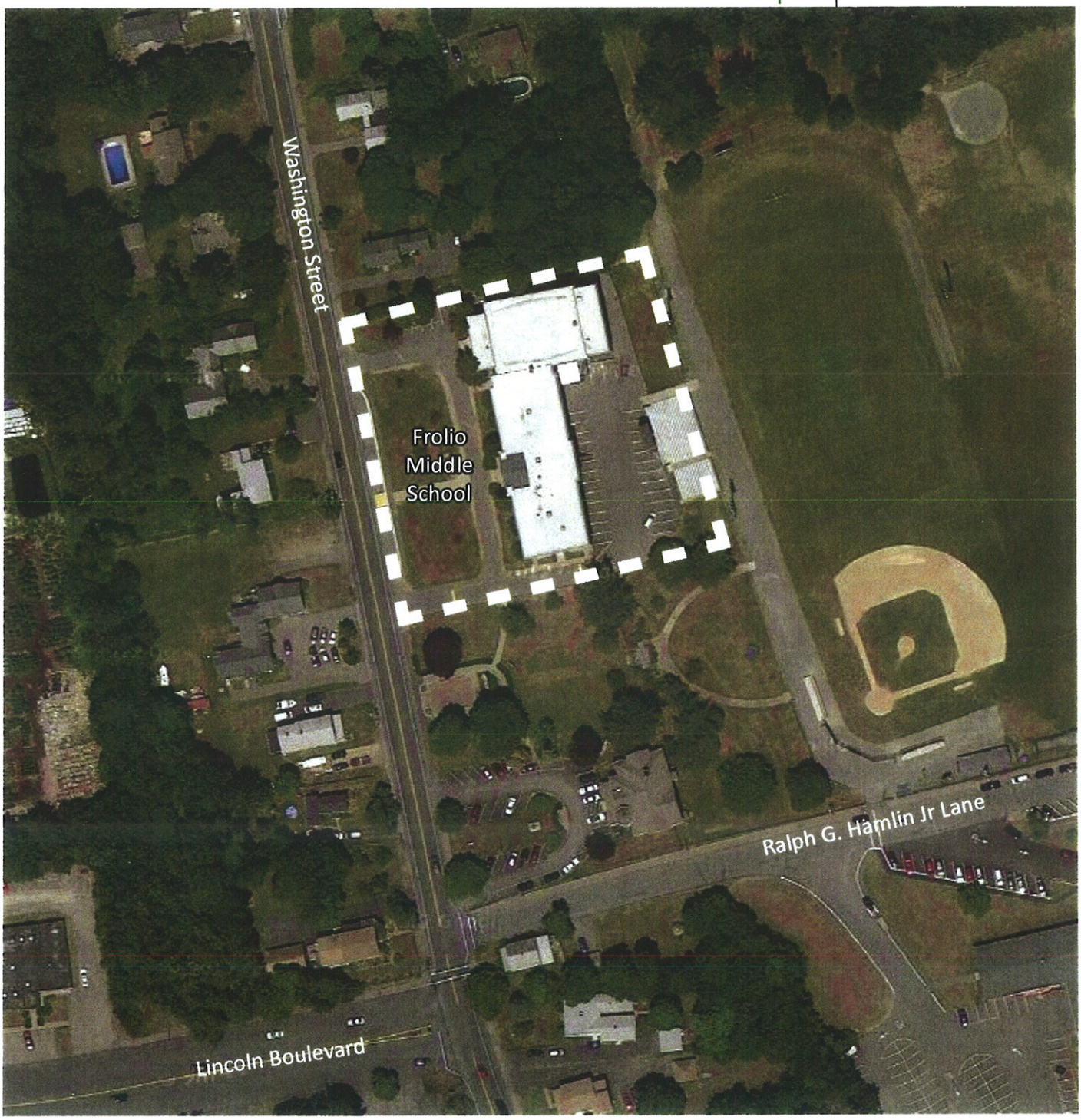
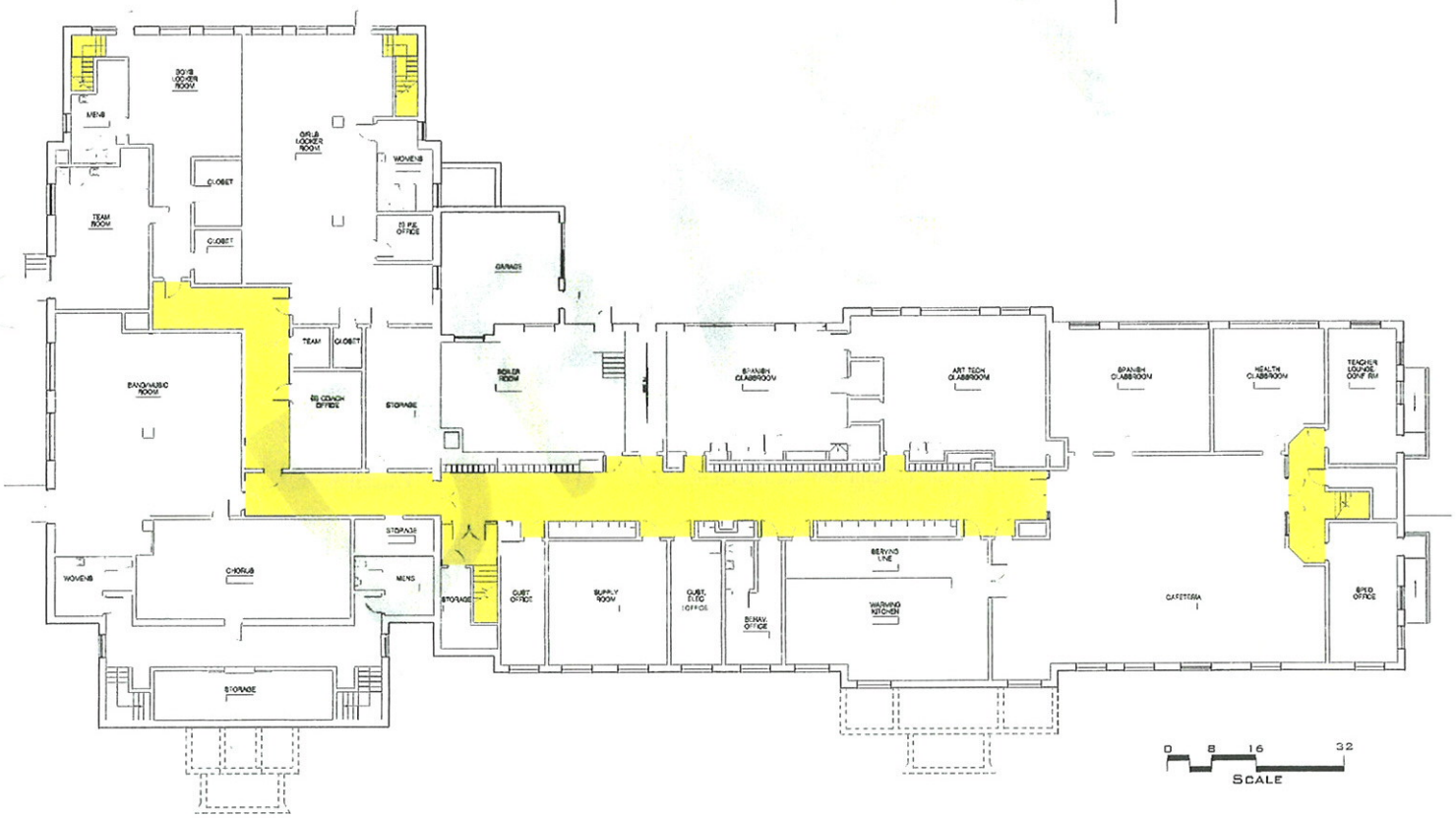
Frolio Middle School Building Evaluation

site plan

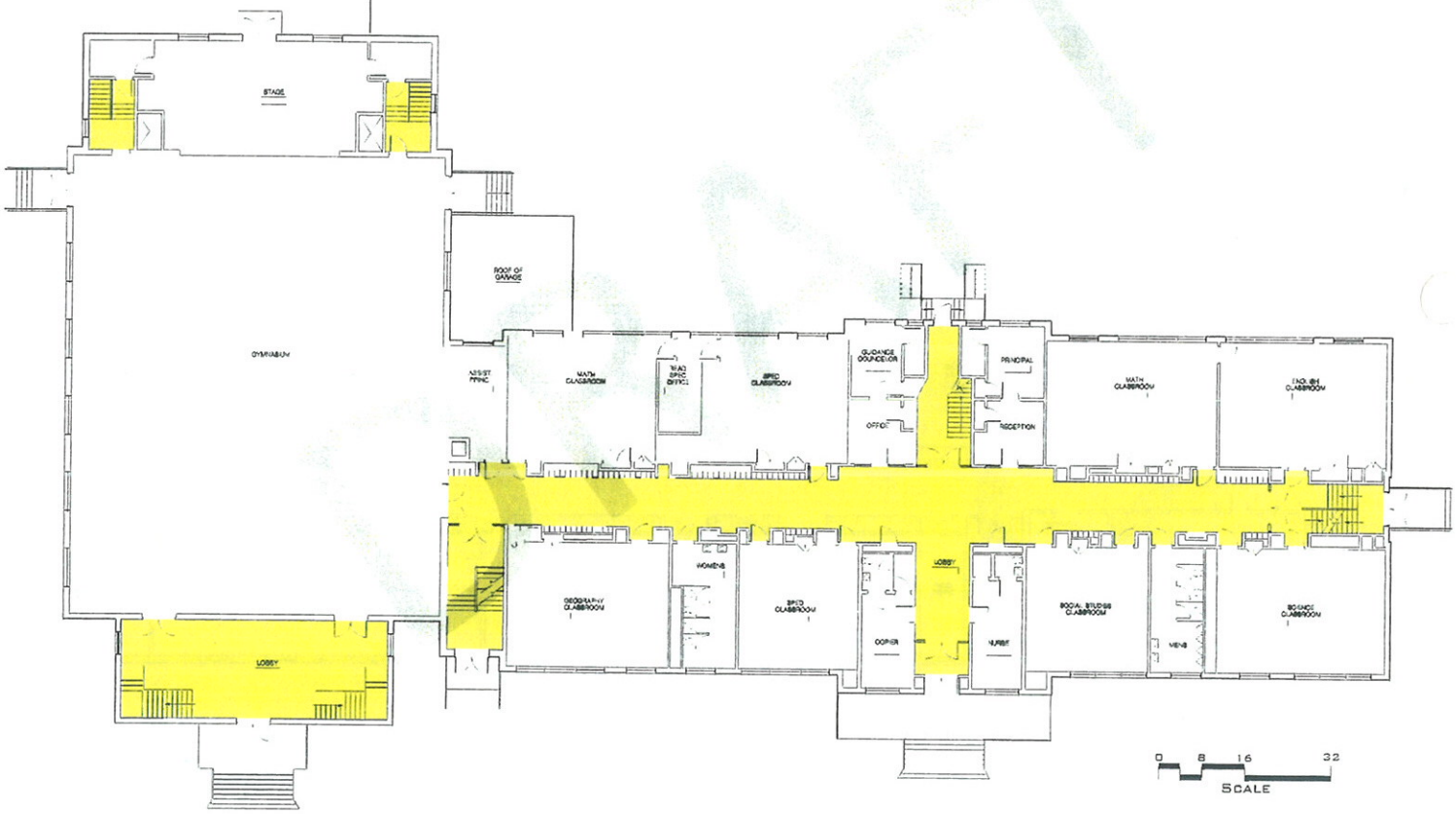


existing floor plans

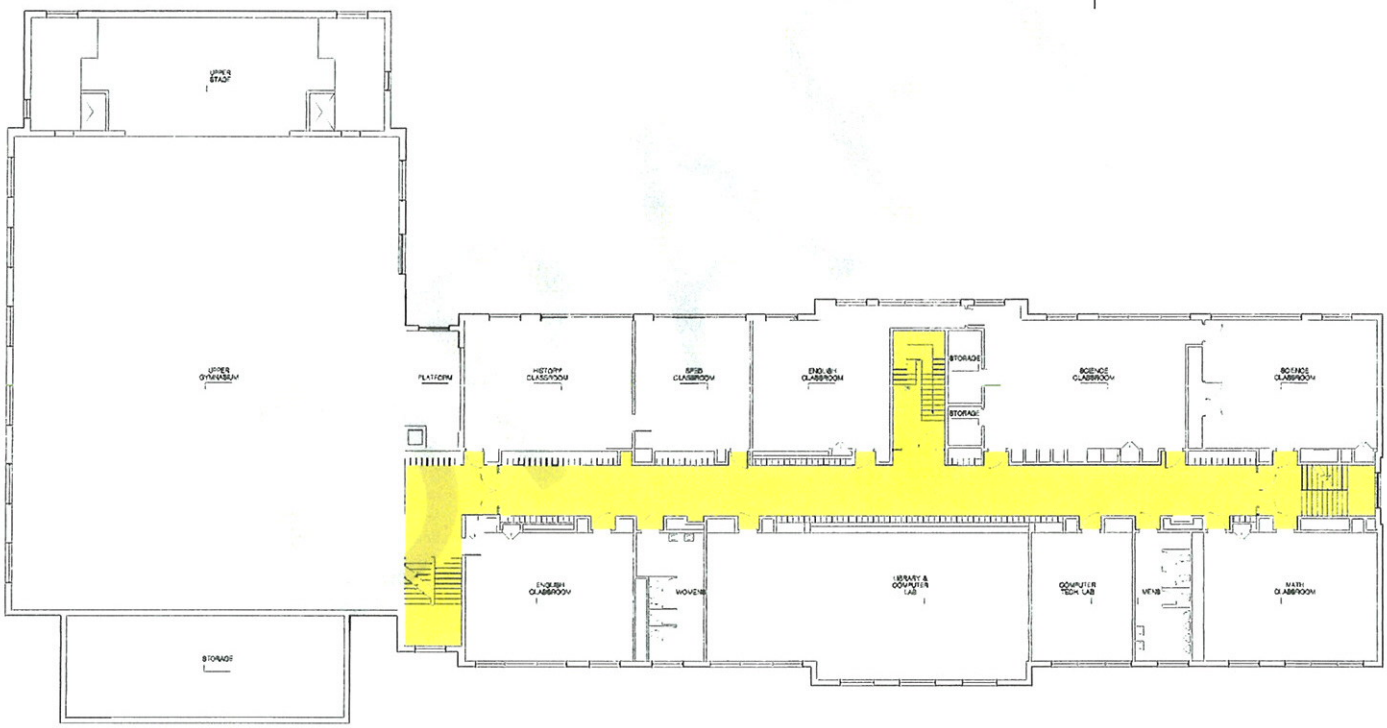
For purposes of this report, the building's existing condition floor plans were generated. While we strive to ensure that the existing conditions drawings are complete and whole, for the purposes of the feasibility study a full on site existing conditions survey was not conducted to confirm exact locations and dimensions of every wall, door or other element. What these plans do provide us with is a starting point to begin to evaluate the overall goals of the study within a given set of parameters which aid us and the Town with evaluating current space allocation and proposed future plans.



existing lower floor plan



existing first floor plan



existing second floor plan

Existing Conditions Assessment

overview

The existing Frolio Middle School is located on a very compressed 2.0 acre site surrounded by property which is restricted from future development. This includes privately owned property and recreational fields that have dedicated use and are not available for development. The school site is located at 1071 Washington Street, Abington, Massachusetts and contains the existing 51,729 square feet school building, insufficient parking areas, no area for safe drop-off or pick-up (currently occurs on street), and minimal landscape areas. The Frolio Middle School was originally constructed in 1936, with most of the 75+ year-old original building, layout, infrastructure, and features remaining identical to the way they were in 1936. It contains two main levels and a lower floor basement level. Classrooms are grossly undersized based on current educational guidelines and requirements, and the building's masonry load bearing structural system combined with modern structural code requirements make modifications (movement of walls) to its configuration cost-prohibitive. The limited occupancy (due to building size) of only two grade levels on multiple floors also restricts its use as a modern middle school facility. It is identified in all former reports and our current analysis as the building with the most deficiencies and restrictions. The school currently has an enrollment of 350 students in grades 7-8.

On the positive side, the Frolio is a clean, well-maintained facility. It is a testament to how a high quality facility can last well beyond the typical 50-year life expectancy of a school facility if it is well maintained. The Town should be proud of the fact that this facility has been able to serve the school department for almost 80 years with routine maintenance and no comprehensive renovations.

The clean, neat appearance of the Frolio combined with its iconic architecture within the Town can be misleading. It is important to understand that it represents an 80-year old approach to education and its infrastructure systems are well beyond their intended life expectancy and are failing. The poor condition of these systems is detailed in the included heating, ventilation, plumbing, electrical, and structural analysis. The school was designed and constructed at a time when there was much less known about 1) educational plan organization, 2) exterior envelope and wall construction, 3) energy conservation, 4) environmental quality factors such as ventilation, lighting, etc., and 5) ideal middle school learning environments. Classrooms are grossly undersized, as they were designed at a time when crowding many small desks into tightly formed orthogonal rows facing a single teacher was the norm. Today, middle school students work in groups and teams, completing projects and utilizing technology that could have never been imagined in 1936. Unfortunately, the classrooms created in 1936 are extremely inadequate in providing the necessary space, amenities, technology, acoustics, lighting, and security found in a modern middle school classroom.

Educational Plan Organization

The Frolio Middle School is a 51,729 square feet, three story facility. The physical size and available classrooms suggests that it has a capacity of approximately 270 students under current educational standards and MSBA (Massachusetts School Building Authority) guidelines, but recent enrollment has been in the range of 350-400 students. The main three story facility includes a Cafeteria, Library/Media Center, Administration and the Academic Spaces. Adjacent to the three story academic wing is an attached Gymnasium with a Stage. Band, Choral and Locker Rooms are located under the Gymnasium.

The current building plan does not reflect a modern approach to effective middle school organization and design. Beyond the inadequate classroom size, the classrooms are not organized in a manner to allow the students to be broken down into functional teams of approximately 125 students. Research indicates that breaking the students down into smaller teams in this manner allows teachers and facilitators to work directly with their team members (students and other teachers), allowing them to more closely monitor and foster student development. It also shows that a team arrangement allows teachers to combine classrooms to facilitate cross discipline instruction, allowing students to better understand the interwoven relationships between subjects like math and science. Students within a team also collaborate on the development of hands-on projects, which allows them to understand the practical application of the subjects they are studying, and allows students who are tactile learners, who have been failed by a visual learning approach in the past, to excel in their academic pursuits. These hands-on projects are often completed in "Project Rooms" or "Team Rooms" where activities can proceed simultaneously to classroom interaction; which requires dedicated space for each team. Over the past 20 years, middle schools across the country have been migrating to this proven, successful model. Even schools that have poorly organized facilities like Frolio do the best they can to organize their students and teachers in teams in order to take advantage of the benefits of this approach. Unfortunately, small schools like Frolio that are divided into multiple floors where classrooms cannot be grouped in teams and no space is available for team projects provide insurmountable challenges to a truly functional team organization. The teachers and administrators should be commended for their efforts, but truly functional middle school team organization cannot be accommodated within the physical limitations of the 80-year-old Frolio facility and its current layout.

Another significant challenge to Frolio as an appropriately organized middle school is its small overall size. It can accommodate only 270 students (under appropriate educational program standards), which prohibits its use for more than two grades (currently grades 7 and 8). This small number of students prohibits the formation of appropriately sized teams and also limits the number of educational opportunities that can be offered. Ideally, a middle school would include at least three grade levels, and many small school districts like Abington have expanded their middle schools to grades 5-8 in order to have enough students to complete successful teaming and offer a comprehensive educational program.

The Frolio Middle School lacks many of the support spaces affiliated with a modern middle school environment, including areas for student exhibit, student presentation, and small group work, study, and testing areas. The faculty and administrators currently use any space that is available for these functions, but the result is greatly compromised. A modern 21st Century middle school would include these required support areas.

The Cafeteria is located in the lower level basement area with little daylight or ventilation. This was a common approach 80 years ago, when the Cafeteria was viewed as a loud space where students were herded in and out as quickly as possible for daily meals. Today, student dining areas serve a much more comprehensive educational and social purpose, and are often made an integral and central part of dining, presentations, performances, parent and volunteer activities, social events, and numerous other school and Town activities. These spaces require an appropriate location, natural day-lighting, acoustics, multi-media presentation systems, and numerous other amenities in order to be effectively utilized for multiple functions throughout the day and evening.

The Library/Media Center is located on the third floor, central located within the academic classrooms on that floor. This was also a popular approach 80 years ago, but today's Library/ Media Center seeks an even more central and convenient location for use by students, educators, parents, and the general public. Eighty years ago, the "Library" included 3,000 volumes of hardcopy books and a card catalogue reference system. Today, it is a technology driven, data based, media retrieval center that promotes inquiry and research by teachers, students, parents, and the general public, with no limitation on subject matter or breadth of information. It is also a media and data distribution center where students create, direct, and broadcast information, presentations, and performances. In addition to being poorly located and lacking all modern amenities, the existing library is less than half of the required program size.

The building's Administration area is centrally located within the academic wing on the main floor level, but its location away from the main entry doors does not provide the required observation and control of visitors entering the building. This was common 80 years ago, when school security was not an issue. Unfortunately, this has changed dramatically over the past 10 years. Currently, the main office is reliant on a camera system for visual observation of the main entrance. This is a commendable effort considering the building's organizational challenges, but unfortunately a potential security and safety hazard remains. Upon entering the building, visitors pass through a portion the building's main circulation corridor to enter the Administrative office and have the potential to intermingle with staff and students prior to being greeted and checked in by the main office.

Middle School Learning Environments

The ideal middle school educational environment includes many key factors. Modern 21st Century middle schools include classrooms that utilize "Laboratories for Learning" where all of the necessary environmental factors, technology integration, and spatial configurations work to create "ideal" environments. These modern classrooms allow teachers to introduce "real world" examples of instructional material through the seamless integration of video internet technology. They also allow students to present and facilitate with their peers, giving them invaluable exposure to learning, presentation, and collaboration skills. Technology can be energized quickly and efficiently through teacher facilitator stations. Lighting, ventilation, and carbon dioxide levels are all monitored and adjusted automatically to create ideal environmental conditions. Teachers have collaborative planning and work areas that allow them to share critical planning and development ideas for their coursework. Team teaching and presentation areas are integrated into the academic environment in a manner similar to that of a corporate planning and work environment. Core facilities such as Library/Media Centers have become highly advanced media retrieval centers and are located in close proximity to all academic functions to allow for key sharing of valuable resources. Academic zones are organized for quiet separation from noisier zones such as cafeterias and gymnasiums. Their layouts and plan organizations are structured to allow flexible teaming and grade level configurations. Corridors and hallways are organized and designed to create "experience and exposure", in addition to providing functional movement patterns. Performing and practical arts facilities include highly advanced opportunities for students to explore their talents at a critical age when many of their future professional talents are evolving.

The Frolio Middle School is an old, "tired" building that has been maintained well. Capital expenditures at this facility have allowed it to exist in good condition for many years beyond its intended life expectancy, but current building organization and layout of Frolio Middle School does not easily lend itself to conversion as a 21st Century middle school. Its walls cannot be efficiently relocated due to its inherent structural systems, and these same structural systems prohibit vertical expansion of the Frolio. Additionally, its limited site area does not allow for expansion of the existing building.

Educational, Spatial & Organizational Capacity

Capacity at the middle school is calculated by multiplying the number of available general classrooms and support areas by the appropriate number of students in each classroom. The Frolio Middle School has a current capacity of approximately 270 students under current educational standards, but recent enrollment has been in the range of 350-400 students. The Frolio Middle School is obviously housing significantly more students than the identified capacity. This has been achieved by converting spaces not originally intended as general classrooms into usable classroom space. It also requires that former storage rooms and closets be utilized as spaces for small group instruction, testing, and counseling. This creates a very stressful environment where it is difficult to deliver a modern educational program.

In addition to being overcrowded, the following conditions exist:

Main Office / Entrance

The main office currently sits across the corridor from the main lobby. Allowing visitors to interact with students prior to being physically greeted and checked in by the main office creates a security and safety issue.

Library Media Center

The library is located on the third floor and is not centrally located. The space is a conversion of two classrooms to become a library. It is significantly undersized and lacks the modern amenities associated with a 21st Century education resource.

Computer Lab

The Computer Lab is located on the third floor. This space is a converted classroom that does not have adequate cooling and is insufficiently sized.

Special Education

The current Special Education Program is extremely undersized and is utilizing inadequate space for instructional, tutorial, and testing areas. The program and associated spaces do not meet current state recommendations and guidelines.

General Classrooms

To address the lack of classroom space, a portion of the cafeteria was broken up and converted into classroom space. These classrooms open directly into the cafeteria and during the lunch periods provide a significant acoustical distraction.

Science Classrooms

The current science classrooms have limited plumbing and do not provide an adequate space for learning and science experiments.

Specialized Instruction (Art/Music)

Specialized instructional areas like art and music are located in spaces that have been converted from general classrooms. The band classroom currently houses the main electrical panels for the school. The school also does not have any vocational or culinary spaces.

Planning Space

Due to the significant shortage of available education space, spaces that would normally be available for planning and storage rooms have become classrooms. The school has no dedicated conference rooms.

Recieving & Storage

The receiving area for the school is serviced by an undersized door by code and does not have any security features as simple as glass to see the exterior. Storage space in the school is extremely limited.

architectural review (exterior / interior)

Exterior Review

Foundation

The exterior poured concrete foundation walls appear to be in good condition with only minor cracking at a few locations. (Refer to structural evaluation for additional information.)

Walls

The exterior envelope (exterior masonry wall construction) of the building is a 77 year old envelope. It appears that mortar joint re-pointing has occurred over time. Additional re-pointing, combined with limited masonry renovation would be required in order to prevent deterioration of the masonry exterior.

Cast stone window sill joints have deteriorated and moisture penetration is evident by staining on the adjacent brick.

The exterior detailing of the building including the cornice, main entry gable and gym entry is constructed of painted wood. Overall they appear to be in good condition, but deterioration and chipping of the paint does require re-painting which could expose potential rot of the existing wood.

Roof

The building's roof consists of both asphalt shingles and PVC roof membrane. The PVC roof membrane was installed in 1994. Overall the roof appears to be in very good condition, although all roof systems are beyond their warranty period and would be approaching their intended life-extectancy.

Windows

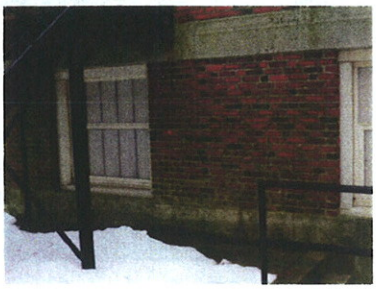
In 1981 the exterior windows of the building were replaced with a single hung Kal-Wall aluminum window system. Overall the system is in fair condition, but the years of exposure are apparent. The translucent panels have yellowed and show deterioration due to UV exposure. The transparent glazing panels are single glazed and would not meet the current energy code requirements. This system has a life expectancy of about 25 years and is rarely used in modern school applications.

The caulking around the window system has been periodically maintained. However, the deterioration of the caulking in many locations results in significant heat loss and air and water infiltration. It was observed in select locations the seal at the glazing has released to the extent that daylight and a draft can be felt.

Doors

A majority of the exterior doors for building appear to have been replaced over the years. The high traffic entrance doors on the front of the building at the gym, accessible and main entry are constructed of metal doors and frames with half glass vision panels in them. Overall the door systems are in fair condition.

The door to the Band Classroom sits in a well. During a significant rain storm this area tends to flood causing water infiltration into the building.



Interior Review

Floors

There are numerous floor materials throughout the building. These finishes include the following: Vinyl Composition Tile (VCT), Hardwood, and Vinyl Asbestos Tile (VAT) in the main lobby, corridors, classrooms, cafeteria and gymnasium/stage. The floors in the toilet rooms are ceramic tile. The floors in the warming kitchen are quarry tile.

The corridor and classroom floors are primarily VAT. Various locations have been patched with VCT. A couple classrooms floor are hardwood. The floors in the corridor are in good condition and well maintained. The floors in the classrooms are in poor condition and are separating from the floor slab at numerous locations. The corridor floor in the lower level is painted concrete. This floor has significant cracking.

The wood flooring in the gymnasium/stage visually appears in fair condition, but closer examination reveals there are numerous "dead spots" in the floor, buckling and signs of wear. The flooring system has exceeded its life expectancy.

The toilet room floors are ceramic and are in fair condition. There is minor damage from wear and tear. New ceramic tile has been installed on the toilet walls of the gang toilet rooms.

The warming kitchen floor is quarry tile. This floor is in good condition and remains serviceable.

Walls

The majority of the walls within the classrooms are painted plaster with wood wainscoting at the base. Given the age of the building, the walls are in good condition. The age of the walls is apparent as modern retrofitted amenities are all exposed including wiring for power, light switches and interactive whiteboards.

The corridors also contain plaster walls, but have a tile and or locker base. They are in good condition, but are very dated.

The walls within the cafeteria are plaster with wood wainscoting at the base on the exterior wall and full tile walls on all other walls, including columns. They currently do not incorporate any acoustical treatment for absorbing sound in the space.

The walls in the gymnasium/stage are tile with wood bleachers/wainscoting at the base. The wood at the base and bleachers shows signs of wear and tear. The walls of the space do not have any acoustical treatment for absorbing or reflecting sound in the space. There is also no acoustical treatment on the stage.

Doors

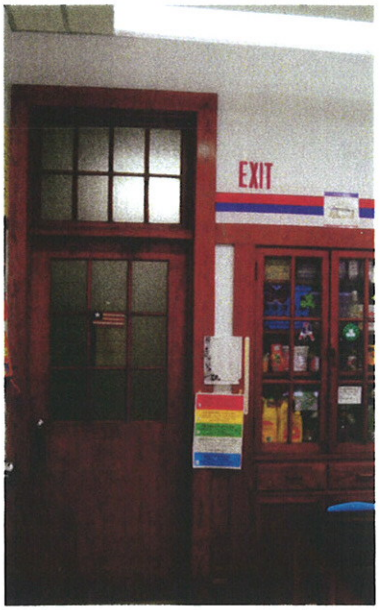
The interior doors and frames, wood, throughout the school are in very poor condition. Many of them are scratched and gouged. The wood frames of the doors are worn, weathered, dented, chipped, etc. The doors to classrooms have half glass window with clerestory lights above them. These do not provide a good acoustical separation between the corridor and classroom under current construction standards. The doors from the corridor to the egress stairs do not provide the necessary fire rating and contain excess glazing within the sidelights and transom. These violate current fire separation requirements.

Most door hardware appears to have been replaced over time. Although the hardware has been replaced, a majority of the door hardware remains non-compliant and is further

discussed in the handicap accessibility portion of this report.

Ceilings

The building contains 2x4 lay-in ceiling tiles throughout. Water damage is apparent due to visual staining of tiles. The ceiling tiles in the gymnasium/stage also contain damage, with missing tiles, from wear and tear of this abusive space.



Recent Capital Improvements

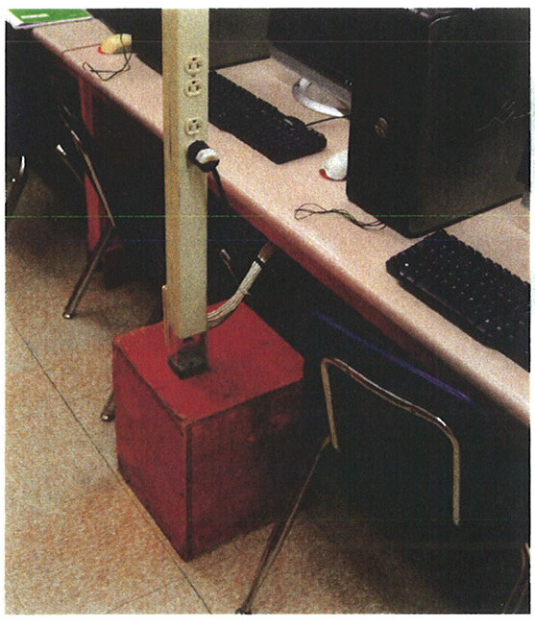
Roof

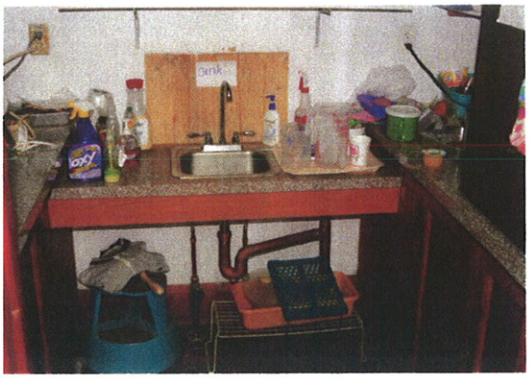
The roof was replaced in the mid-90s and has reached its intended 20 year life expectancy.

Masonry

An ongoing maintenance program for the repair of existing masonry exists.

Additional Photo Documentation of Existing Conditions





structural review

Engineers Design Group Inc.

Purpose

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

Scope

1. Description of existing structure.
2. Comments on the existing condition.
3. Comments on the feasibility of renovation and expansion.

Basis of the Report

This report is based on our visual observations during our site visit on May 31, 2013; the review of available structural drawings of the original construction prepared by S. W. Haynes & Associates Architects dated October 21, 1935.

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

Building Description

The school is located on Washington Street in Abington, Massachusetts and was constructed in 1935. No major renovations or additions have been constructed since the original construction. The school is essentially a three story concrete, steel, wood and masonry structure. The lowest level is partially below grade all around. The school structure is essentially a three story rectangular building with a double story gymnasium and other ancillary spaces located at the north end of the three story structure.

The first floor is concrete slab on grade. The typical second and third floors are wood planking supported on wood joists spanning between the corridor steel beams and exterior masonry walls. The corridor is gypsum plank supported on steel beams spanning between steel girders along the corridor. The steel girders are supported on 'I' shaped steel columns. The typical roof is wood planking spanning between wood joists and the joists are supported on interior steel beams and exterior masonry walls. The gymnasium roof is framed with steel beams supported on structural steel trusses spanning between steel columns. The interior and exterior bearing walls are supported on continuous concrete foundations and the columns are supported on isolated concrete spread footings.

Existing Conditions

Based on our observations, the school structure is functioning well. There are no major structural concerns that we observed. We did not see any signs of foundation settlement, nor did we observe any excessive vibration on the supported floors due to footfall. We did observe some minor damage in the masonry façade in the form of cracks and spalls. We also observed signs of surface water intruding in the building at the lowest level.

Feasibility of Renovation and Expansion of the Structure

Depending on the scope of the renovations to the school, it may be feasible to make modifications to the existing structure without requiring full compliance with the code requirements for new construction. If the proposed renovations require the expansion of classroom spaces, the relocation of demising walls would be extremely complicated, as these walls also serve as shear walls to resist lateral loads. A vertical addition on top of the existing structure is not feasible due to the limitations of the size of the existing foundations and the limited capacity of the existing structural members. We would recommend that any additions, if planned, be separated from the existing structure by way of expansion joints.

Primary Structural Code Issues Related To The Existing Structure

If any repairs, renovations, additions or change of occupancy or use are made to the existing structures, a check for compliance with 780 CMR, Chapter 34 "Existing Structures" (Massachusetts Amendments to The International Existing Building Code 2009) of the Massachusetts Amendments to the International Building Code 2009 (IBC 2009) and reference code "International Existing Building Code 2009" (IEBC 2009) is required. The intent of the IEBC and the related Massachusetts Amendments to IEBC is to provide alternative approaches to alterations, repairs, additions and/or a change of occupancy or use without requiring full compliance with the code requirements for new construction.

The IEBC provides three compliance methods for the repair, alteration, change of use or additions to an existing structure. Compliance is required with only one of the three compliance alternatives. Once the compliance alternative is selected, the project will have to comply with all requirements of that particular method. The requirements from the three compliance alternatives cannot be applied in combination with each other.

The three compliance methods are as follows:

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

Comment

The approach is to evaluate the compliance requirements for each of the three methods and select the method that would yield the most cost effective solution for the structural scope of the project. The selection of the compliance method may have to be re-evaluated after the impact of the selected method is understood and after analyzing the compliance requirements of the other disciplines, Architectural, Mechanical, Fire Protection, Electrical and Plumbing.

Since the existing buildings are un-reinforced masonry wall structures, the analysis and reinforcement of the existing structures would be governed by the requirements of Appendix A1 "Seismic Strengthening Provisions for Un-reinforced Masonry Bearing Wall Buildings" in the IEBC.

Prescriptive Compliance Method

In this method, compliance with Chapter 3 of the IEBC is required. As part of the scope of this report, the extent of the compliance requirements identified are limited to the structural requirements of this chapter.

Additions

Based on the project scope, the following structural issues have to be addressed:

- All additions should comply with the code requirements for new construction in the IBC.
- For additions that are not structurally independent of an existing structure, the existing structure and its addition, acting as a single structure, shall meet the requirements of the code for new construction for resisting lateral loads, except for the existing lateral load carrying structural elements whose demand-capacity ratio is not increased by more than 10 percent, these elements can remain unaltered.
- Any existing gravity, load-carrying structural element for which an addition or its related alterations causes an increase in the design gravity load of more than 5 percent shall be strengthened, supplemented or replaced.

Alterations

- Any existing gravity, load-carrying structural element for which an addition or its related alterations causes an increase in the design gravity load of more than 5 percent shall be strengthened, supplemented or replaced.
- For alterations that would increase the design lateral loads or cause a structural irregularity or decrease the capacity of any lateral load carrying structural element, the structure of the altered building shall meet the requirements of the code for new construction, except for the existing lateral load carrying structural elements whose demand-capacity ratio is not increased by more than 10 percent, these elements can remain unaltered.

Work Area Compliance Method

In this method, compliance with Chapter 4 through 12 of the IEBC is required. As part of the scope of this report, the extent of the compliance requirements identified are limited to the structural requirements of these chapters.

In this method, the extent of alterations has to be classified into LEVELS OF WORK based on the scope and extent of the alterations to the existing structure. The LEVEL OF WORK can be classified into LEVEL 1, LEVEL 2 or LEVEL 3 Alterations. In addition, there are requirements that have to be satisfied for additions to the existing structure.

The extent of the renovations (includes Architectural, FP and MEP renovations) for this project will exceed 50 percent of the aggregate area of each of the buildings, thus the LEVEL OF WORK for this project would be classified as LEVEL 3 Alterations. This would require compliance with provision of Chapters 6, 7 and 8 of the IEBC. If the scope of the project includes new additions to the existing structure; this would trigger compliance with provisions in Chapter 10 of the IEBC.

Level 3 Alterations

- Any existing gravity, load-carrying structural element for which an alteration causes an increase in the design gravity load of more than 5 percent shall be strengthened, supplemented or replaced.

- For alterations where more than 30 percent of the total floor area and roof areas of a building or structure have been or proposed to be involved in structural alterations within a 12 month period, the evaluation and analysis shall demonstrate that the altered building complies with the full design wind loads as per the code requirements for new construction and with reduced IBC level seismic forces.

- For alterations where not more than 30 percent of the total floor and roof areas of a building are involved in structural alterations within a 12 month period, the evaluation and analysis shall demonstrate that the altered building or structure complies with the loads at the time of the original construction or the most recent substantial alteration (more than 30 percent of total floor and roof area). If these alterations increase the seismic demand-capacity ratio on any structural element by more than 10 percent, that particular structural element shall comply with reduced IBC level seismic forces.

- For alterations that involve structural alterations to more than 30 percent of the total floor and roof area of a building within a 12 month period, the evaluation and analysis shall demonstrate that the altered building structure complies with IBC for wind loading and with reduced IBC level seismic forces.

- For alterations where more than 25 percent of the roof is replaced for buildings assigned to seismic design categories B, C, D, E or F, all un-reinforced masonry walls shall be anchored to the roof structure and un-reinforced masonry parapets shall be braced to the roof structure.

Additions

- All additions shall comply with the requirements for the code for new construction in the IBC.

- Any existing gravity, load-carrying structural element for which an addition or its related alterations cause an increase in design gravity load of more than 5 percent shall be strengthened, supplemented or replaced.

- For additions that are not structurally independent of any existing structures, the existing structure and its additions, acting as a single structure, shall meet the requirements of the code for new construction in the IBC for resisting wind loads and IBC Level Seismic Forces (may be lower than loads from the Code for New Construction in the IBC), except for small additions that would not increase the lateral force story shear in any story by more than 10 percent cumulative. In this case, the existing lateral load resisting system can remain unaltered.

Performance Compliance Method

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

Particular Requirements of Compliance Methods

For our project, in order to meet compliance with one of the two compliance methods "Prescriptive Compliance Method" or the "Work Area Compliance Method", we have to address the following:

Prescriptive Compliance Method

Additions

The proposed additions would be designed structurally independent of the existing structures, thus, would not impart any additional lateral loads on the existing structure.

If the proposed alterations are such that the alterations increase the design lateral loads on the existing building or cause any structural irregularity of decrease the lateral load carrying capacity of the building, the structure of the altered building shall meet the requirements of the Code for New Construction in the IBC.

If the proposed additions increase the design gravity load on portions of the existing roof members, these members would have to be reinforced and this incidental structural alteration of the existing structures would have to be accounted for in the scope of the alterations to the existing schools and would trigger requirements for alterations.

Alterations

Alterations that would increase the design gravity loads by more than 5 percent on any structural members would have to be reinforced.

If the proposed alterations of the structures increase the effective seismic weight on the existing structures due to the greater snow loads from the drifted snow against any proposed additions, or, by addition of equipment on the roof, the increase of the effective seismic weight from the drifted snow and the equipment would require that the existing lateral load resisting system comply with the requirements of the code for new construction in the IBC and it would increase the demand-capacity ratio on certain structural elements of the existing lateral load resisting system.

Work Area Compliance Method

Level 3 Alterations

If the proposed structural alterations of an existing structure are less than 30 percent of the total floor and roof areas of the existing structure, we have to demonstrate that the altered structure complies with the loads applicable at the time of the original construction and that the seismic demand-capacity ratio is not increased by more than 10 percent on any existing structural element. Those structural elements whose seismic demand-capacity ratio is increased by more than 10 percent shall comply with reduced IBC level seismic forces. The percentage increase in seismic demand-capacity ratio on any particular structural element from the added snowdrift load against the proposed addition would be fairly low, thus, this would not have any major impact on the existing lateral load resisting system, though we would have to verify that the increase in seismic demand-capacity ratio on any of those particular structural elements is not greater than 10 percent.

If the proposed structural alterations of an existing structure exceed 30 percent of the total floor and roof areas of an existing structure, we have to demonstrate that the altered structure complies with the IBC for wind loading and with reduced IBC level seismic forces.

The seismic design category (SDC) of the existing structures is 'B'; thus, the replacement of the existing roofs would trigger anchorage of un-reinforced masonry walls to the roof structures and bracing of un-reinforced masonry parapets to the roof structures. All un-reinforced masonry walls in the existing schools will have to be identified. These un-reinforced masonry walls are required to be anchored to the roof structures. Since there are no existing un-reinforced masonry parapets, this requirement does not have any impact on the structural scope of the project.

Additions

The proposed additions would be designed structurally independent of the existing structures, thus, they would not impart any additional lateral loads on the existing structures.

Comment

The compliance requirements of the two methods, in most respects, are very similar. The Work Area Compliance Method would trigger anchorage of un-reinforced masonry walls, if re-roofing of the existing structures is included as part of the scope for this project. The Prescriptive Compliance Method would require that the existing lateral load resisting systems meet the requirements of the code for new construction of the IBC, even for small increases of design lateral loads. We are required to comply with requirements of Appendix A1 of IEBC for either method, which requires anchorage of all existing masonry walls. Based on this, we would recommend the Work Area Compliance Method for the project.

Summary

The existing school structure appears to be performing well and all of the structural components that are visible appear to be in sound condition. Minor repairs are required to the exterior walls to repair the cracks and spalls.

Any proposed renovations and additions would likely require that the structure be updated to meet the requirements for code for new construction. Even limited structural modifications may require the addition of some shear walls, connection of the floor and roof diaphragms to the existing masonry walls and clipping of non-structural masonry walls to the structure. All of the existing masonry walls would have to be adequately connected to the roof and floor structure. It should be noted that the existing structure is not very adaptable for any reconfigurations of major structural elements. Reconfiguration and relocation of internal demising walls would be extremely complicated and expensive, as these walls also serve as shear walls. The existing structure is not suited for any vertical expansion on top of the existing structure.

plumbing review

The building is served by a single 2" domestic water service. This service pipe enters the building on the front west side. The pipe enters the exterior wall in the Custodian's office on the basement level. The water meter is located in this office. The water piping is primarily of solder joint copper with external insulation.

The 2" domestic water service pipe is marginal for the existing water demand. This service pipe would have to be replaced with a larger service size out to the main town water connection pipe if the demands of the school were to be increased.

Domestic hot water is provided from two (2) sources:

> Ever-Hot tankless hot water heater. This unit is operated from the boiler steam system. This tank was installed in 1984 and has far exceeded its service life. This tank and all associated piping should be removed and replaced.
>
> Bradford-White water heater, natural gas, model 75T80B3N, 76,000 BTUH input, 75 gallon. This unit appears to be fairly new and is in very good condition.

The building sanitary system drains by gravity to the outside rear side of the building and continues down to the adjacent street Ralph Hamlin Jr. Lane. There are steel floor panels installed in the cafeteria and kitchen corridors to access the pipe cleanouts. The sanitary piping mains are of cast iron hub type construction. Cleanouts are installed at the floor connection locations. Most of the sanitary piping is original to the building and has exceeded the normal service life. Pipe leaks will be difficult to repair and may cause damage in the adjacent areas.

Kitchen 3-bay sink grease collector is very old and needs to be replaced.

Many of the existing plumbing fixtures are very old. Some have been replaced as required. Some new Sloan waterless urinals have been installed in this building. All of the existing fixtures would have to be removed and new ones installed to comply with the most recent Plumbing Codes and Standards.

Natural gas is used in this building. The natural gas service enters the building on the front west side. The 2" underground service pipe is connected to a Roots gas meter, serial number 00905339. The discharge pipe from the meter becomes a 4" into the building. A 3/4" pipe tap upstream of the meter provides for a second gas service into the building. This 3/4" pipe serves an American gas meter model number AC-250, number X148399160. The discharge from the meter becomes a 1-1/4" into the building.

The natural gas 4" main pipe from the Custodian's office is routed through the basement corridor to the boilers. A 2" pipe taps off of the 4" main pipe to each boiler.

Exterior hose bibbs have been installed in a few locations. These have not been installed with vacuum breakers. New freeze-proof hose bibbs with vacuum breakers will have to be installed to replace the existing hose bibbs.

The building has a roof drain collection system. The storm drain leaders are routed to an underground collection system. Additional roof drains and associated storm drain pipe leader risers need to be installed for proper coverage and flow rates.

fire protection review

This building has a fire protection sprinkler system installed to provide coverage for the majority of the building.

The water service for the fire protection system and the fire department connection are on the front west side of the building adjacent to the natural gas meter.

The fire sprinkler service pipe enters the building in the Custodian's Office on the basement level. The incoming 6" Victaulic pipe is connected to a FEBCO, model 805, type YD, size 6, double-check backflow preventer. The pipe riser is connected to a Rockwood alarm valve. The system was last tested on 6/28/13 with readings of seventy (70) PSI static and sixty-five (65) PSI residual. A Potter VSR flow alarm sensor is installed on the main riser pipe.

The pendant heads are not visible in many of the upper floor classrooms and corridors. These areas have been renovated in the past and lower ceilings were installed. The existing heads in the original high ceilings were left in place and not extended down into the lower ceiling coverage area. The new ceiling tiles in the lower ceiling areas are a melt-away type. These ceiling tiles are no longer code compliant. These tiles need to be removed and new ceiling tiles installed. The existing sprinkler distribution system needs to be reconfigured and re-piped. New sprinkler drops and heads should be installed down from the original ceiling to the new ceilings with an intermediate level of coverage installed also.

All of the sprinkler system heads should be removed and replaced due to the age and service life.

The kitchen area is not sprinklered. Sprinkler coverage needs to be added to this area.

Proper coverage of the entire building will need to be reviewed for current code compliance and re-piped as required.

mechanical review

Boiler System

This building is served by two (2), natural gas, H.B Smith, Mills type, model HBS-9, 750 MBH to 3080 MBH heating range, steam boilers. The Power-Flame Burner control panel C2-GO-20B has oil / gas selection switch for dual fuel capability. The gas valve is a Honeywell type V4062A1008. The breeching for these units has a barometric damper. The flue connects into a masonry chimney enclosure routed to the roof. The main steam header pipe has two (2) zone pipes connected to the header with chain operated isolation valves. The boilers were installed approximately 1984 and are in only marginal condition. It appears that the boilers have been inspected and serviced regularly. These units are functional but require regular maintenance to maintain operation. These two boilers and all associated steam and condensate piping should be removed and replaced. These boilers require regular maintenance and are problematic. A steam heating system is inefficient, harder to control, and requires larger distribution piping to be installed. The boilers should be replaced with new natural gas, hot water, fire-tube, high-efficiency, boilers.

The heating system has minimal operational controls. The control system is pneumatic by Johnson Controls. A Quincy model QHPR5-10 air compressor has been installed to replace the previous compressor. This unit is fairly new and is in excellent condition. The controls system is problematic and requires regular maintenance to locate air leaks and repair system components. This entire controls system should be removed and replaced with automatic digital controls.

The steam distribution system consists of cabinet heaters, exposed radiators, and fin-tube heaters of various configurations. The steam piping throughout the building is not insulated. There are many areas where the exposed steam piping is close to the students and classroom furnishings. This exposed piping and radiators are a serious burn hazard to the students. All of the steam piping and all associated radiators, cabinet heaters, and fin-tube heater elements need to be removed completely.

Classroom unit ventilators are installed in each classroom. Most appear to be functional but need to be replaced. Most of the ventilators are very old and require regular maintenance. It is unlikely that the fresh air dampers are functional. The Nesbitt ventilators are no longer in production. Parts are no longer available. These units are problematic and are labor-intensive to maintain and keep operational. The coils are subject to blockage and leakage. Coils that break will cause extensive damage to the adjacent rooms and floor spaces below. All of the unit ventilators should be removed completely and replaced.

The steam pipes service the various devices in the different areas. Steam is supplied through a system of main pipes and branch pipes. These are generally threaded steel pipe routed to the classroom wall ventilators and cast iron radiators. The radiators are primarily installed below the exterior perimeter windows of the building, corridors, and at exterior doorways. The radiators in the main corridors are set into recessed areas in the walls of the main corridors. These radiators are visible and accessible to students. The units have individual control valves to adjust the temperature in each room. The steam pipes are insulated in the boiler room on the main header pipes but the distribution piping generally is not insulated. The distribution pipes are routed un-insulated through

the open classroom areas. This is a serious burn hazard to the students. Most of the steam piping is original and is subject to leaks and repairs. A leak in a pipe or fitting will create a serious burn hazard to the students. All of the steam piping and all associated radiators, cabinet heaters, and fin-tube heater elements need to be removed completely.

The condensate is collected and gravity fed back to the boiler room. The condensate piping throughout the facility is routed un-insulated and is a serious burn hazard to the students. The condensate is collected in the Hoffman Watchman condensate collection tank, type WC, model WCD-12-208, 18 GPM, and was installed in 3/2000. The condensate is pumped to the Skidmore boiler feed tank installed in 1984. This tank has three (3) Skidmore pumps. This feed tank and pumps have exceeded their service-life and should be replaced. The condensate collection tank, two pumps, boiler feed tank, and three pumps should be checked for performance efficiency. The condensate pipes are insulated in the boiler room on the main header pipes but the distribution piping generally is not insulated. A steam trap is used on each device to remove the condensate and direct it back to the boiler room. Most of the traps are very old. These traps all need to be removed and replaced. The condensate piping is original to the building. All of the condensate piping, and all associated traps, pumps, and devices need to be removed and replaced.

The boiler makeup air is accomplished through a large intake louver on the side wall. There are no automatic damper controls to close the damper when the boiler is not in operation. This is an Energy code requirement.

Air-Conditioning and Ventilation Systems

The original base building did not incorporate general space air-conditioning. The classrooms were each furnished with a dedicated exterior wall Nesbitt classroom unit ventilator with a fresh air louver and steam heating. The fresh air duct has an automatic damper to open when the unit is energized and closes when the unit is de-energized. These units are very old and have exceeded their normal service life. Some of the ventilator units have been replaced but many are original. The fresh air damper operation could not be verified. It appears that these units have been properly maintained but these units require regular maintenance to keep them operational. It is unlikely that the fresh air dampers are functional. The Nesbitt ventilators are no longer in production. Parts are no longer available. These units are problematic and are labor-intensive to maintain and keep operational. The coils are subject to blockage and leakage. Coils that break will cause extensive damage to the adjacent rooms and floor spaces below. All of the unit ventilators should be removed completely and replaced. These units and all associated piping should be removed completely.

Some classrooms and offices have been furnished with dedicated air-conditioning units. The existing dedicated thermostat for each room only controls the respective classroom unit ventilator. There are no controls in place to prevent simultaneous heating and cooling of these spaces. The ventilators are required to be energized so that the fresh air damper will open to satisfy the fresh air to the space but this will also energize the steam valves to be open.

Each classroom incorporates a ventilation exhaust shaft grille located in a recessed section of the corridor wall. Many of these grilles have been blocked by file cabinets or furniture. All of these grilles are connected to riser ducts up to the attic space. This riser duct

arrangement connecting the various rooms and on different floors is a violation of the mechanical and fire codes and creates a potential for dangerous situations to occur. A fire or smoke situation in one area would be allowed to spread through these riser ducts and grilles to other areas since none of them have smoke or fire dampers. The riser ducts are also required to be in fire rated chases between the floors up to the roof. All of the riser ducts extending between the three floors and related shafts need to be removed completely.

Each bathroom incorporates an exhaust grille connected to riser ducts to roof exhaust fans. The roof exhaust fans are controlled by occupied / unoccupied timer circuits in the building. This riser duct arrangement connecting the various bathrooms and on different floors is a violation of the mechanical and fire codes and creates a potential for dangerous situations to occur. A fire or smoke situation in one area would be allowed to spread through these riser ducts and grilles to other areas since none of them have smoke or fire dampers. The riser ducts are also required to be in fire rated chases between the floors up to the roof.

The fans for the various exhaust systems are located on the roof. These fans are old and are well past their service life. All of these fans need to be removed and replaced.

The gymnasium has its own dedicated ventilation system. The exhaust ductwork originates at the exhaust grille installed low on the stage of the gymnasium. The exhaust duct is routed to the roof exhaust fans. The makeup air to the gymnasium is obtained from a sidewall louver and duct. The makeup air duct does not have an automatic control damper which is not in compliance with the Energy Code.

The kitchen equipment is vented using flexible duct through a side window. This location will allow for the exhaust to be short-cycled back into the building through the first floor open windows. This equipment needs to be routed to the roof in a fire-rated shaft and discharged from the roof area.

electrical review

The building's 400 amp, 120/208 volt, three phase, four wire main circuit breaker located in the Basement Music Room and is fed by an overhead electric service off of an electric utility company transformer on a utility pole located on the property, via exterior weatherhead. The electric utility company meter is located adjacent to the main disconnect switch. The electric service is original to the building, is at the end of its life expectancy, and should be replaced with a new larger service to accommodate the electrical needs to today's schools. The electric service is in poor condition.

The main circuit breaker feeds a 400 amp, 120/208 volt, three phase, four wire main distribution panelboard in the Basement Main Electric Room. The main distribution panelboard feeds panelboards throughout the building. Overhead cabling at back of the School feeds the Press Box. Most of the power distribution appears to be original to the building, is at the end of its life expectancy, and should be replaced with a new larger distribution panel, and branch circuit panelboards. The power distribution is in poor condition.

The building does not have an emergency generator. Emergency lighting is provided by exit signs with battery back-up, emergency battery units with integral light heads, combination emergency battery units/exit signs, and remote emergency light heads. Corridors, Stairs, and Toilet rooms in general have emergency lighting. Deficiencies include no emergency lighting outside of egress doors, emergency lighting not working, and not enough emergency lighting and exit signage marking paths of egress. Most of the emergency lighting appears to be original to the building and is in poor condition.

The four zone conventional FCI 72 fire alarm control panel is located in the Basement Main Electric Room. Zones are labeled Sprinkler, Pull Station South, Pull Station North, and Pull Station Locker. An exterior building mounted local energy master box is fed by an underground fire alarm cable in conduit from a utility pole, with the master box connecting to the fire alarm control panel. A knox box is located adjacent to the master box. Deficiencies of the fire alarm system includes inadequate smoke detector coverage in Corridors and Stairs, points of egress without pull stations including Stairs and egress doors, pull stations not at ADA heights, inadequate notification appliance coverage in rooms including Assembly spaces, Corridors, and Classrooms. Most of the fire alarm system appears to be original to the building, is at the end of its life expectancy, and should be replaced with new fire alarm equipment throughout the building. The fire alarm system is in poor condition.

Staff indicated that the original lighting fixtures were replaced with new or existing wereretrofitted with new T8 lamps, via electric utility company program. Interior lighting is made up of wraparounds, prismatics, industrials, and strips. Staff also indicated that most of the original Classroom local wall switches were replaced with new combination wall switches/occupancy sensors. Other forms of control include local keyed switches and regular switches. Although the interior lighting is in fair condition, most of the lighting is made up of wraparounds which is very glary and is not conducive to learning environments.

Exterior lighting is made up of wall mounted flood lights with incandescent lamps, traditional type sconces at main egress doors with incandescent lamps, LED floodlights, and LED wall sconces at other egress doors. The lighting does not appear to adequate at the front of the building. The lighting appears to be in poor condition.

The sports lighting fields at the back of the property appear to have a dedicated electric service (not fed from the building electric service).

Receptacles and switches are mostly brown and white with stainless steel plates. Receptacles are ground type. Receptacles have been added over the years through the use of tele-power poles, plugmold, and wiremold. Additional receptacles to accommodate computers would be required if they were to meet the needs to today's classrooms.

The building does not have a lightning protection system.

massachusetts state building code: 780 cmr and life safety issues

The Massachusetts State Building Code (780 CMR) has been updated and amended a number of times since the construction of the building. The State Board of Building Regulations and Standards regularly updates and amends its regulations. Based on these regulations, we found the following items to be in non-compliance:

- Occupied spaces (classrooms and offices) currently provide an entrance from within an egress stairway.
- Egress stairway enclosures, including door assemblies, require a minimum 1-hour fire separation assembly.
- Fire extinguishers.
- Fire separation assembly between Use Group E (Educational) and Use Group A-3 (Assembly – Cafeteria, Gymnaisum) (1 hour fire separation required).
- Handrail and guardrail at egress stairways.
- Electrical panels in classrooms and corridors.

Energy Conservation

The Frolio Middle School was constructed in 1936, which was prior to the historic energy shortages of the 1970s and escalating oil prices of 2005. The emergence of a new energy code in 2000, which promoted an increased knowledge of exterior building envelope construction techniques and materials, has dramatically changed the way in which buildings respond to energy efficiency issues. The Frolio Middle School building does not include a single component (exterior walls, roof, windows, etc.) that would meet the current energy code or any of the typical guidelines for conscientious energy consumption.

handicap accessibility review (aab & ada)

Requirements for handicap accessibility in building planning and design were non-existent in 1936 when this building was originally designed. However, on January 26, 1992, the Department of Justice implemented Title III of the American with Disabilities Act (ADA) into Public Law. Additionally, on September 1, 1996, the Commonwealth of Massachusetts developed its own accessibility regulations: 521 CMR Architectural Access Board (AAB), which in some instances is more restrictive than ADA guidelines. The ADA and AAB regularly update and amend their regulations.

These regulations "prohibit discrimination on the basis of disability by private entities in places of public accommodation." The regulations require all new places of public accommodation, including schools, to be designed and constructed so as to be readily accessible to and usable by persons with disabilities. Existing structures being renovated that exceed 30% of the equitized assessment of the building or its replacement value must fully comply with the regulations for new construction.

Frolio Middle School's accessed building value is $3,625,200, therefore any renovations or additions to the existing school that exceed the cost of $1,087,560 would require full compliance with the regulations for new construction.

Based on these regulations, we found the following items to be in non-compliance or not accessible to the disabled:

- All doors leading to all rooms in the school including classrooms, gymnasium, library, administration, etc. Non-conforming knob-type hardware currently exists. Lever handles are required.
- The main public entrance to the building is not accessible.
- All entries into classrooms require clear floor space adjacent to latch side of the door for entry and exit.
- Check-in counter at Administration Office.
- Lack of proper interior building signage (braille).
- Toilet rooms.
- Water fountains.
- Access to stage from the main floor within the gymnasium.
- Library Circulation Desk.
- Ramps must be reconfigured for proper handicap slope and handrails.
- All stairs (handrails and nosing).
- Alarms and strobes within classrooms.

Each of the inaccessible features listed above has an impact on the ability of disabled students or members of the community to access various spaces throughout the school independently. Disabled persons may include students with permanent handicap condition, students that are temporarily disabled from athletic activity, and parents, staff or other visitors that could have any form of disability. Any future plans should incorporate as many items as possible to accommodate disabled people to the fullest extent possible.

historical analysis

The Frolio Middle School currently is not listed on the National Register of Historic Places and does not appear in the Massachusetts Cultural Resource Information System.

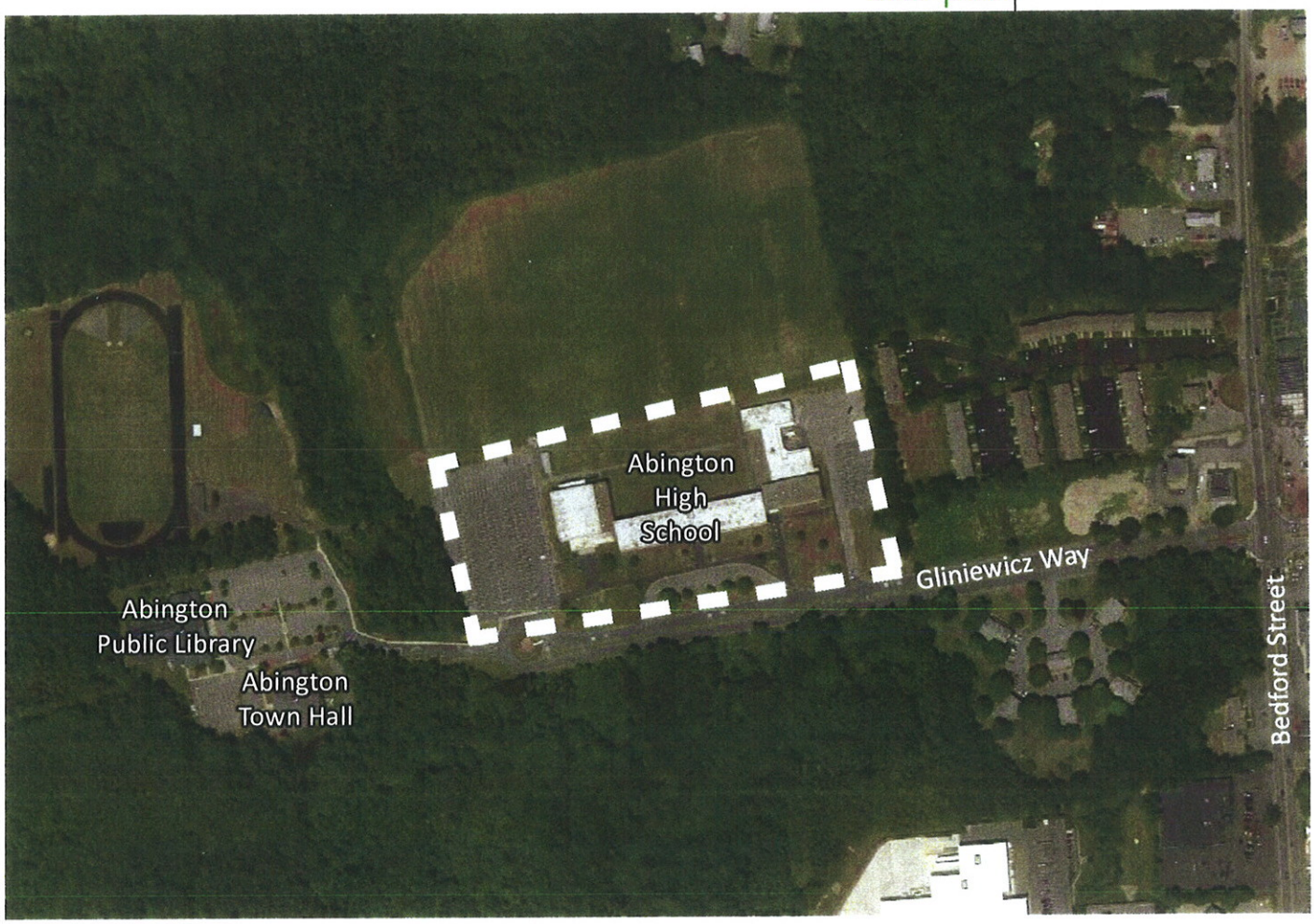
Although the property is not listed on either of these databases it may to preclude it from a review by the Massachusetts Historical Commission.

Per 950 CMR 71.00, any project that is undertaken by a local government that seeks the provision of financial assistance by a state body (MSBA) is required to submit a "Project Notification Form."

As part of this process the, either the state body or the local goverment is required to provide notice to the Massachusetts Historical Commission (MHC) of the project. After receipt of notice the MHC will review any adverse affects, direct or indirect, from the proposed project on any property listed in the State Register of Historic Places. If the MHC determines that a project will have an adverse effect on a State Register property, then the MHS, the state body, and the local government will consult to discuss ways to eliminate, minimize, or mitigate the adverse effects. The local government must adopt all prudent and feasible means to eliminate, minimize, or mitigate the adverse effects.

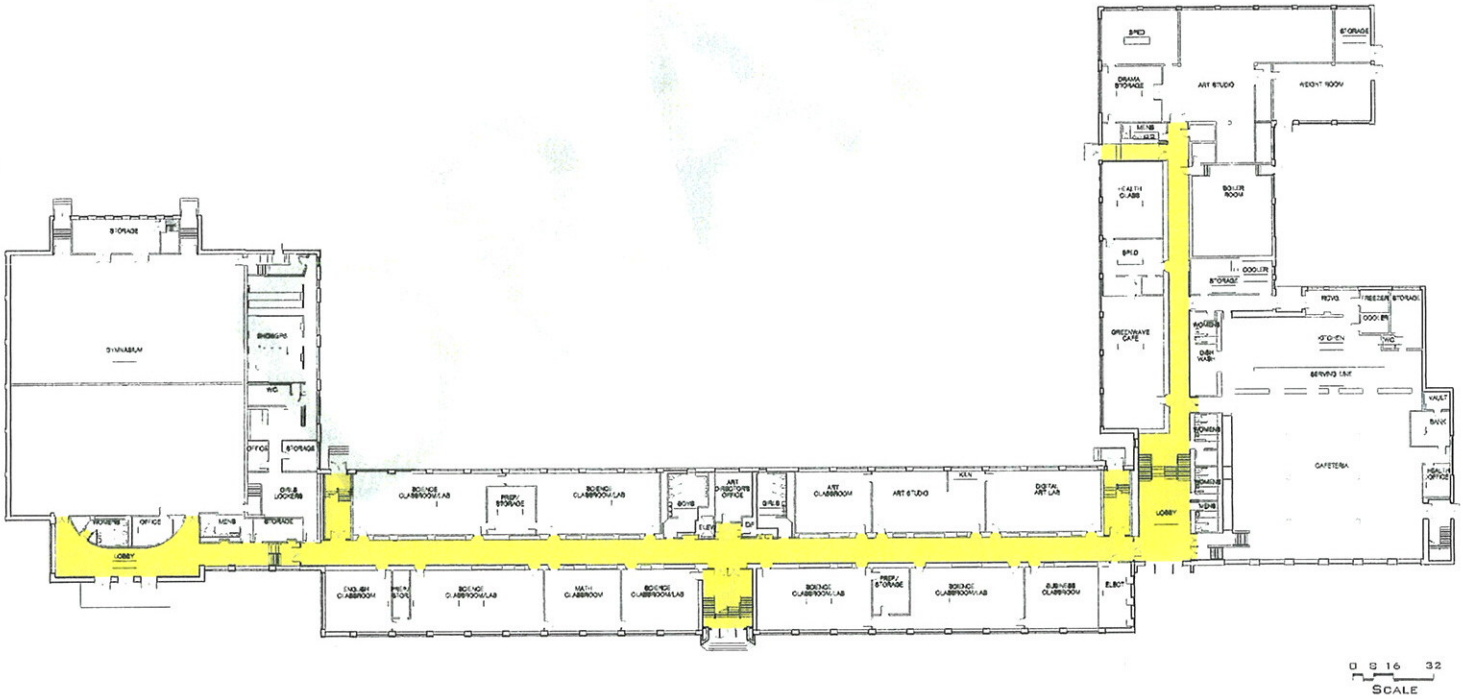
Abington High School Building Evaluation

site plan

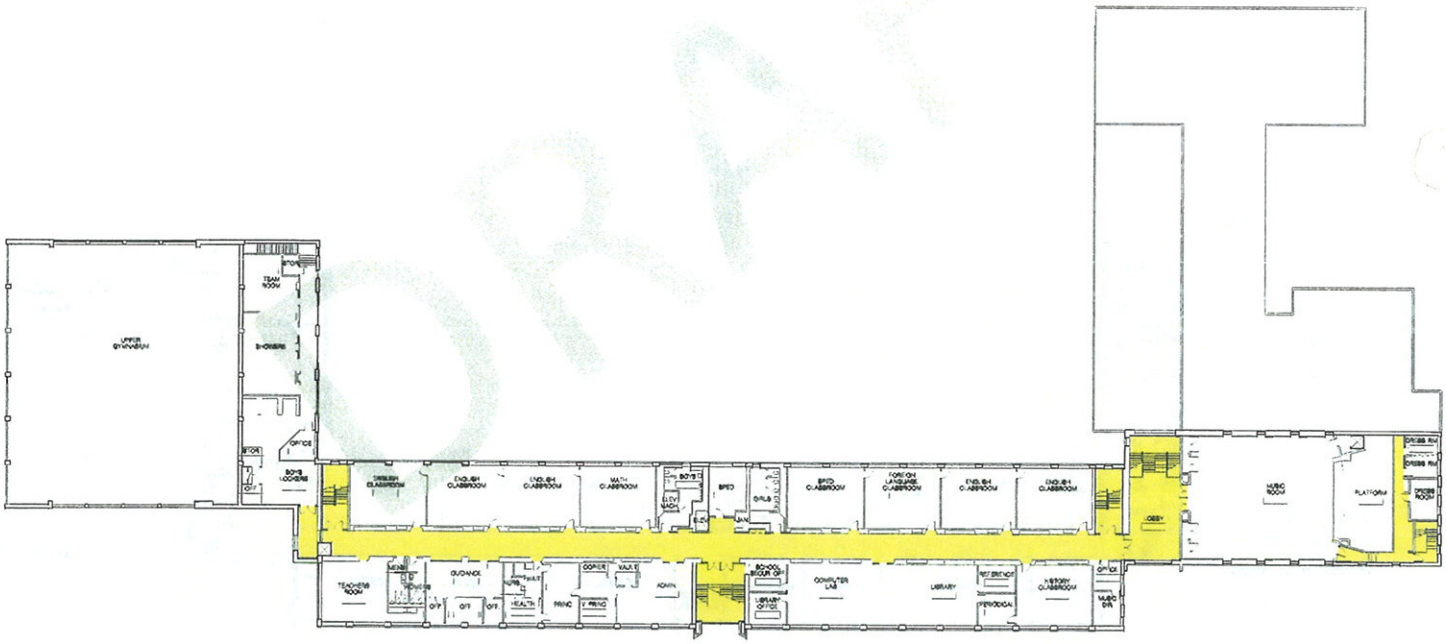


existing floor plans

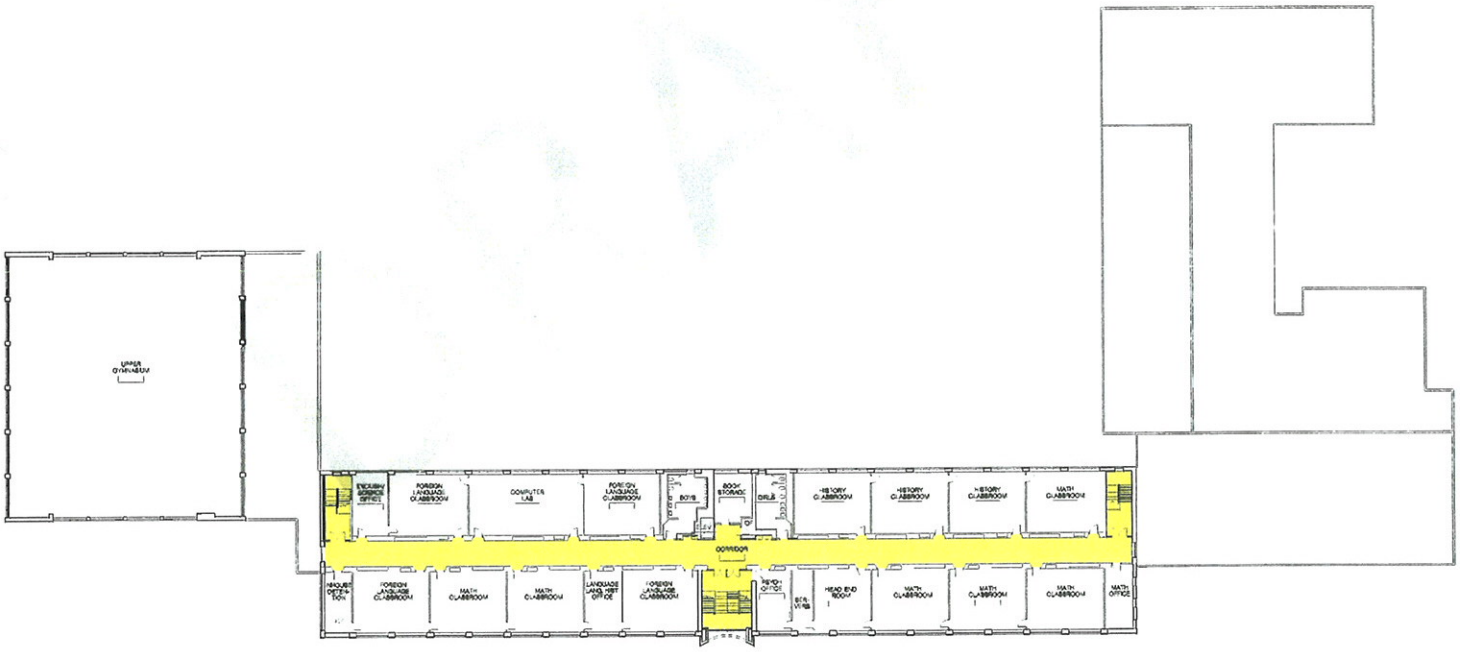
For purposes of this report, the building's existing condition floor plans were generated. While we strive to ensure that the existing conditions drawings are complete and whole, for the purposes of the feasibility study, a full on site existing conditions survey was not conducted to confirm exact locations and dimensions of every wall, door or other element. What these plans do provide us with is a starting point to begin to evaluate the overall goals of the study within a given set of parameters which aid us and the Town with evaluating current space allocation and proposed future plans.



existing lower floor plan



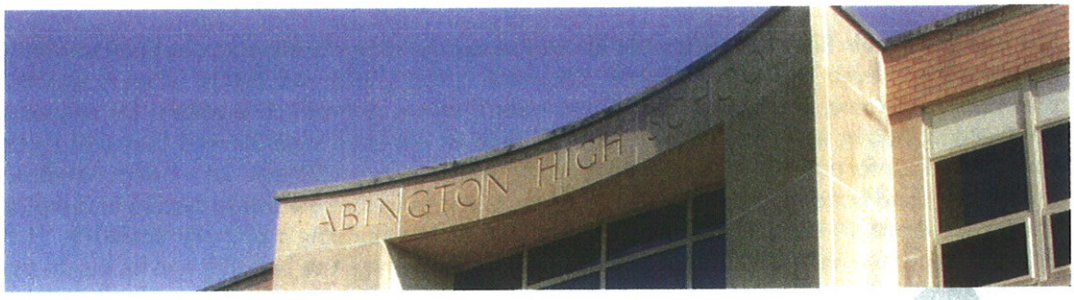
existing first floor plan



existing second floor plan

Existing Conditions Assessment

overview



The existing Abington High School was originally constructed in 1962 with no additions to date. The facility currently houses grades 9 through 12.

The 51 year old building was designed and constructed at a time when educational environments were much different than they are today. There was much less known about 1) educational plan organization, 2) exterior envelope and wall construction, 3) energy conservation, 4) environmental quality factors such as ventilation, lighting, etc., and 5) ideal high school learning environments.

It is a very clean and well-maintained facility and there has been some investment in maintaining the building with projects such as window replacement, boiler replacement, and the repair of exterior masonry. However, the clean, well-maintained appearance can be deceiving. All of the major building systems that have not been replaced have now reached or surpassed their intended life expectancy and the building lacks many of the educational amenities featured in a modern 21st Century high school. The building requires a comprehensive renovation of the building systems and components that have not been addressed to date, and such renovations trigger a requirement for full building code compliance throughout the building. The required renovations also trigger full accessibility requirements throughout the building. Additionally, if the Town wishes to receive reimbursement funding from the Massachusetts School Building Authority (MSBA) for any proposed project, the project will have to fully address educational deficiencies within the high school such as undersized classrooms, lack of specialized classrooms, insufficient special education space, and outdated classroom amenities. The required comprehensive renovation at the high school is a significant project, and extends well beyond a series of capital improvements.

Educational Plan Organization

The Abington High School is a 111,831 square feet, three story facility. The physical size and available classrooms suggests that it has a capacity of approximately 470 students under current educational standards and MSBA (Massachusetts School Building Authority) guidelines, but recent enrollment has been in the range of 500-550 students. This calculated capacity can be confusing, as there was likely a time in the building's history when there were significantly more students occupying the building. However, this would have involved overcrowded classrooms, insufficient special education space, lack of specialized program space, and many of the other remaining educational support spaces required as part of the guidelines for a 21st Century high school facility. If one factors in all of the spaces required as part of current educational guidelines, and follows appropriate protocol with regard to acceptable space standards for each space, the calculation reveals a capacity of 470 students.

The main three story facility includes a Library/Media Center, administration and the academic spaces. Attached on one side of the three story academic wing is a gymnasium with locker rooms. On the opposite side of the main three story facility is a wing that contains the cafeteria, art classrooms, and Music Room.

The current building plan includes many deficiencies when compared to a modern high school organization and design.

The building's main floor level is located above the surrounding site elevation by approximately half of a floor level. This was a popular approach is the 1950s and 1960s, when it was felt that burying a lower floor level (partial basement) was a cost-effective means for reducing the building height and thus reducing the amount of exposed exterior wall that had to be constructed. Unfortunately, this approach provides two major challenges to modern handicap accessibility and building security requirements: 1) It requires an elaborate system of ramping and/or elevators in order to provide accessibility at the building's primary entrance, 2) It presents security challenges in that it allows someone to enter the building and be inside the classroom corridor prior to passing through an administrative control point. The building's main administration area is centrally located within the academic wing on the main floor level, but the distance and stairway path between the entry point and the administrative control area does not provide the required observation and control of visitors entering the building. This was common 50 years ago, when school security was not an issue. Unfortunately, this has changed dramatically over the past 10 years. Currently, the main office is reliant on a camera system for visual observation of the main entrance. This is a commendable effort considering the building's organizational challenges, but unfortunately a potential security and safety hazard remains. Upon entering the building, visitors are immediately inside a stairway which allows them to access all floors of the building without supervision and to co-mingle with staff and students prior to being greeted and checked-in by the main office. This creates a significant potential security threat.

The 1960s building layout provides no common area for student projects, exhibits, or cross-discipline instruction. It also lacks team areas, planning areas, and work areas. Undersized classrooms are stacked along a corridor with no intention of organizing them into teams or academic neighborhoods. There is no incorporation of planning areas for faculty and staff and no incorporation of smaller group rooms to support testing, partnering, or small group instruction.

The student dining area is located on the lower level of the building and is organized to support a 1950s style process of herding large groups of students into a single large space for purposes of consuming meals as quickly as possible. It does not include provisions for multi-purpose use, and does not make accommodations for varying dining and/or socialization experiences for students. Although these kinds of provisions may seem like a luxury, they are common in the modern school environment and have proven to effect positive change both academically and socially, while simultaneously promoting all-day use of this area for multiple purposes.

The Library/Media Center is located on the main floor level, but lacks any meaningful integration to the academic environment or other specialized instructional areas that it might serve. It is significantly undersized (a little more than half the recommended size) and does not include many of the necessary support spaces.

The school currently does not have an auditorium. It appears that an auditorium may have been part of the original design and a significant reduction to the proposed space took place prior to construction. The remaining space, a music/presentation room with a small stage, lacks the potential that can be afforded by a legitimate performance auditorium. There are very few school systems within the Commonwealth of Massachusetts that do not have an auditorium, as the academic and community benefits of such a space are well documented.

High School Learning Environments

The ideal high school educational environment includes many key factors. Modern 21st Century high schools include classrooms that utilize "Laboratories for Learning" where all of the necessary environmental factors, technology integration, and spatial configurations work to create "ideal" environments. These modern classrooms allow teachers to introduce "Real World" examples of instructional material through the seamless integration of video internet technology. They also allow students to present and facilitate with their peers, giving them invaluable exposure to learning, presentation, and collaboration skills. Technology can be energized quickly and efficiently through teacher facilitator stations. Lighting, ventilation, and carbon dioxide levels are all monitored and adjusted automatically to create ideal environmental conditions. Teachers have collaborative planning and work areas that allow them to share critical planning and development ideas for their coursework. Cross discipline instruction and work areas are integrated into the academic environment in a manner similar to that of a corporate planning and work environment. Core facilities such as library/media centers have become highly advanced media retrieval centers and are located in close proximity to all academic functions to allow for key sharing of valuable resources. Academic zones are organized for quiet separation from noisier zones such as cafeterias and gymnasiums. Their layouts and plan organizations are structured to promote integration of science, technology, engineering, math, and the arts. Corridors and hallways are organized and designed to create "experience and exposure", in addition to providing functional movement patterns. Performing and practical arts facilities include highly advanced opportunities for students to explore their talents at a critical age when many of their future professional talents are evolving.

Educational, Spatial & Organizational Capacity

Capacity at the high school can be calculated in several ways, including multiplying the number of available general classrooms and support areas by the appropriate number of students in each classroom. The Abington High School has a current capacity of approximately 470 students under current educational standards, but recent enrollment has been in the range of 500-550 students. The Abington High School has been able to house more students than its identified capacity by having some of the original vocational education spaces not originally intended as general classrooms converted into usable classroom space. Former storage rooms and closets have also been converted to provide spaces for small group instruction, testing, and counseling. The ability to achieve a higher occupancy than capacity has also been achieved through the deletion of specialized instructional areas such as academic planning, collaboration and work areas, and providing insufficient special education space. The overcrowding conditions have resulted in creating a very stressful environment where it is difficult to deliver a modern educational program.

In addition to being overcrowded, the following conditions exist:

Main Office / Entrance

As mentioned previously within this report, the main office currently sits adjacent to the main entry stair. To enter the main office, visitors must first enter into the main corridor of the school. Visitors then are able to interact with students prior to being physically greeted and checked in by the main office. This poses potential security and safety issues.

Nurse's Suite

The nurse's office is undersized and inadequate for medical exam and resting space.

Library Media Center

The library is located on the main floor. It is significantly undersized and lacks the modern amenities associated with a 21st Century education resource.

General Classrooms

The size, configuration, organization, environmental quality and instructional amenities within the classroom are critical to successful teaching and learning. Current classrooms are undersized and lack almost all of the most recent advancements in educational instruction.

Special Education

The current Special Education program is extremely undersized and is utilizing inadequate space for instructional, tutorial and testing areas. The program and associated spaces do not meet current state recommendations and guidelines.

Science Classrooms

The current science classrooms have limited plumbing and do not provide an adequate space for learning and science experiments. The spaces have poor ventilation, including the central chemical storage room. Gas and water piping runs exposed at the student workstations.

Art Classrooms

One of the Art Classrooms is located in a space that been converted from a vocation wood shop and is separated from the other Art Classrooms.

Music Classroom

The current High School lacks many of the amenities associated with a modern choral, band, music and performance environment.

Plan Organization and Adjacencies

Current research with regard to appropriate plan organization and productive academic adjacencies provides significant insight into the educational value of these concepts. The current layout is not conducive to these methods and does not support the educational vision of Abington Public Schools.

Teacher & Group Planning and Collaboration Areas

Modern 21st Century high schools are designed to include critical interdepartmental planning and collaboration spaces, allowing for increased understanding (among students) of the relationship between disciplines. These spaces do not exist within the current Abington High School.

Distance Learning and Student Presentation Theatres

Many modern high schools incorporate advancements in technology that allow students to exchange ideas, information, and resources with other students around the world. These learning and presentation opportunities do not exist in the current Abington High School.

Receiving and Storage

Storage space in the school is extremely limited.

architectural review (exterior / interior)

Exterior Review

Foundation

The exterior poured concrete foundation walls appear to be in good condition with only minor cracking at a few locations. (Refer to structural evaluation for additional information.)

Walls

The exterior envelope (exterior masonry wall construction) of the building is a 51 year old envelope. The envelope consists of face brick and cut stone panels with masonry back-up support. It appears that mortar joint re-pointing and brick replacement has occurred over the past few years, and has acted to protect the building's exterior envelope. Some additional re-pointing, combined with limited masonry renovation could allow the building's exterior wall system to remain water-tight for many years. The 1962 construction drawings combined with recent field observation indicate that the building exterior wall does not have a cavity or weeping system for drainage of water absorbed by the brick. This was common in 1960s construction, but can lead to a rapid decline in the exterior wall condition if the brick and mortar joints are not routinely monitored for signs of moisture infiltration. For this reason, non-cavity wall construction is no longer practiced in modern building construction. Another primary deficiency in the exterior wall construction is the absence of insulation. This is another common practice of the 1960s, but is no longer allowed as per the current building code and would have to be addressed as part of any proposed comprehensive renovation to the building.

It appears that vertical control joints have recently been cut into the exterior wall system. The provides significant improvement to the building's ability to accommodate thermal movement in the wall.

Roof

The building's roof consists of a combination of a rubber membrane and gravel ballasted roof and a PVC roof installed in 1994. The PVC roof appears to be in serviceable condition, but would only have a 20 year life expectancy and would be slated for replacement now. The areas which include membrane and gravel ballasted roof have outlived their life expectancy and require replacement. These areas include the roof over the Music Room, Locker Rooms and lower roofs of the Culinary, SPED, and Health Room. A complete replacement of the roof systems completed as part of a comprehensive renovation would also require that the roof insulation be modified to comply with current energy code requirements. This would likely include removal of the entire roofing system (down to the structural deck), and replacing it with a compliant insulation and roofing system.

Windows

In 2007 the exterior windows of the building were replaced with a combination of fixed and hopper aluminum windows. This is a high-quality system which has done a good job stopping the deterioration of the building's exterior. Although the system represented the best of industry standards in 2007, the recent focus on energy conservation has since resulted in the Commonwealth's adoption of significantly higher energy code standards. The system remains in excellent condition; however, it is possible that portions of the system would have to be replaced if a fully compliant comprehensive renovation is completed at the facility. The system would be over 10 years old at that time, and the windows would not meet the new standards. Additionally, even more stringent energy code requirements will be in place prior to the commencement of any proposed renovations to the high school.

Doors

As part of the window replacement project, the exterior doors to the building were also replaced. The doors are constructed of metal, and have vision panels inserted within metal frames. Overall the doors systems are in good condition.

Interior Review

Floors

There are numerous floor materials throughout the building. These finishes include the following: Vinyl Composition Tile (VCT), Hardwood, and Vinyl Asbestos Tile (VAT) in the main lobby, corridors, classrooms, cafeteria and gymnasium. The floors in the toilet rooms are ceramic tile.

The corridor and classroom floors are primarily VAT. Various locations have been patched with VCT. The floors in the corridors and classrooms are in good condition and well maintained.

The wood flooring in the gymnasium visually appears in fair condition, but shows signs of wear. The flooring system has exceeded its life expectancy.

The toilet room floors are ceramic and are in fair condition. There is minor damage from wear and tear.

Walls

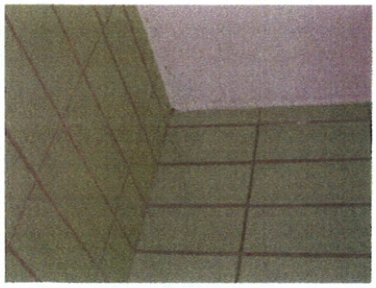
The majority of the walls within the classrooms are painted concrete masonry units. Given the age of the building, the walls are in good condition. The age of the walls is apparent as modern retrofitted amenities are all exposed including wiring for power, light switches and interactive whiteboards.

The corridors are a combination of glazed block down low with plaster above. They are in fair condition, but are very dated. A few walls with lockers in them show signs of warping. A wall previously constructed of glazed block has been replaced due to it collapsing from poor reinforcing.

The walls within the cafeteria are glazed block with plaster above. The interior columns are wrapped with ceramic tile. They currently do not incorporate any acoustical treatment for absorbing sound in the space.

The walls in the gymnasium are painted CMU with wood bleachers on each side. The wood bleachers shows signs of wear and tear. The walls of the space do not have any acoustical treatment for absorbing or reflecting sound in the space.

Doors



The interior wood doors and steel frames throughout the school are in fair condition. Many of them show signs of wear. The doors to classrooms have half glass window with clerestory lights above them. These do not provide a good acoustical separation between the corridor and classroom under current construction standards. The doors from the corridor to the egress stairs do not provide the necessary fire rating and contain excess glazing within the sidelights and transom. These violate current fire separation requirements.

Most door hardware appears to have been replaced over time. Although the hardware has been replaced, a majority of the door hardware remains non-compliant and is further discussed in the handicap accessibility portion of this report.

Ceilings

There are numerous ceiling materials throughout the building. These finishes include the following: 2x4 ceiling tile (installed in select classrooms as part of lighting upgrade), 1x1 ceiling tiles, exposed painted concrete ceilings, and Tectum ceiling panels in the corridor. The age of the ceilings is apparent as modern retrofitted amenities are all exposed including wiring for power, fire alarm and lighting.

Recent Capital Improvements

Roof

The roof was partially replaced in 1994.

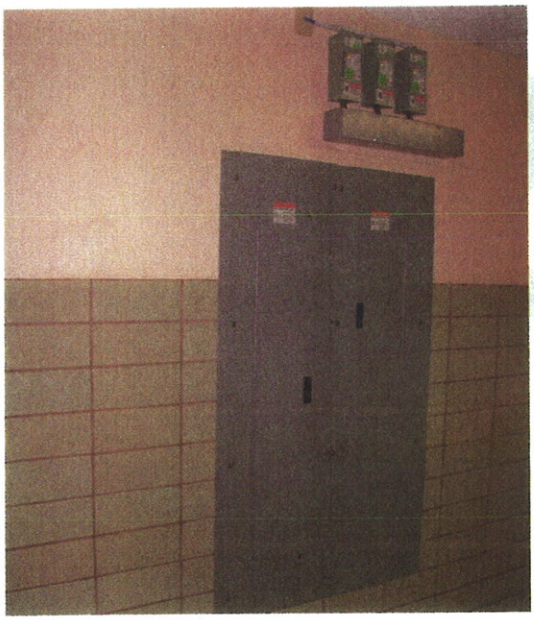
Masonry

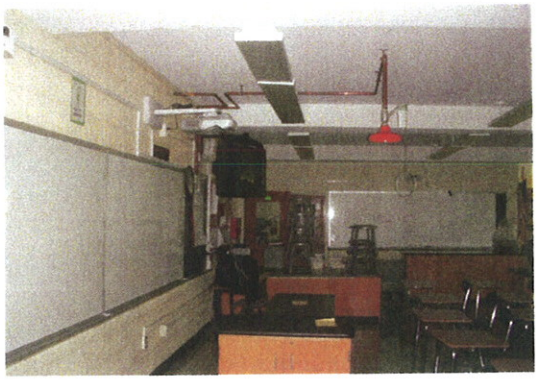
An ongoing maintenance program for the repair of existing masonry exists.

Windows

Windows were replaced in 2007.

Additional Photo Documentation of Existing Conditions





structural review

Engineers Design Group Inc.

Purpose

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

Scope

1. Description of existing structure.
2. Comments on the existing condition.
3. Comments on the feasibility of renovation and expansion.

Basis of the Report

This report is based on our visual observations during our site visit on July 10, 2013; the review of available structural drawings of the original construction prepared by Aisner & Atwood Architects dated January 10, 1962.

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

Building Description

The school is located on Glieniewicz Way in Abington, Massachusetts and was constructed in 1962. No major renovations or additions have been constructed since the original construction. The school is essentially a three story concrete and masonry structure. The school structure is essentially a three story rectangular building with a double story gymnasium and other ancillary spaces located at the west end of the three story structure and a cafeteria and music/ activity rooms at the east end.

The first floor is a concrete slab-on-grade. The typical second and third floors of the academic wing are concrete one-way slabs spanning between reinforced concrete beams in the classrooms. The corridor is a concrete flat slab. The concrete beams are supported on interior and exterior reinforced concrete columns. The roof of the academic wing is also of similar construction as the typical floors. The supported floor and the roof of the locker rooms is a concrete ribbed slab supported on reinforced concrete beams and columns. The gymnasium roof is a gypsum panel supported on bulb tees, steel purlins and structural steel girders. The steel girders are supported on wide flange steel columns. The first floor and low roof of the cafeteria and music/activity spaces at the east is similar to the typical floor construction of the academic wing. The high roof above the activity/music spaces is similar in construction to the gymnasium roof. The interior and exterior columns are supported on reinforced concrete spread footings, the exterior walls are supported on grade beams spanning between piers supported on the spread footings.

Existing Conditions

Based on our observations, the school structure is functioning well. There are no major structural concerns that we observed. We did not see any signs of foundation settlement, nor did we observe any excessive vibration on the supported floors due to footfall. We did observe cracks in the interior masonry walls at a few locations; these cracks are not a structural

concern. It does not appear that these masonry walls are anchored to the structure. We observed some minor cracks in the masonry façade. The façade has been extensively repaired with new control joints cut in 2005. We did not observe any weep holes in the façade; so, it is possible that some of the cracks in the façade that were repaired may appear again from the infiltration of moisture in the cavity behind the façade. We also observed that the masonry shaft for the elevator above the roof is an exposed CMU wall and is neither insulated nor protected from moisture infiltration.

Feasibility of Renovation and Expansion of the Structure

Depending on the scope of the renovations to the school, it may be feasible to make modifications to the existing structure without requiring full compliance with the code requirements for new construction. We would recommend that any additions, if planned, be separated from the existing structure by way of expansion joints.

Primary Structural Code Issues Related To The Existing Structure

If any repairs, renovations, additions or change of occupancy or use are made to the existing structures, a check for compliance with 780 CMR, Chapter 34 "Existing Structures" (Massachusetts Amendments to The International Existing Building Code 2009) of the Massachusetts Amendments to the International Building Code 2009 (IBC 2009) and reference code "International Existing Building Code 2009" (IEBC 2009) is required. The intent of the IEBC and the related Massachusetts Amendments to IEBC is to provide alternative approaches to alterations, repairs, additions and/or a change of occupancy or use without requiring full compliance with the code requirements for new construction.

The IEBC provides three compliance methods for the repair, alteration, change of use or additions to an existing structure. Compliance is required with only one of the three compliance alternatives. Once the compliance alternative is selected, the project will have to comply with all requirements of that particular method. The requirements from the three compliance alternatives cannot be applied in combination with each other.

The three compliance methods are as follows:

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

Comment

The approach is to evaluate the compliance requirements for each of the three methods and select the method that would yield the most cost effective solution for the structural scope of the project. The selection of the compliance method may have to be re-evaluated after the impact of the selected method is understood and after analyzing the compliance requirements of the other disciplines, Architectural, Mechanical, Fire Protection, Electrical and Plumbing.

Since the existing buildings are un-reinforced masonry wall structures, the analysis and reinforcement of the existing structures would be governed by the requirements of Appendix A1 "Seismic Strengthening Provisions for Un-reinforced Masonry Bearing Wall Buildings" in the IEBC.

Prescriptive Compliance Method

In this method, compliance with Chapter 3 of the IEBC is required. As part of the scope of this report, the extent of the compliance requirements identified are limited to the structural requirements of this chapter.

Additions

Based on the project scope, the following structural issues have to be addressed:

- All additions should comply with the code requirements for new construction in the IBC.
- For additions that are not structurally independent of an existing structure, the existing structure and its addition, acting as a single structure, shall meet the requirements of the code for new construction for resisting lateral loads, except for the existing lateral load carrying structural elements whose demand-capacity ratio is not increased by more than 10 percent, these elements can remain unaltered.
- Any existing gravity, load-carrying structural element for which an addition or its related alterations causes an increase in the design gravity load of more than 5 percent shall be strengthened, supplemented or replaced.

Alterations

- Any existing gravity, load-carrying structural element for which an addition or its related alterations causes an increase in the design gravity load of more than 5 percent shall be strengthened, supplemented or replaced.
- For alterations that would increase the design lateral loads or cause a structural irregularity or decrease the capacity of any lateral load carrying structural element, the structure of the altered building shall meet the requirements of the code for new construction, except for the existing lateral load carrying structural elements whose demand-capacity ratio is not increased by more than 10 percent, these elements can remain unaltered.

Work Area Compliance Method

In this method, compliance with Chapters 4 through 12 of the IEBC is required. As part of the scope of this report, the extent of the compliance requirements identified are limited to the structural requirements of these chapters.

In this method, the extent of alterations has to be classified into LEVELS OF WORK based on the scope and extent of the alterations to the existing structure. The LEVEL OF WORK can be classified into LEVEL 1, LEVEL 2 or LEVEL 3 Alterations. In addition, there are requirements that have to be satisfied for additions to the existing structure.

The extent of the renovations (includes Architectural, FP and MEP renovations) for this project will exceed 50 percent of the aggregate area of each of the buildings, thus the LEVEL OF WORK for this project would be classified as LEVEL 3 Alterations. This would require compliance with provision of Chapters 6, 7 and 8 of the IEBC. If the scope of the project includes new additions to the existing structure; this would trigger compliance with provisions in Chapter 10 of the IEBC.

Level 3 Alterations

- Any existing gravity, load-carrying structural element for which an alteration causes an increase in the design gravity load of more than 5 percent shall be strengthened, supplemented or replaced.

- For alterations where more than 30 percent of the total floor area and roof areas of a building or structure have been or proposed to be involved in structural alterations within a 12 month period, the evaluation and analysis shall demonstrate that the altered building complies with the full design wind loads as per the code requirements for new construction and with reduced IBC level seismic forces.

- For alterations where not more than 30 percent of the total floor and roof areas of a building are involved in structural alterations within a 12 month period, the evaluation and analysis shall demonstrate that the altered building or structure complies with the loads at the time of the original construction or the most recent substantial alteration (more than 30 percent of total floor and roof area). If these alterations increase the seismic demand-capacity ratio on any structural element by more than 10 percent, that particular structural element shall comply with reduced IBC level seismic forces.

- For alterations that involve structural alterations to more than 30 percent of the total floor and roof area of a building within a 12 month period, the evaluation and analysis shall demonstrate that the altered building structure complies with IBC for wind loading and with reduced IBC level seismic forces.

- For alterations where more than 25 percent of the roof is replaced for buildings assigned to seismic design categories B, C, D, E or F, all un-reinforced masonry walls shall be anchored to the roof structure and un-reinforced masonry parapets shall be braced to the roof structure.

Additions

- All additions shall comply with the requirements for the code for new construction in the IBC.

- Any existing gravity, load-carrying structural element for which an addition or its related alterations cause an increase in design gravity load of more than 5 percent shall be strengthened, supplemented or replaced.

- For additions that are not structurally independent of any existing structures, the existing structure and its additions, acting as a single structure, shall meet the requirements of the code for new construction in the IBC for resisting wind loads and IBC Level Seismic Forces (may be lower than loads from the Code for New Construction in the IBC), except for small additions that would not increase the lateral force story shear in any story by more than 10 percent cumulative. In this case, the existing lateral load resisting system can remain unaltered.

Performance Compliance Method

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

Particular Requirements of Compliance Methods

For our project, in order to meet compliance with one of the two compliance methods "Prescriptive Compliance Method" or the "Work Area Compliance Method", we have to address the following:

Prescriptive Compliance Method

Additions

The proposed additions would be designed structurally independent of the existing structures, thus, would not impart any additional lateral loads on the existing structure.

If the proposed alterations are such that the alterations increase the design lateral loads on the existing building or cause any structural irregularity of decrease the lateral load carrying capacity of the building, the structure of the altered building shall meet the requirements of the Code for New Construction in the IBC.

If the proposed additions increase the design gravity load on portions of the existing roof members, these members would have to be reinforced and this incidental structural alteration of the existing structures would have to be accounted for in the scope of the alterations to the existing schools and would trigger requirements for alterations.

Alterations

Alterations that would increase the design gravity loads by more than 5 percent on any structural members would have to be reinforced.

If the proposed alterations of the structures increase the effective seismic weight on the existing structures due to the greater snow loads from the drifted snow against any proposed additions, or, by addition of equipment on the roof, the increase of the effective seismic weight from the drifted snow and the equipment would require that the existing lateral load resisting system comply with the requirements of the code for new construction in the IBC and it would increase the demand-capacity ratio on certain structural elements of the existing lateral load resisting system.

Work Area Compliance Method

Level 3 Alterations

If the proposed structural alterations of an existing structure are less than 30 percent of the total floor and roof areas of the existing structure, we have to demonstrate that the altered structure complies with the loads applicable at the time of the original construction and that the seismic demand-capacity ratio is not increased by more than 10 percent on any existing structural element. Those structural elements whose seismic demand-capacity ratio is increased by more than 10 percent shall comply with reduced IBC level seismic forces. The percentage increase in seismic demand-capacity ratio on any particular structural element from the added snowdrift load against the proposed addition would be fairly low, thus, this would not have any major impact on the existing lateral load resisting system, though we would have to verify that the increase in seismic demand-capacity ratio on any of those particular structural elements is not greater than 10 percent.

If the proposed structural alterations of an existing structure exceed 30 percent of the total floor and roof areas of an existing structure, we have to demonstrate that the altered structure complies with the IBC for wind loading and with reduced IBC level seismic forces.

The seismic design category (SDC) of the existing structures is 'B'; thus, the replacement of the existing roofs would trigger anchorage of un-reinforced masonry walls to the roof structures and bracing of un-reinforced masonry parapets to the roof structures. All un-reinforced masonry walls in the existing schools will have to be identified. These un-reinforced masonry walls are required to be anchored to the roof structures. Since there are no existing un-reinforced masonry parapets, this requirement does not have any impact on the structural scope of the project.

Additions

The proposed additions would be designed structurally independent of the existing structures, thus, they would not impart any additional lateral loads on the existing structures.

Comment

The compliance requirements of the two methods, in most respects, are very similar. The Work Area Compliance Method would trigger anchorage of un-reinforced masonry walls, if re-roofing of the existing structures is included as part of the scope for this project. The Prescriptive Compliance Method would require that the existing lateral load resisting systems meet the requirements of the code for new construction of the IBC, even for small increases of design lateral loads. We are required to comply with requirements of Appendix A1 of IEBC for either method, which requires anchorage of all existing masonry walls. Based on this, we would recommend the Work Area Compliance Method for the project.

Summary

The existing school structure appears to be performing well and all of the structural components that are visible appear to be in sound condition. Minor repairs are required to the exterior walls to repair the cracks and spalls.

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

plumbing review

The building is served by a single 6" domestic water service. This underground service pipe reduces to be 4" thru an isolation valve, bucket strainer, and into a Neptune water meter. The discharge from the meter is 2-1/2" to the building systems. The water piping is primarily soldered joint copper that is externally insulated.

Domestic hot water is provided by an A.O. Smith, natural gas fired water heater, model BC670780, 670 MBH, 563 GPH recovery, which was installed in 1982. This unit is functional but has exceeded its operational service life and should be replaced. Regular maintenance has to be performed to keep the unit running.

The heated water from the A.O. Smith water heater is routed to a Dominion, 2,538 gallon, hot water storage tank located in the boiler room. This tank appears to be original installed in 1962.

Two (2) Bell and Gossett model 1510 hot water circulation pumps are installed below the storage tank. These pumps have 4" diameter discharge pipes to service the building systems.

The building sanitary system drains by gravity to outside of building. The branch sanitary pipes are routed to the main sanitary collection pipe. This main sanitary collection pipe is installed under the corridor extending from the cafeteria, past the boiler room, into the art studio, and out the building to the east side driveway. The original installation consisted of a leeching field on the north side of the building under the athletic field. At some time in the past this sanitary pipe out of the building was re-routed to be under the east side driveway and routed to the main sanitary pipe under Gliniewicz Way at the front side of the building. The sanitary piping mains in the building are of cast iron hub type construction. Cleanouts are installed at the floor risers and in the floor slabs as required.

The kitchen utilizes a grease interceptor installed near the three bay sink and below the floor slab. This unit requires constant care and the drain water backs up occasionally. It appears that this trap cannot handle a constant flow from the sink drains.

Most of the plumbing fixtures are original. Some of the fixtures have been replaced in the past as required. Some of the urinals have been replaced with the Sloan waterless type. Most of the existing fixtures would have to be removed and new ones installed to comply with the most recent Plumbing Codes and Standards.

Natural gas piping has been installed to this building under the east side driveway. There are two separate services with separate meters presently being used in this facility.

> One service enters the building at the corner where the kitchen storage room is located. This consists of a 2" underground pipe into an American Meter model AL-1400. The meter discharges into a 3" gas pipe that serves the kitchen equipment. This supply pipe also serves the science lab tables.
>
> The second natural gas service is located along the east wall outside of the boiler room. This natural gas pipe is labeled as "Elevated Pressure". The underground pipe is a 2" and connects as a 4" to the Roots Meter, model 16H175, serial number 0605168. The meter discharge pipe is a 3" that is routed into the boiler room to service the boiler room equipment.

Exterior hose bibbs have been installed in locations along the exterior walls. These have not been installed with vacuum breakers. New freeze-proof hose bibbs with vacuum breakers will have to be installed to replace the existing hose bibbs.

The building roof storm drainage system consists of roof drains and riser pipes routed to an exterior underground storm collection system.

fire protection review

This building does not have a fire protection sprinkler system nor are there any existing provisions to have this system installed.

mechanical review

Boiler System

The heating for this facility is furnished by two (2) natural gas fired, Cleaver Brooks, model CB655-150, fire tube, hot water, boilers. The boilers each have two (2) 6" discharge header pipes on the top of the boiler that serve one main header pipe. The boilers are original and were installed approximately 1962. The boilers are operational but require regular maintenance to keep them functional. It appears that the boilers have been inspected and serviced regularly. The boilers have exceeded their normal service life and should be replaced with high-efficiency type units. The breeching for these units each have a barometric damper. The flue connects into a masonry chimney enclosure routed to the roof.

A new expansion tank was installed in 1998. This is a Extrol size 2000L, 125 PSI @ 240 degrees F.

The boiler controls are original and are of the pneumatic type. This control system is functional but requires constant maintenance to locate and repair pneumatic leaks and problems. A new Quincy Air Compressor, model QHPR5-10 was installed in 2010 since the previous one could no longer maintain the required system pressure. This entire control system should be removed and replaced with a digital control type of system.

The heating system incorporates a hot water supply and return loop. The classrooms are served by classroom ventilator units. The hot water valves for each ventilator unit are controlled by the dedicated room thermostat.

The boiler makeup air is accomplished through intake louvers in the side wall. There are no automatic damper controls to close the damper when the boiler is not in operation. Dampers are required by the Massachusetts Fuel Gas and Plumbing Code.

Air-Conditioning and Ventilation Systems

The original base building did not incorporate general space air-conditioning. The classrooms were each furnished with a dedicated exterior wall Nesbitt classroom unit ventilator with a fresh air louver and hot water heating. The fresh air duct has an automatic damper to open when the unit is energized and closes when the unit is de-energized. These units are very old and have exceeded their normal service life. Some of the ventilator units have been replaced but many are original. The fresh air damper operation could not be verified. It appears that these units have been properly maintained but these units require regular maintenance to keep them operational. These units should all be removed.

Some classrooms and offices have been furnished with dedicated air-conditioning units. The existing dedicated thermostat for each room only controls the respective classroom ventilator. There are no controls in place to prevent simultaneous heating and cooling of these spaces. The ventilators are required to be energized so that the fresh air damper will open to satisfy the fresh air to the space but this will also energize the hot water valves to be open.

The classrooms generally are not air-conditioned. Certain rooms and classrooms have been furnished with dedicated air-conditioning units as required such as:

The library uses two (2) wall-mounted ductless split units.

The computer classroom utilizes two (2) Friedrich self-contained portable units.

The main office utilizes a Sanyo recessed ceiling split system unit.

The Principal's office utilizes a window air-conditioning unit.

The guidance office utilizes a air-handler split-system for cooling.

Other offices utilize window air-conditioning units as required.

IT closets have portable cooling units as required.

Each classroom incorporates an exhaust grille located on the corridor wall. The grilles are approximately 14"x14". Many of these grilles have been blocked by file cabinets or furniture. All of these grilles are connected to riser ducts to roof exhaust fans. The roof exhaust fans are controlled by occupied / unoccupied timer circuits in the building. This riser duct arrangement connecting the various rooms and on different floors is a violation of the mechanical and fire codes and creates a potential for dangerous situations to occur. A fire or smoke situation in one area would be allowed to spread through these riser ducts and grilles since none of them have smoke or fire dampers. The riser ducts are also required to be in fire rated chases between the floors up to the roof.

Each bathroom incorporates an exhaust grille connected to riser ducts to roof exhaust fans. The roof exhaust fans are controlled by occupied / unoccupied timer circuits in the building. This riser duct arrangement connecting the various bathrooms and on different floors is a violation of the mechanical and fire codes and creates a potential for dangerous situations to occur. A fire or smoke situation in one area would be allowed to spread through these riser ducts and grilles since none of them have smoke or fire dampers. The riser ducts are also required to be in fire rated chases between the floors up to the roof.

The gymnasium has its own dedicated heating and ventilation system. The supply air is provided by two (2) heating-only air-handling units located in the basement. The supply and return ductwork are routed to wall grilles on the north and south walls of the gymnasium. The return ductwork also has a connecting duct for fresh air. Both units appear to be original and are in poor condition. The controls appear not to be functional. The return and fresh air ductwork is rusted at the floor level. The ductwork for one of the units is totally rusted and the integrity of the ductwork is gone. The exhaust system for the gymnasium consists of two (2) propeller fans mounted in the south wall above the main entrance. These fan boxes appear to have operational backdraft dampers. The fresh air duct does not have an operational automatic control damper which is not in compliance with the current International Energy Conservation Code.

The kitchen incorporates its own dedicated exhaust system. There are downflow roof exhaust fans to serve the dishwasher hood and the center equipment hood. All of the primary cooking appliances are installed in the center of the kitchen. One large hood exhausts this entire central area. A few sections of the hood are protected with an Ansul system with distribution heads. The layout of these appliances creates a situation where a fire could spread to adjacent equipment that is not protected by the ansul system. The roof exhaust fans do not comply with the mechanical codes. The roof fans should be the upblast type. The fan should also be mounted on a vented curb with a curb extension to be further from the roof surface. The fan should also have a grease collection cup for cleaning.

electrical review

The building's 2000 amp, 120/208 volt, three phase, four wire fused main disconnect switch located in the switchboard within the Basement Main Electric Room is fed by an underground electric utility company transformer in a manhole, via underground conduit and cabling in ductbank and an electric utility company meter. The primary electric service comes from an electric utility pole via underground conduit and cabling in ductbank. The electric service to the School appears to be original to the building and is in poor condition.

The switchboard feeds panelboards in the Main Electric Room as well as panelboards on all floors. Some of the panelboards are split bus type with the top portion being normal power and bottom portion being emergency. Staff indicated that some panelboards have been replaced with new due to failure of existing panelboards although the existing wiring was left as original. Most of the power distribution appears to be original to the building and is in poor condition.

The building has a 60 kW natural gas fired generator located in the Main Electric Room. The automatic transfer switch is located within the switchboard. The automatic transfer switch feeds the emergency distribution in the switchboard, located below the automatic transfer switch. The emergency distribution in turn feeds the bottom portion of the split bus panelboards. There are numerous deficiencies as it relates to current Codes including spilt bus panelboards which are not dedicated to emergency loads, the automatic transfer switch and emergency distribution is located in the normal switchboard, optional and standby loads mixed within same panelboards, emergency panelboards which are not fed by two hour rated feeders and are not within two hour enclosures. The emergency power distribution appears to be original to the building and is in poor condition.

There are two fire alarm control panels in the Main Office; a Firelite Sensiscan 1000 which appears to be the original panel and an FCI 72 panel below it which appears to be an added sub-panel. The original eight zone conventional Firelite fire alarm control panel zones are labeled Activity Room, 1st Floor, 2nd Floor, 3rd Floor, Zone 2, East Wing, Locker Room, and there is one spare zone. The FCI panel zones are not labeled. An exterior pedestal mounted local energy master box is fed by the electric utility pole via underground conduit and cabling in ductbank, with the master box connecting to the Fire Lite panel. There are two exterior mounted knox boxes. Deficiencies of the fire alarm system includes inadequate smoke detector coverage in Corridors and Stairs, no fire alarm initiating (smoke and heat detectors) devices in Classrooms and rooms other than Boiler Room and Storage, points of egress without pull stations including Stairs and egress doors, pull stations not at ADA heights, inadequate notification appliance coverage in rooms including Assembly spaces and Classrooms, and building has mostly horn/lights, not strobes or horn/strobes as required by ADA. Most of the fire alarm system appears to be original to the building and is in poor condition.

Staff indicated that the original lighting fixtures were replaced with new or existing wereretrofitted with new T8 lamps, via electric utility company program. Interior lighting is made up of wraparounds, volumetrics, microcubes, prismatics, industrials, strips, wall sconces, and industrial high bays. Exit signs have green lettering. There are some emergency battery units in the building including in Toilet rooms and in the Art Room. Staff also indicated that most of the original Classroom local wall switches were replaced with new combination wall switches/occupancy sensors. Other forms of control include local keyed switches and regular switches. The Activities Room has a dimming rack with Stage lighting fixtures. The interior lighting appears to be in fair condition.

Exterior lighting is made up of building mounted wall packs and roof mounted floodlights with high intensity discharge lamps, LED wall sconces, and LED

floodlights on original poles lighting the parking lot. Parking lot lighting does not appear to be adequate. The exterior lighting appears to be in poor condition.

Receptacles and switches are mostly brown and white with stainless steel plates. Receptacles are ground type. The Kitchen has some receptacles which are not GFCI type as required by the NEC. There are some TVSS type receptacles in the building. Receptacles have been added over the years through the use of tele-power poles, plugmold, and wiremold.

The building does not have a lightning protection system.

massachusetts state building code: 780 cmr and life safety issues

The Massachusetts State Building Code (780 CMR) has been updated and amended a number of times since the construction of the building. The State Board of Building Regulations and Standards regularly updates and amends its regulations. Based on these regulations, we found the following items to be in non-compliance:

- Occupied spaces (classrooms and offices) currently provide an entrance from within an egress stairway.
- Egress stairway enclosures, including door assemblies, require a minimum one-hour fire separation assembly.
- Two means of egress from spaces having an occupant load of greater than 50.
- Fire extinguishers.
- Fire separation assembly between Use Group E (Educational) and Use Group A-3 (Assembly – Cafeteria, Gymnaisum) (one-hour fire separation required).
- Handrail and guardrail at egress stairways.
- Electrical panels in classrooms and corridors.
- No sprinkler system.

Energy Conservation

The Abington High School was constructed in 1962, which was prior to the historic energy shortages of the 1970s and escalating oil prices of 2005. The emergence of a new energy code in 2000, which promoted an increased knowledge of exterior building envelope construction techniques and materials, has dramatically changed the way in which buildings respond to energy efficiency issues. The Abington High School building does not include a single component, including the replacement windows (exterior walls, roof, etc.) that would meet the current energy code or any of the typical guidelines for conscientious energy consumption.

handicap accessibility review (aab & ada)

Requirements for handicap accessibility in building planning and design were non-existent in 1962 when this building was originally designed. However, on January 26, 1992, the Department of Justice implemented Title III of the American with Disabilities Act (ADA) into Public Law. Additionally, on September 1, 1996, the Commonwealth of Massachusetts developed its own accessibility regulations: 521 CMR Architectural Access Board (AAB), which in some instances is more restrictive than ADA guidelines. The ADA and AAB regularly update and amend their regulations.

These regulations "prohibit discrimination on the basis of disability by private entities in places of public accommodation." The regulations require all new places of public accommodation, including schools, to be designed and constructed so as to be readily accessible to and usable by persons with disabilities. Existing structures being renovated that exceed 30% of the equitized assessment of the building or its replacement value must fully comply with the regulations for new construction.

Abington High School's accessed building value is $9,640,100, therefore any renovations or additions to the existing school that exceed the cost of $2,892,030 would require full compliance with the regulations for new construction.

Based on these regulations, we found the following items to be in non-compliance or not accessible to the disabled:

- All doors leading to all rooms in the school including classrooms, gymnasium, library, administration, etc. Non-conforming knob-type hardware currently exists. Lever handles are required.
- The main public entrance to the building is not accessible.
- All entries into classrooms require clear floor space adjacent to latch side of the door for entry and exit.
- To enter the lower portion of the "E-wing" a person must travel through a ramp in the Cafeteria and then re-enter the hallway.
- Location of Central Administration on 2nd floor.
- Check-in counter at Administration Office.
- Lack of proper interior building signage (braille).
- Toilet and shower rooms.
- Water fountains.
- Library Circulation Desk.
- Ramps must be reconfigured for proper handicap slope and handrails.
- All stairs (handrails and nosing).
- Alarms and strobes within classrooms.
- Access to stage from main floor within Music Room.

Each of the inaccessible features listed above has an impact on the ability of disabled students or members of the community to access various spaces throughout the school independently. Disabled persons may include students with permanent handicap condition, students that are temporarily disabled from athletic activity, and parents, staff or other visitors that could have any form of disability. Any future plans should incorporate as many items as possible to accommodate disabled people to the fullest extent possible.

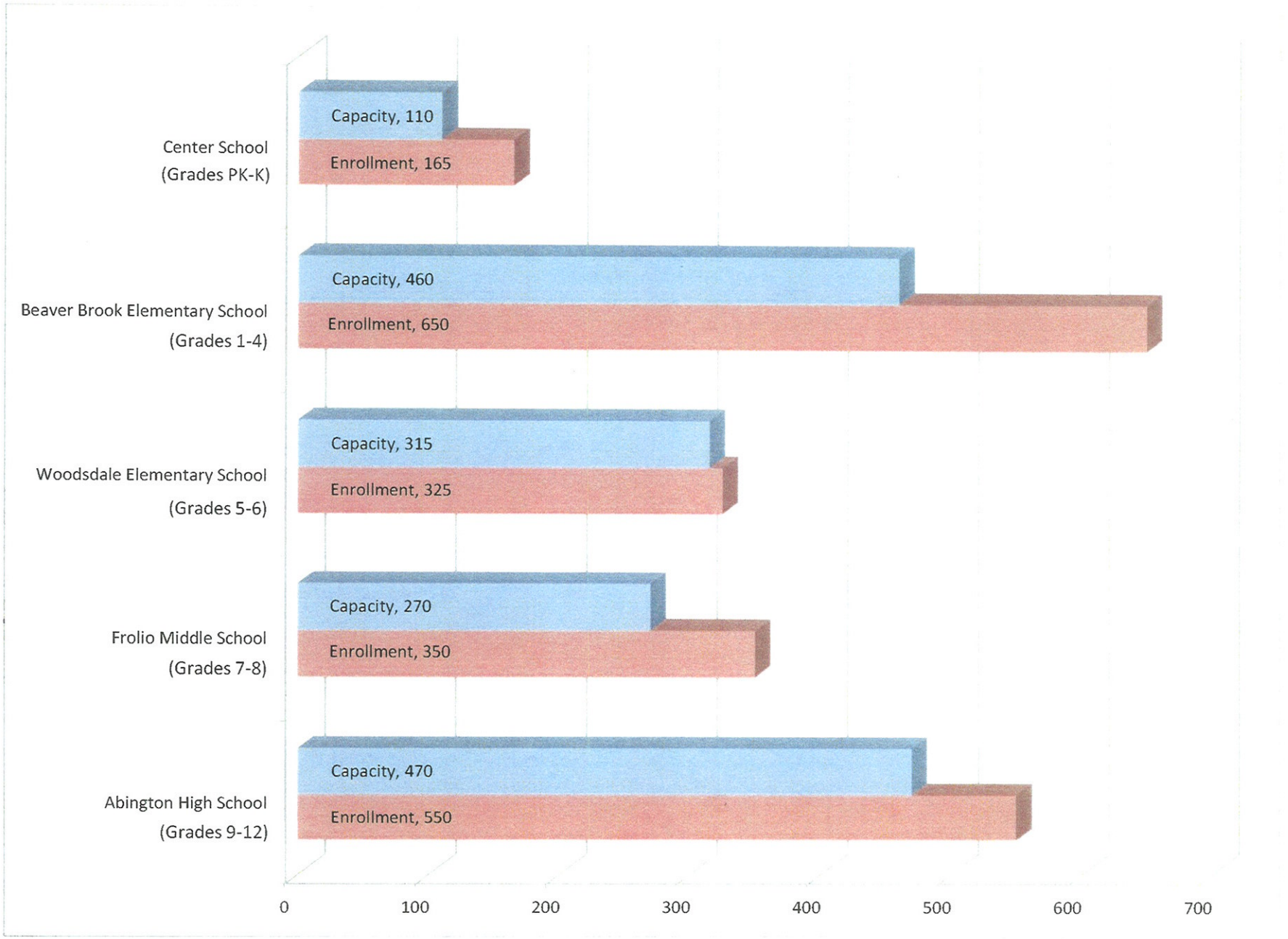
historical analysis

The Abington High School currently is not listed on the National Register of Historic Places and does not appear in the Massachusetts Cultural Resource Information System.

Although the property is not listed on either of these databases it may to preclude it from a review by the Massachusetts Historical Commission.

Per 950 CMR 71.00, any project that is undertaken by a local government that seeks the provision of financial assistance by a state body (MSBA) is required to submit a "Project Notification Form."

As part of this process the, either the state body or the local goverment is required to provide notice to the Massachusetts Historical Commission (MHC) of the project. After receipt of notice the MHC will review any adverse affects, direct or indirect, from the proposed project on any property listed in the State Register of Historic Places. If the MHC determines that a project will have an adverse effect on a State Register property, then the MHS, the state body, and the local government will consult to discuss ways to eliminate, minimize, or mitigate the adverse effects. The local government must adopt all prudent and feasible means to eliminate, minimize, or mitigate the adverse effects.


Center School
(Grades PK-K)
Capacity, 110
Enrollment, 165
Beaver Brook Elementary School
(Grades 1-4)
Capacity, 460
Enrollment, 650
Woodsdale Elementary School
(Grades 5-6)
Capacity, 315
Enrollment, 325
Frolio Middle School
(Grades 7-8)
Capacity, 270
Enrollment, 350
Abington High School
(Grades 9-12)
Capacity, 470
Enrollment, 550
0
100
200
300
400
500
600
700

1	Major Milestones Timeline
2	Facilities Evaluation
3	Site Evaluations Summary
4	Educational Visioning Summary Document
5	Educational Programming Document
6	Introduction Document
7	Space Summary Documents
8	Options Considered Document
9	Evaluation Matrix
10	Draft of Cost Analysis Options
11	Cost of New School vs. Renovation Document
12	Review of Major Milestones

Site Development Requirements

review of potential school sites

Our review of possible school sites within the Town of Abington included a review of those sites mentioned as part of the 2003 Master Plan Study. In that study, many sites across the Town of Abington were reviewed as possible candidates for a new school facility. Over 20 parcels were identified as potentially having enough acreage to support a new school facility, without any specifics on the site characteristics that might possibly restrict or prohibit development of the land. In order to ensure that all possible sites were considered under the current feasibility study, sites which may have been identified in the past were reviewed in combination with any other suggested sites. Most of the sites that have sufficient acreage also have significant restriction such as wetlands, limited access, impractical grading (too steep), lack of utilities, etc.

There are many economic, geographic, and physical impacts that need to be reviewed and considered when identifying an appropriate site for the development of an educational facility. Economic impacts include the cost of the site to the Town as well as the costs associated with supplying the various required utilities to the site. Geographic impacts include proximity to the Town's residences, downtown and other schools. Physical impacts include buildable area, resource areas onsite, existing uses and structures on the property and access to the property.

It is also important to note that building a new school on a site that already includes the development of a school can have significant benefits and potentially save the Town millions of dollars. MSBA guidelines typically allow reimbursement grant money on site costs of up to 8% of building construction costs. Since most schools built on new sites exceed this 8% cap by a significant amount due to the need for new utilities, drainage, grading, etc., it is common for new building projects (on sites not previously developed for a school) to have substantial site costs that the Town will not be reimbursed for, and will therefore have to pay 100% of such costs. These costs can be millions of dollars. New school projects that build on existing school sites or additions to existing schools typically have reduced site costs, and this site cost differential is likely to be a 100% savings to the Town of Abington. Additionally, since existing Abington schools are on town sewer and new sites may not be, the substantial cost of on-site sewage disposal, if required, could be a significant unreimbursed cost to the Town. One example of this would be the new high school in East Bridgewater, where the lack of sewage utilities resulted in an additional $3.0 million cost for a wastewater treatment facility on the school site.

The following parameters were used to initially review and evaluate potential properties:

Cost of Property

Some of the properties under consideration are not currently owned by the Town. Any property currently not owned by the Town and costing over $1.0 million was eliminated from consideration, as the Town does own property that is sufficiently sized, well located, and having the required utilities; therefore paying a $1.0 million premium does not seem practical.

Location in Town

The location within the Town is an important consideration for busing and access. Sites at the

perimeter of the Town may not be as desirable due to increased busing costs and lack of easy accessibility for the people in Town to utilize the school and its facilities.

Restricted Access

Undesirable scenarios for access apply to sites with no frontage or requiring access through a minor street. If the site has no frontage, additional land would need to be purchased or an easement would need to be obtained. Access to the property through a neighborhood or on a minor road would have potentially negative impacts on the area and the abutters.

Buildable Area

The amount of buildable area on the property may be restricted due to one or more of the following: lot size, building setbacks or wetland resource areas. Based on the similar uses and some conceptual layouts, it was determined that some of the sites did not provide enough buildable area.

Abutting Properties

The area surrounding each site was evaluated to determine if it provided an appropriate context for a school environment. Abutters that were favorable included residential areas, commercial areas, and roads that have existing sidewalks. Areas that were less desirable included industrial areas and roads with high volumes of traffic and a lack of existing sidewalks.

The table below lists all of the sites that were considered as well as the reason(s), if any, for each site's elimination from further consideration. Additional details explaining the reason(s) for each site's elimination is provided below the table. Site 5 was the only site that was not eliminated, even though it involved some of the same limitations and constraints as the other sites. It was determined that Site 5 presented many benefits that far outweighed the limitations including, but not limited to, its central location, ease of access, available utilities, and low cost.

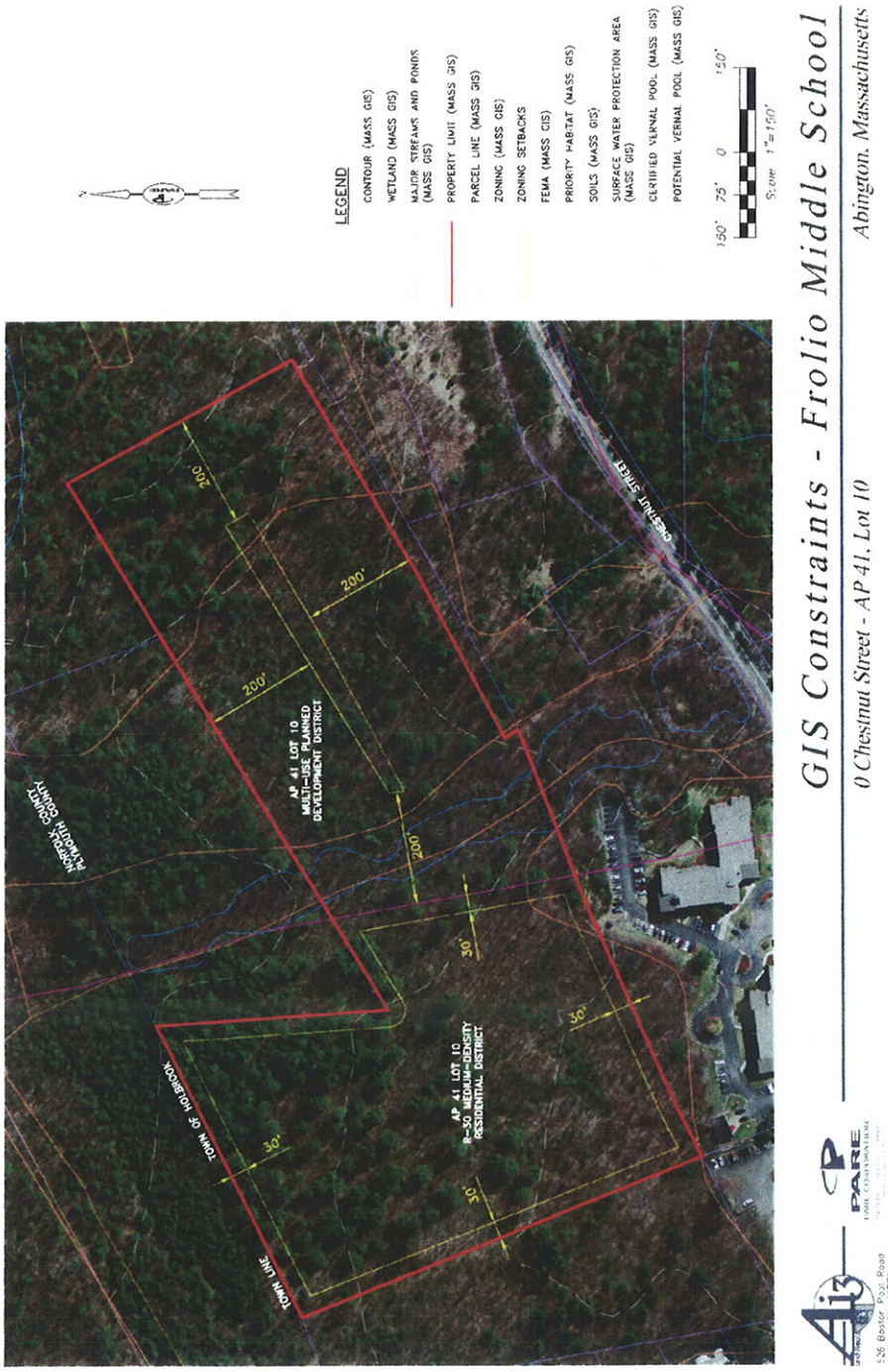
Site		Reason(s) for Elimination
1	0 Chestnut Street	Location in Town Restricted access
2	1015 Plymouth Street	Location in Town
3	589 Plymouth Street	Lot Area
4	Dorsey Street	Buildable Area
5	Existing High School Property	
6	0 Adams Street – AP 69, Lots 1, 1A, and 1B	Location in Town Buildable area Abutting Properties
7	1325 Bedford Street	Location in Town Abutting Properties
8	500 Gliniewicz Way	Buildable area
9	0 High Street	Location in Town
10	500 Chestnut Street	Location in Town Restricted Access
11	0 Hancock Street	Location in Town
12	0 Rockland Street	Buildable Area
13	0 Chestnut Street – AP 48, Lot 10	Location in Town Restricted Access
14	375 Centre Avenue	Property Acquisition Cost Location in Town Existing Site Use
15	0 Linwood Street	Buildable Area
16	0 Vineyard Road	Restricted Access
17	0 Granite Street	Buildable area
18	326 Plymouth Street	
19	0 Chestnut Street – AP 50 Lot 5	Buildable area

20	651 Randolph Street	Location in Town Restricted Access
21	95 North Quincy Street	Location in Town
22	0 Chestnut Street – AP 50, Lot 43	Buildable Area
23	164 Washington Street	Property Acquisition Cost Location in Town
24	0 Adams Street – AP 65, Lot 120	Location in Town Restricted Access – Railroad Crossing
25	1071 Washington St.	Buildable Area Existing Site Use

Eliminated Sites

Site 1
0 Chestnut Street

The property at 0 Chestnut Street does not have any frontage on a town road. Access to the site is limited because an easement through another lot or the purchase of additional land would be required. Additionally, the site is located in the western portion of the Town, rather than centrally located within the Town's developed residential districts and therefore does not provide ease of access to potential users of the facilities.



Site 2
1015 Plymouth Street

This site is located in the southeast corner of the Town and therefore does not present appropriate proximity to all residents.

Site 3
589 Plymouth Street

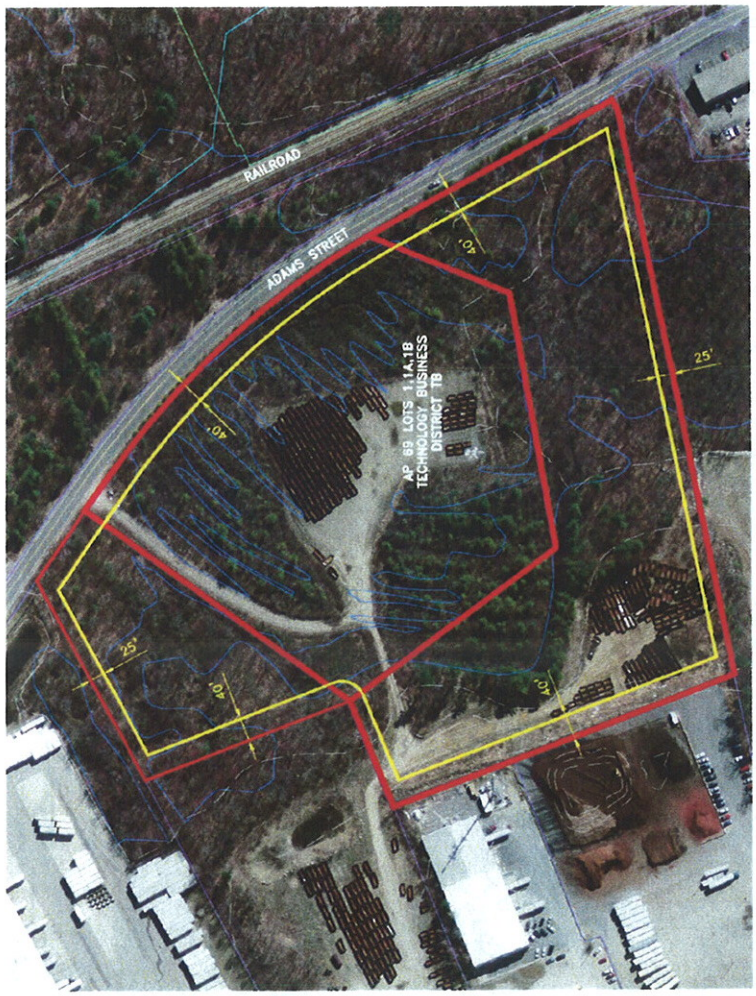
With less than 2 acres of buildable area, this site does not provide adequate area to effectively house a new middle school with all the necessary facilities.

Site 4
Dorsey Street

The buildable area of this site is limited by existing surface drainage features on the property and includes previously subdivided land with paved streets. These restrictions decrease the feasibility of the site to conveniently host a new school facility.

Site 6
0 Adams Street

This site is located in the northeast corner of the Town. This location does not provide desired access for town residents. Additionally, the buildable area of the site is significantly reduced due to wetland restrictions. The abutting properties are zoned for technology business and are used for industrial purposes, which does not provide a strong benefit or connection to the school being constructed at this site.



GIS Constraints - Frolio Middle School

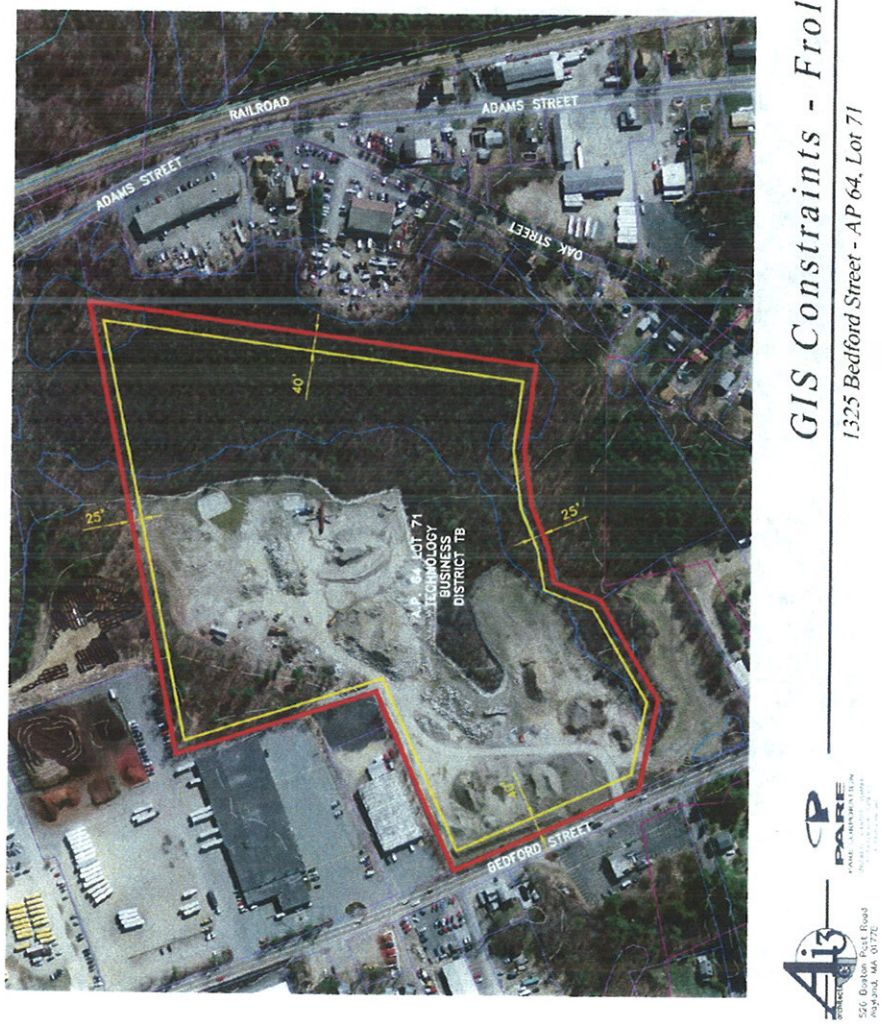
0 Adams Street - AP 69, Lots 1.1A.1B

Abington, Massachusetts

526 Boston Post Road
Hopkinton, MA 01748

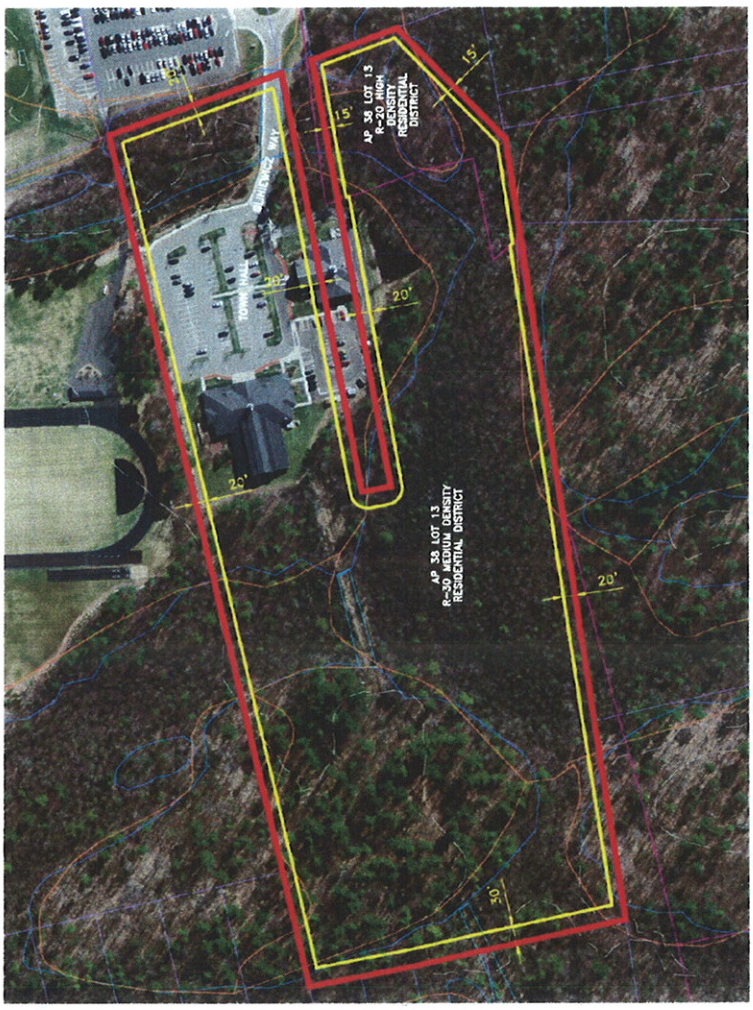
Site 7
1325 Bedford Street

This site is located in the northeast corner of the Town and is too remote for many of the town residents. Additionally, the abutting properties are zoned for technology business and are currently used for industrial purposes.



Site 8
500 Gliniewicz Way

The buildable area of this site is limited by wetland features and the existing town hall and library leaving insufficient connected area to comfortably host a new school building and facilities.



Site 9
0 High Street

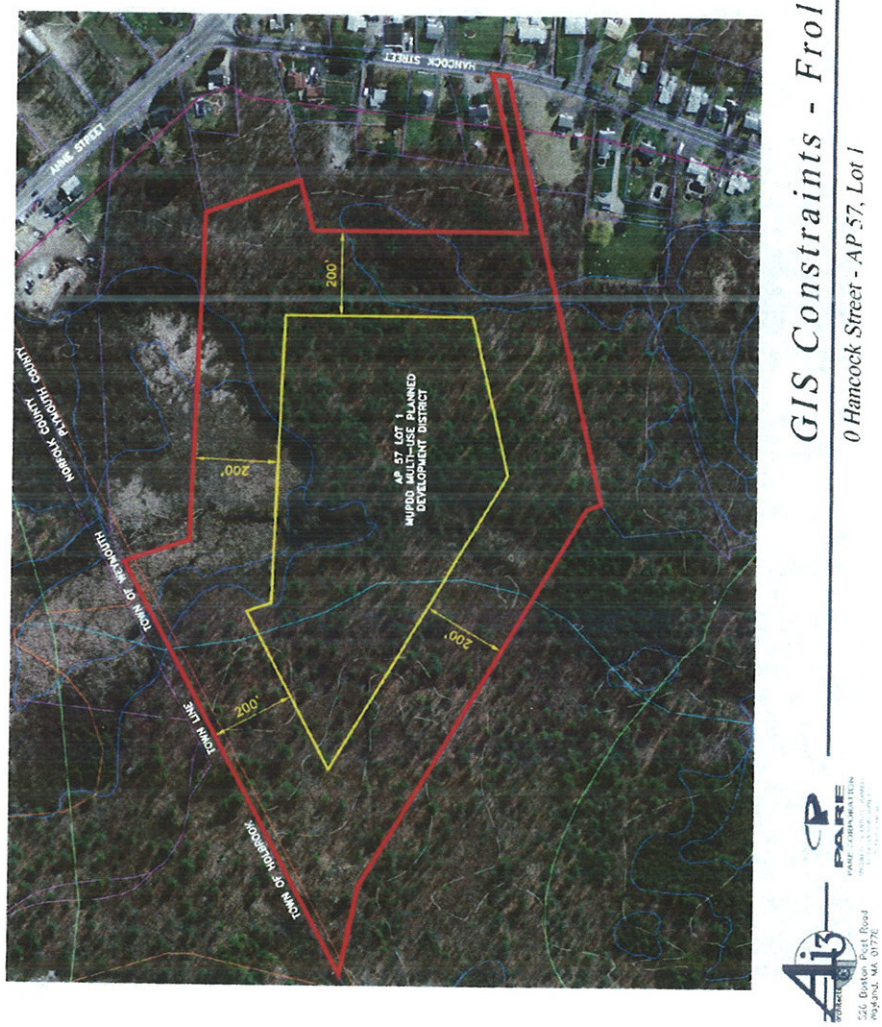
This site is located at the southern border of the Town. Being on the outskirts of town, this location does not provide ideal access to all potential users of the facility.

Site 10
500 Chestnut Street

This site is located in the western portion of the Town, far from the Town's developed residential areas. This location is not ideal to facilitate the best access for potential users of the facility. Additionally, this property is not adjacent to a town road. Access would need to be gained through the purchase of additional land or through an easement through another property.

Site 11
0 Hancock Street

This site is located in the northwest corner of the Town. This remote location is not situated centrally within the Town's developed residential districts and therefore does not provide ease of access to potential users of the facilities.



Site 12
0 Rockland Street

This site is segmented by water bodies including a pond. These natural features restrict and segment the buildable area of the site reducing the feasibility of the site to effectively house a new school.

Site 13

0 Chestnut Street - AP 48, Lot 10

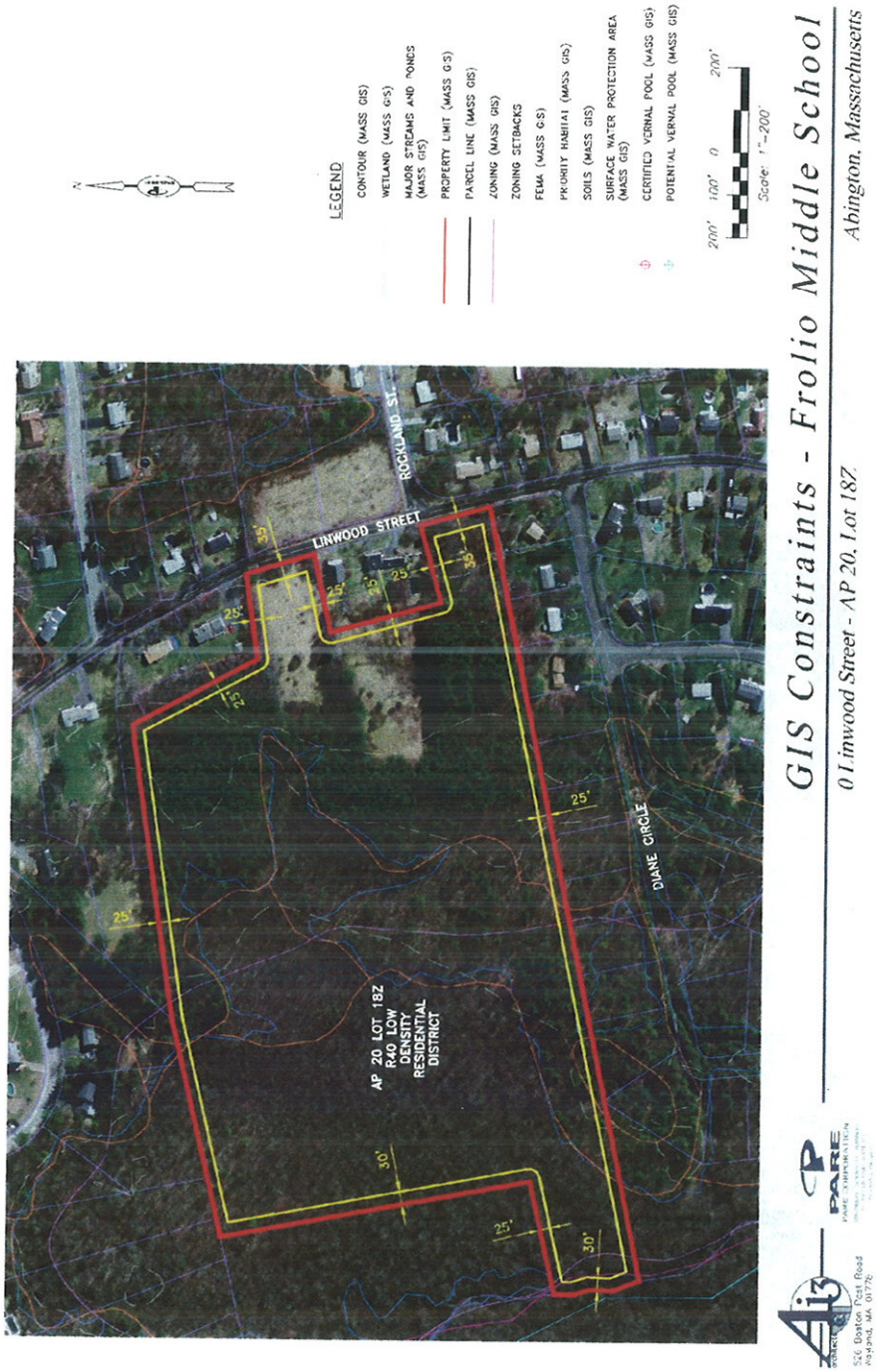
This site is located in the western portion of the Town, far from the Town's developed residential areas. This remote location is not ideal to facilitate the best access for potential users of the facility. Additionally, this property is not adjacent to a town road. Access would need to be gained through the purchase of additional land or through an easement through another property.

Site 14
375 Centre Avenue

This property is currently not under ownership by the Town and is developed for business purposes. The development of the land creates a high property value that would make acquisition of the property costly. Additionally, the property is located on the southeastern Town border, allowing unequal access for potential users of the facility.

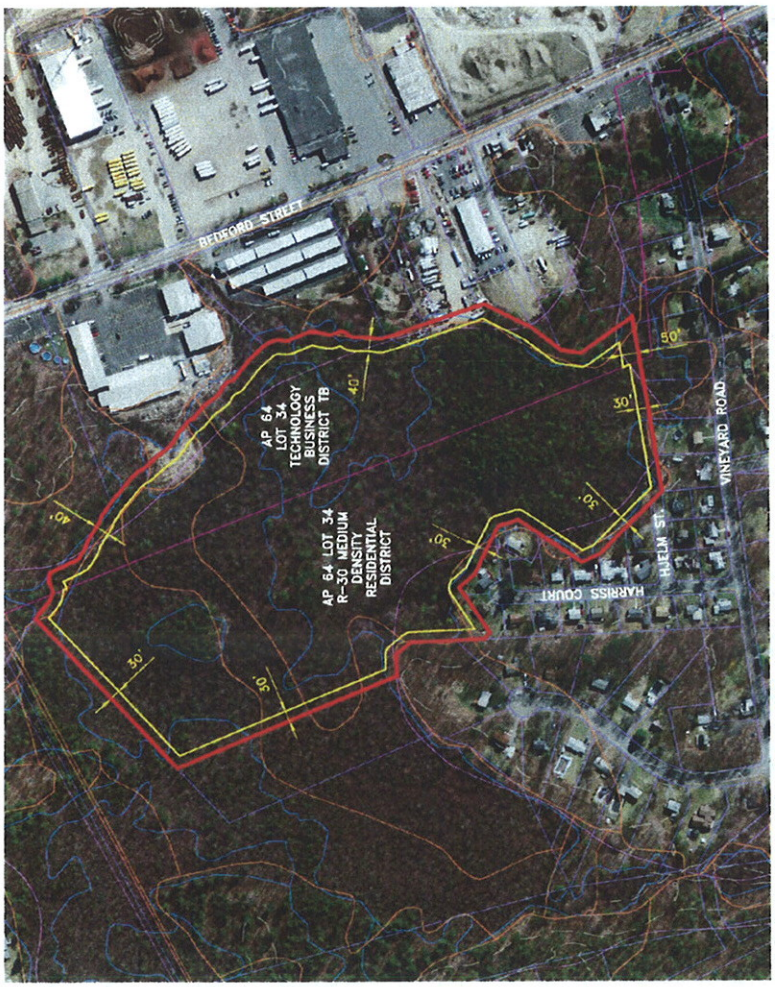
Site 15
0 Linwood Street

This site is characterized by wetland features on the property. These areas limit the amount of buildable area of the site and the potential for the site to effectively house the proposed facilities.



Site 16
0 Vineyard Road

The portions of this site that are not limited by wetland features are abutted by residential and commercial properties and are not adjacent to a town road. Access would need to be gained through the purchase of additional land or through an easement through an existing development.

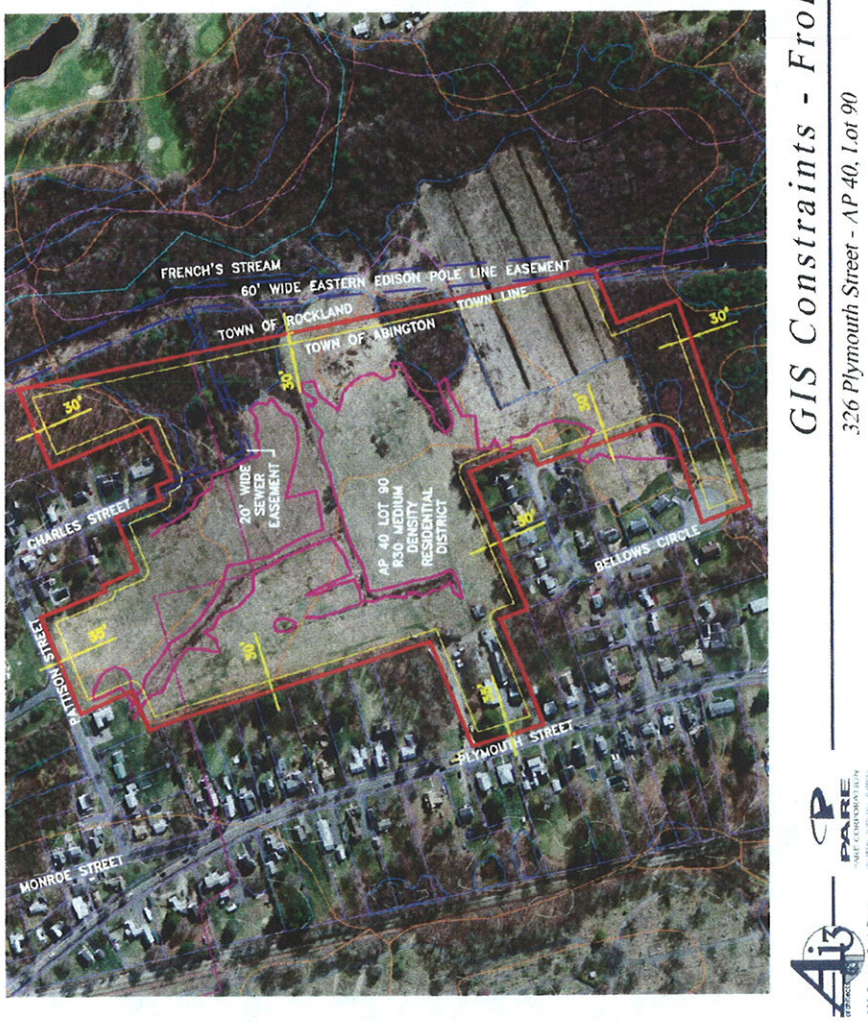


Site 17
0 Granite Street

This site is occupied almost entirely by a water body eliminating nearly the entire property from the buildable area.

Site 18
326 Plymouth Street

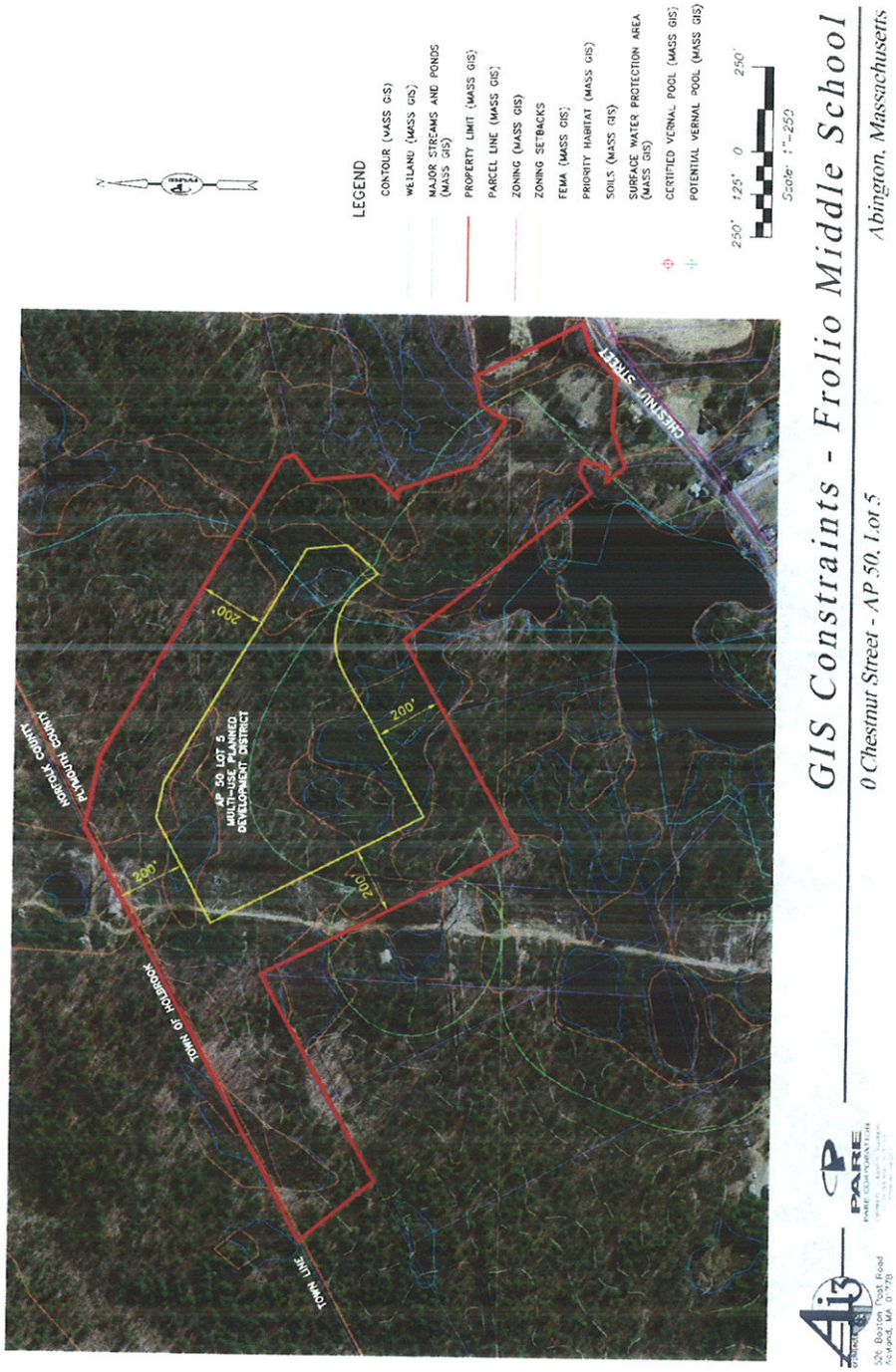
This property remains as a viable property for a school; however, the available area is limited as a result of the wetland features and utility easement on the site. The available area would likely allow for a single school (such as a middle school), but would not support a larger co-located school and would not provide fields and other site amenities to support a co-located middle/high school facility. Additionally, the costs associated with clearing and grading the property, as well as providing the appropriate utilities, would also be significant (millions of dollars) compared to a site such as the existing high school site.



Site 19

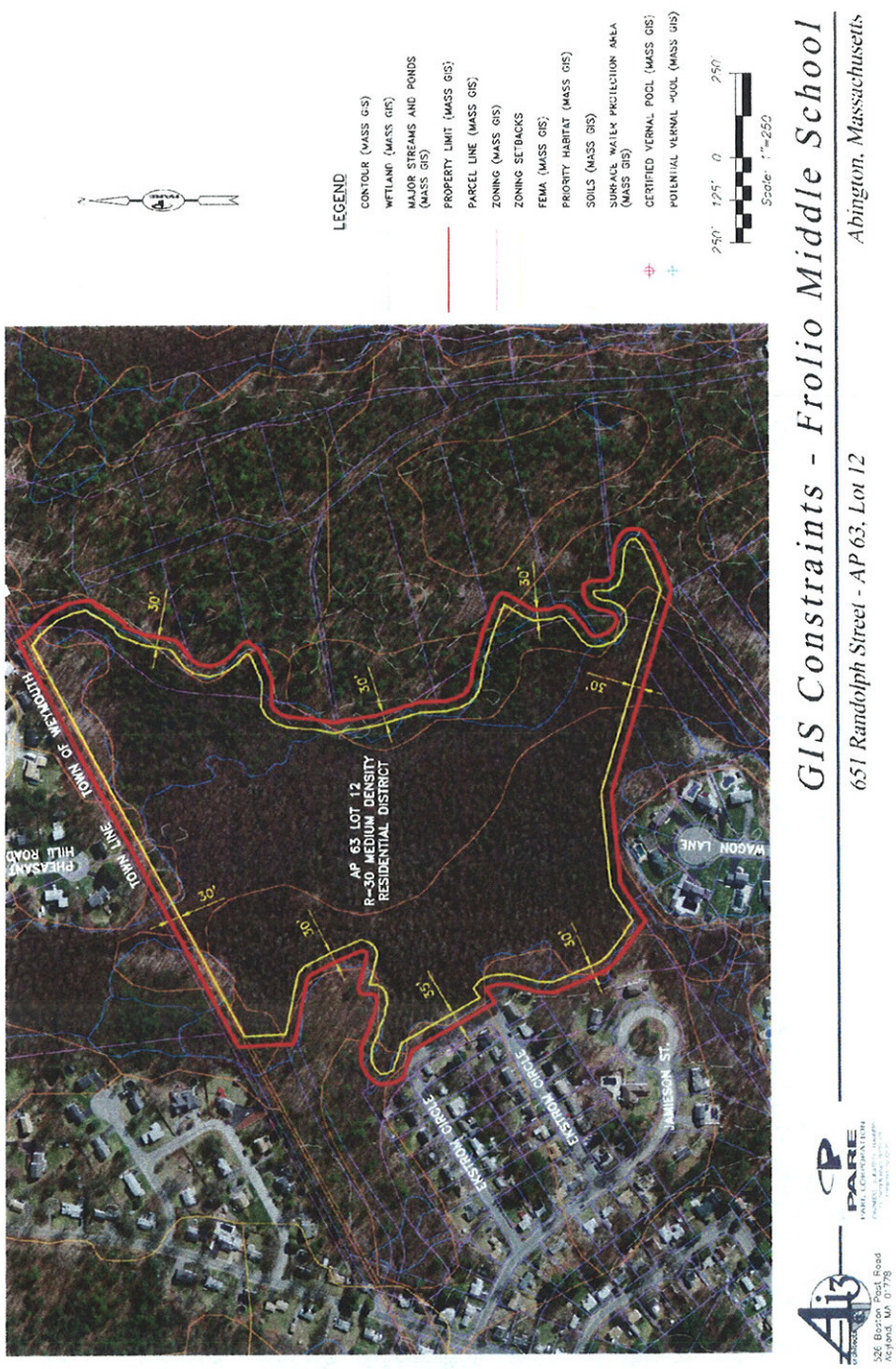
0 Chestnut Street - AP 50, Lot 5

The buildable area of this site is limited by wetland features, NHESP priority habitat area, and building setbacks specified by a zoning bylaw of the Town of Abington. These limitations decrease the site's ability to practicably house the school facility.



Site 20
651 Randolph Street

This site is located on the northern border of the Town. Its non-central location does not provide equal ease and accessibility for all members of the Town. Additionally, the property does not abut a town road and access would need to be gained through the purchase of additional land or through an easement through an existing development.



Site 21
95 North Quincy Street

This site is characterized by wetland features on the property. These areas limit the amount of buildable area of the site and the potential for the site to effectively house the proposed facilities.

Site 22

0 Chestnut Street - AP 50, Lot 43

The buildable area of this site is limited by wetlands, water bodies, NHESP priority habitat, and a utility easement reducing the site's ability to effectively house the school facility.

Site 23
164 Washington Street

This site is currently developed as a golf course. The value of this land would make the cost of acquisition prohibitive. Additionally, the property is located along the southern border of the Town. This remote location does not provide evenly distributed ease of access for potential users of the facility.

Site 24

0 Adams Street - AP 65, Lot 120

This site is located in the northeastern corner of the town. This non-central location does not provide evenly distributed ease of access for potential users of the facility. Additionally, access to the site is prevented by railroad tracks along the western property border.

Site 25

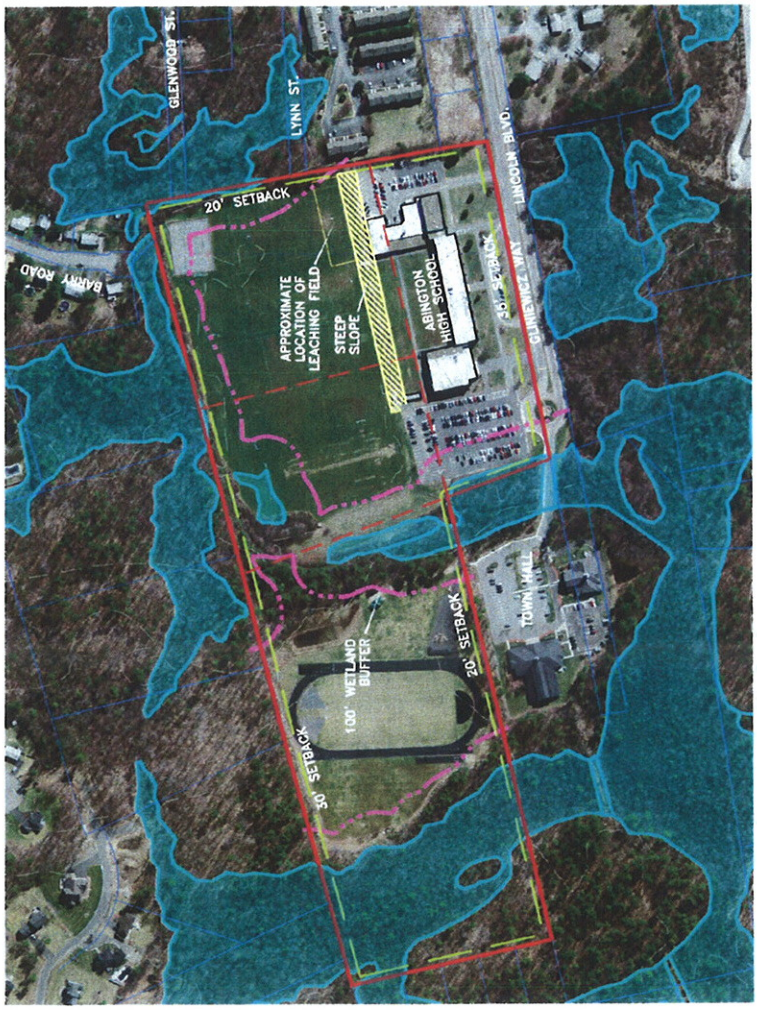
1071 Washington Street (Existing Frolio Middle School)

This site is currently being used for the existing Frolio Middle School. The memorial athletic fields located at the rear of the property occupy land owned partially by the School Department and the Soldiers, Sailors, and Marines Memorial and have limited protection from development other than recreational use. The available land owned by the School Department along with the recreation restriction does not provide sufficient area for the construction of a new facility while the existing school is in use.

existing conditions site plan of existing high school site

Site 5
Existing High School Property

Attached is a site plan indicating some of the initial site constraints described on the site. Additional details are described below.



Existing Conditions and Site Plan - Frolio Middle School

Abington High School - Site Analysis - Figure 1

Abington, Massachusetts

326 Boston Post Road
Wayland, MA 01778

The existing high school Site (the Site) is located on approximately 41 acres of land owned by the Town of Abington School Department. The Site is accessible from the south via Lincoln Boulevard and Gliniewicz Way. Properties abutting the Site include the Abington Public Library and Town Hall to the southwest and woodlands and residential property to the north. There are commercial properties abutting to the south and east of the property along Route 18. The Site is currently developed and includes the Abington High School, fields, and a running track. The Site is furnished with paved parking areas, paved drives, and storage buildings. The Site is located on 4 parcels of land, Assessors Map 38, Block 38, Parcel Numbers 10, 11, 12, and 14, at 201 Gliniewicz Way.

The proposed Site design will need to take into consideration, and interact with, the existing school uses. Through construction phasing, planning, and coordination, the new school will be able to be constructed while all existing building uses and associated utilities remain available and able to operate in a safe and effective manner.

Natural Environment

Topography

The topography of the Site pitches gradually to the south of the property from the north. The highest elevation on site appears to be at the existing building and the lowest elevation at the north edge of the athletic fields. The grade drops steeply approximately 5 feet in grade into the existing athletic fields along their southern and western edges.

Soils

Existing soils were evaluated based on the USDA Natural Resource Conservation Services Web Soil Survey. In the existing high school and athletic field portion of the Site, soils primarily include Udorthents, loamy and wet substratum. These soils have moderate to slow permeability and typically have bedrock at greater than 80 inches below existing grade and groundwater at greater than 80 inches below existing grade. These soils are humanly altered and can include lands located on outwash plains and deltas. In the wooded areas of the Site, soils consist of Ridgebury fine sandy loam which is extremely stony and ranges from 2%-8% slope. The soils are typically poorly drained, bedrock is typically down 60 inches and the seasonal high groundwater is 1.5 feet below the ground surface. It is not anticipated that these soils would prevent some issues with development; however a majority of this soil type overlaps the wetland resource areas onsite which are not suitable for development anyway. Based on this preliminary review of onsite soil condition, it appears that the proposed development would be impacted significantly by the soils in the cleared and developed areas.

Wetlands

After review of the Massachusetts GIS layers, it does appear that there are a few wetlands located along the western property line in the undisturbed forested areas as well as the central portion of wooded area. If determined to be jurisdictional wetlands in an environmental review, these areas will have a minimum 100 foot regulatory buffer.

After review of the MASSGIS certified and potential vernal pools layers, the Site does not appear to have potential or certified vernal pools as defined by the Natural Heritage and Endangered Species Program (NHESP).

According to the Flood Insurance Rate Maps for Abington available through FEMA (Federal Emergency Management Agency), this Site is located entirely in Zone X. A Zone X is defined by FEMA as areas of 0.2% annual chance flood. There are no restrictions for development in the Zone X area.

Rare Species and Cultural Resources

Information regarding rare species was obtained from the MASSGIS Rare Species and Priority Habitat data layer showing data recorded by the NHESP in the State Registry. Review of this information indicates that there are no significant habitat areas within the Site.

Zoning Regulations

According to the "Zoning Map, Town of Abington, Massachusetts", the Site is located in an area zoned Medium Density Residential (R-30). Municipal buildings including educational facilities require a special permit within a Zone R-30 according to Article V Use Regulations of the Zoning Regulations. Applicable sections of the Zoning Regulation indicate the following would control the development on this Site:

Medium Density Residential District:

- 30,000 sqft minimum area
- 110' minimum lot width
- 110' of frontage
- 35' maximum height
- 25% maximum lot coverage (total of all impervious areas)
- 35' front yard setback
- 30' rear yard setback
- 20' side yard setback

If the building height is anticipated to exceed the maximum height of 35', a special permit will be required. Additionally, the maximum lot coverage is likely to exceed 25% and will require a special permit from the Planning Department.

The Site also falls within the Flood Plain and Wetlands Protection District overlay. Within this zone, applicants for building permits must apply for a special permit with the Conservation Commission.

The parking capacity requirements for schools are one space for every three seats of occupancy according to Article VIII of the Zoning Regulations.

Infrastructure

Roadways and Parking Lots

The boulevard that allows access to the Site runs along the south of the school from Bedford Street (Route 18) and has an eastbound and westbound component. There are 5 available entrances to the school along the westbound component, Gliniewicz Way. The boulevard ends at the west end with a traffic circle around a veterans memorial with exits for the town hall and library, a high school parking lot, and the eastbound component, Lincoln Boulevard. Bituminous sidewalk is located on either side of Gliniewicz Way and Lincoln. Travel speeds on Gliniewicz Way are posted as 20-mph with "slow" printed on the pavement.

There are multiple parking lots that service the existing high school on the Site. The westernmost lot, containing approximately 212 spaces, is designated for student use and the easternmost lot, containing approximately 75 spaces, is for staff use. There are 15 spaces along the front of the building designated for visitors. Granite and concrete curbing exists at the edges of some pavement within the Site.

Utilities

The following information was collected through communications with Jason Linn, the Facilities Manager for the High School; John Stone, the Superintendent of the Abington Sewer Department; and coordination with the Town of Abington.

Sewer

Sanitary waste from the existing high school is conveyed by gravity sewer mains to the sewer lines maintained by the Town of Abington. The connection is made to the building at the east side of the building. The line that services the school is an 8 inch line and the main on Route 18 is a 10 inch line. The Town of Abington pumps all of its sewer water to a treatment plant in Brockton. The school used to utilize a leach field on site to treat its wastewater before it was connected to the Town sewer. The leach field was located underneath the existing athletic fields.

Water

Hydrants and water service are located onsite. The Abington High School is serviced by water lines off of Gliniewicz Way. During design, a hydrant flow test will be required to determine available flow for fire suppression system design.

Drainage

There are onsite closed drainage systems for the parking lots which collect drainage in dry wells. Each storm grate represents its own dry well. The drainage infrastructure on Gliniewicz Way includes a 12 inch line and a 10 inch line. Portions of the onsite drainage on the athletic fields discharge to the wooded areas north of the Site. Stormwater does not appear to be treated for quality or controlled for quantity and peak flow before discharging the Site. The proposed design would incorporate low impact drainage design to treat for water quality and mitigate peak flows onsite.

Gas

National Grid is the supplier of natural gas to the Town of Abington. The high school is currently serviced by natural gas. There are 2 gas connections at the east side of the building. One connection services the kitchen and the other connection services the boiler and hot water.

Electric

Electric supply is above ground to a utility pole off of Gliniewicz Way. The service is transitioned to underground once it is onsite at a pole to the southeast of the building. The generator for the building is positioned below grade where it is transferred underground and connected to the building. The supplier of electricity for the Town of Abington is National Grid.