WINTER STREET ARCHITECTS

Brown School
Feasibility Study - Draft

City of Newburyport
Newburyport, MA
October 1, 2014

Table of Contents

[This page was intentionally left blank]

EXECUTIVE SUMMARY

RECOMMENDATIONS

As a preliminary step in determining the future use of the existing Brown School Building in Newburyport, MA, the City of Newburyport has commissioned The Brown School Feasibility Study. This study is to consider the following options:

1. a re-located Youth Services program (currently located at the former Kelley School); and
2. affordable and/or market-rate housing (rental units and/or condominiums), senior housing and/or (alternatively) artist lofts; and/or
3. offices

Given that the relocation of the City's Youth Services Department to a portion of the first floor is considered a required component of this project, the primary objective of this study is to evaluate the feasibility of adaptive re-use and determine the ideal programming of the remainder of the building.

Limited on-site parking is a driving force in determining the ideal program. While the Youth Service Department only requires 6-8 spaces, parking requirements for the full build out (either office or residential) of the second and third levels will exceed the available on–site spaces.

(WSA to complete Executive Summary after further discussions with the city)

[This page was intentionally left blank]

SITE ANALYSIS

GENERAL DESCRIPTION

The George Brown School is a three-story brick structure located at the corner of Milk and Lime Streets in a residential neighborhood near downtown Newburyport. The building lies on a relatively flat, 1.24 acres site which includes the adjacent playground and a former residential lot on which two small basketball courts are located.

SITE ANALYSIS:

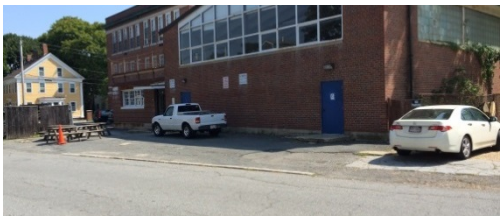
Parking & Access Improvements

Off-Street Parking:

The site currently provides a total of 15 designated parking spaces. Of these spaces, 14 are located in the paved lot in the northwest corner of the site. The 15th space is a handicap space facing the fence in the northeast corner of the site. Additional parking takes place between the gymnasium and the Lime Street curb line on the east side of the site; however, these spaces are not marked. Review of aerial photographs indicates that as many as six additional cars may park in this area bringing the effective available off-street parking provided to approximately 21 spac**es.**

Site Access:

Vehicular site access is provided by curb cuts on Milk Street on the east and west sides of the building. The western curb cut provides direct access to the parking area in the northwest corner of the site. The eastern curb cut provides access to the playground areas in the eastern portion of the site,but is restricted by a chain link fence.



There is direct and uncontrolled access to the informal parking area between Lime Street and the gym since the granite curb along the edge of the Lime Street travel way is nearly flush with the surrounding pavement.

Pedestrian access to the site is provided from the sidewalks fronting the property on Milk Street and Lime Street. There is also pedestrian access to the playground area in the southern potion of the site from Prospect Street.

Paving & Curbing

Paved areas at the site include the parking and playground areas. The pavement in these areas is variable and generally in fair to poor condition.

Northwest Parking Area:

There are areas of significant pavement deterioration in the parking area in the northwest corner of the site, particularly near the Milk Street curb cut and along the accessible route from handicap parking space to Door 1. Plans for adaptive reuse should consider resurfacing the parking areas and repairing damaged concrete at the Milk Street curb cut.

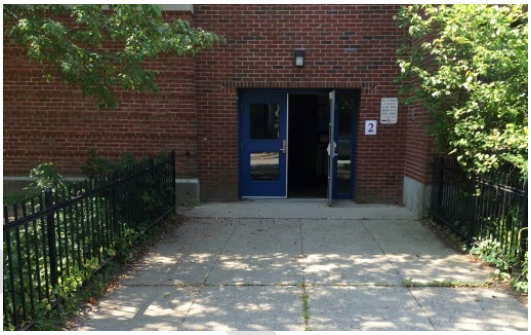
Playground Areas:

The pavement in the playground areas east and south of the building is in fair condition. There are visible cracks in some locations and patches from underground utility work. Future maintenance will be required for the surface to continue to be suitable for playground use.

Pedestrian Access, Walkways & Steps

Primary Entrances (Accessible)

Pedestrian access to the primary building entrances (Doors 1 and 2) is provided by concrete walks. These walks are in good condition and appear to be compliant accessible routes.



Secondary Entrances:

Secondary entrances to the building are located in the playground area (Doors 3 through 5) and along the east side of the building facing Lime Street (Doors 6 through 8). These entrances are not accessible. Doors 3 and 4 are provided with timber and concrete steps, respectively which appear to be in fair to good condition. Door 5 is a service door to the boiler room.

Doors 6 through 8 have concrete pads/steps that are in fair to poor condition. Most notably the concrete pad at Door 7 has fallen into disrepair and should be replaced.

ADA / AAB / 504 Accessibility Checklist

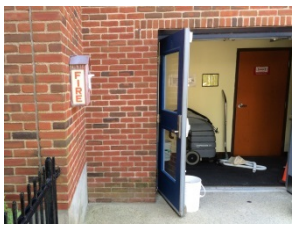
Handicapped Accessibility:

The site provides two designated handicap parking spaces. This number of accessible spaces is sufficient for parking lots with up to 50 cars. The routes from the parking spaces to the primary entrances (Doors 1 and 2) on the north side of the building appear to be accessible. However, the site does not conform to the current M.A.A.B. (Massachusetts Architectural Access Board) or ADA (American Disabilities Act) standards. The following is a listing of required alterations needed to gain compliance:

- The access aisle for the accessible parking space on the west end of the building (near Door 1) does not extend the full length of the parking stall.

- No access aisle is provided for the accessible parking space on the east end of the building (near Door 2).

- The fire alarm box mounted on the building near Door 1 extends more than four inches from the face of the building and is considered a protruding object. A barrier with a maximum height of 27 inches within cane sweep is required.



- There is a painted crosswalk on Prospect Street. There is a curb ramp on the north end of the walk to the sidewalk along the site frontage; however, it is not compliant. Further, there is no curb ramp to the sidewalk on the south side of Prospect Street.

- There are no designated van-accessible spaces.

Wastewater Management Systems

Sanitary Sewer Service:
The building is provided with sanitary sewer service which is presumed to connect to the main located in Milk Street. The service connection was not accessible for inspection.

Residential adaptive reuse of the building will likely result in an increase in average daily water and sewer flows. Video inspection of the sewer connection is recommended to assess the condition of the piping and determine if it has the capacity to accommodate the additional flows from the proposed uses. This assessment should also consider waste water flow peaking factors.

Stormwater/Drainage Management Systems

Storm Drain Systems:
Stormwater from the site flows into the municipal storm drain system on Milk Street. There are two on-site catch basins located in the paved playground area southeast of the building. Visible trench patches in the pavement indicate that these structures are connected to a third catch basin on Milk Street near the northeast corner of the site. These systems are presumed to provide adequate site drainage for existing conditions.

Since no increase in impervious area is anticipated, existing stormwater management systems are presumed to be adequate for the proposed adaptive reuse of the site. However, there do not appear to be any stormwater Best Management Practices (BMPs) in place beyond the catch basins. Should reuse plans for the site require Site Plan Review in accordance with Section XV of the Zoning Ordinance of the City of Newburyport (Zoning Ordinance), additional stormwater BMPs may be required to comply with the Massachusetts Department of Environmental Protection Stormwater Management Policy.

Trash & Recycling Facilities

Solid Waste:
A dumpster for solid waste disposal is located along the Lime Street frontage. The dumpster is placed directly on an asphalt surface consistent with the adjacent parking areas and is surrounded by a wooden fence enclosure. The enclosure and underlying pavement are in poor conditions. Adaptive reuse plans should consider relocating the dumpster to improve the functionality and aesthetics of the parking areas in the northwest corner of the site. Regardless of the dumpster's final location, a new concrete pad and fence enclosure should be provided.

Recycling:
Recycling containers are provided within the dumpster enclosure and should be accommodated by future plans to reconstruct or relocate the solid waste collection area.

Accessory Buildings & Structures

Playground Equipment:
Playground equipment is installed on a wood chip surface in the eastern portion of the site. This equipment and surrounding surface appear to be in good condition and adequate for continued use. There are also basketball hoops in the southern end of the playground near Prospect Street. The hoops are in fair to good condition and will require maintenance for continued use.

Fencing & Landscaping

Fences:

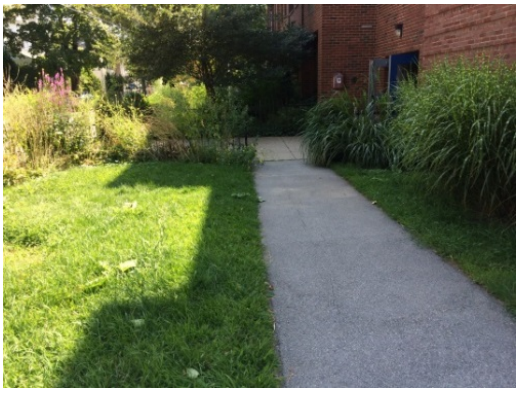
There are various fences located throughout the property. These fences include chain link fences and iron ornamental fencing near the front of the building. The ornamental fencing surrounds landscape areas and is in fair to poor condition with significant corrosion in certain locations. The chain link fence in the northeast corner of the site controlling access to the playground area from Milk Street is in good condition. A similar chain link fence controlling access from Prospect Street at the south end of the site is in fair condition and requires minor repairs.

A chain link fence in the northwest corner of the site also requires minor repairs. This fence encloses only a portion of the parking area and does not provide security to the site or adequate protection to the sidewalk from vehicles on the site. The purpose of this fence should be considered with site planning for the adaptive reuse of the site and it should be replaced with guard rail, additional fencing and/or screening as appropriate.

There are wood screening fences surrounding the site along abutting residential property lines. These fences appear to be in good condition and are likely owned and maintained by the adjacent property owners.

Landscaping:

Site landscaping includes an area of assorted plantings within the ornamental fence on the front of the building as well as trees and grass areas around the perimeter of the paved playground and parking areas. The vegetation in these landscaped appears to be healthy and suitable for the site. Adaptive reuse may consider aesthetic landscape improvements. If additional designated parking is proposed, internal landscaping and trees may be required in accordance with Section XV of the Zoning Ordinance.



Retaining Walls

No retaining walls were observed on the site.

Exterior Lighting

Site lighting is provided via building-mounted lights as well as street lighting and specific site lighting installed on utility poles. Adaptive reuse planning should evaluate photometrics from these fixtures and consider possible site lighting improvements to provide adequate security with minimal impacts to surrounding properties.

Signage

Site signage consists of directional signs regarding site use, site access and parking. These signs are mounted on the building and fencing at various locations throughout the site. There is also a pole-mounted sign for the Brown School in the northeast corner of the site. Signage should be reviewed and improved as appropriate to accommodate the adaptive reuse of the facility.

Hazardous Materials/Removal

No provisions for handling or removing hazardous materials were observed on the site.

Code Compliance

The site is located in the R-3 Residential District. It is intended that this district allow multifamily units at no greater than six units per structure and generally exceeding densities of ten (10) dwelling units per acre of land. A summary of the zoning compliance for each of the adaptive reuses being considered is provided below.

Youth Services Program:

The Youth Services Program may be considered a Community Center use (Use 216) in Section V of the Zoning Ordinance. This use is not permitted in the R-3 District and would require a Use Variance from the Zoning Board of Appeals. Alternatively, the use may be considered a Public School (Use 202) which is permitted in the district. The determination of the applicable Zoning Ordinance use and need for a variance, if any, should be made by the City of Newburyport Building Commissioner.

Residential:

The proposed residential housing reuses being considered include rental units, condominiums and senior housing. Rental units or condominiums are considered Multifamily (Use 103) or Over 20 Units (Use 104) depending upon the number of units proposed. Senior housing is Congregate Elderly Housing (Use 108). These uses are permitted within the R-3 District but require a Special Permit.

Artist Lofts:

Artist lofts are generally considered to be combined living and workspaces. This adaptive reuse may be considered Home Occupation (Use 417A or 417B). Use 417A is permitted in the R-3 District; however, the Zoning Ordinance poses certain restrictions such as limiting the occupation to 25% of

the floor area and only for the resident. These limits may be exceeded by obtaining a Special Permit for Use 417B.

Offices:
The Zoning Ordinance considers general office space as Professional/Social Service/Office (Use 416). This use is not permitted in the R-3 District and would require a Use Variance.

Mixed Use:
The overall adaptive reuse of the site may be considered Mixed Use (Use 405). The Zoning Ordinance describes mixed use building as buildings which contains nonresidential or hotel uses on the first floor and may contain such uses on any other floor and also may contain one or more residential units on any other floor. However, this use is not permitted in the R-3 District and would require a Use Variance from the ZBA.

[This page was intentionally left blank]

EXISTING BUILDING ANALYSIS

GENERAL DESCRIPTION

The main three story structure (shown in gray) originally built in 1922-1925 had a U-shaped configuration oriented towards the Northeast with a mechanical leg extending to the Southwest. A single story wing was added in 1970 (shown in blue) followed by a three story addition in 1975 (shown in green). Heights of building vary and the roofs are flat with the exception of the pitched roof over the gymnasium.

As currently configured, the main three story structure has a central corridor with classrooms on the perimeter and administrative offices on the Northeast portion of the first floor. The main structure is flanked to the Southwest by the 1970 kitchen/gymnasium addition.

Overall building dimensions are 176' northwest to southeast and 142' Northeast to Southwest at its widest points. The gross footprint of the entire building (including the 756 SF boiler room sub-basement), is approximately 19,582 SF. The total gross area of the building is 36,701 SF (excluding the boiler room) and is distributed as follows:

First Floor	17,875 SF
Second Floor	9,413 SF
Third Floor	9,413 SF
Total Gross	36,701 SF

ARCHITECTURAL ANALYSIS:

Recent Capital Improvements to the Building (City to provide this information)

As per the City of Newburyport's facilities department, there have been some floors replaced, some bathrooms renovated and some upgrades to the pneumatic control systems, but no substantial capital improvements have been made to the Brown School recently.

Known building deficiencies (City to provide this information)

As per the original RFP:

- Boilers are about 20 years old. Recent problems with controls and leaking/corroded pipes in the boiler room.
- Wooden double hung windows are in poor condition.
- Roof over boiler room leaks.
- Substantially rotted exterior wood trim.
- All mechanical units (HVAC) are a minimum of 40 years old.
- Asbestos tile/roll flooring throughout building.
- Elevator undersized
- Many accessibility issues.
- Odd room/corridor configuration on first floor.
- Inadequate electrical and data.

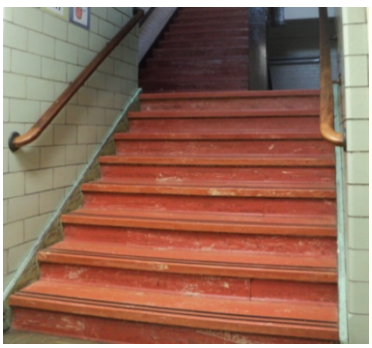
ADA / AAB / 504 Accessibility Checklist

Handicapped Accessibility:

Efforts to update accessibility are evident throughout the building though there are a number of areas that remain non-compliant with current M.A.A.B. (Massachusetts Architectural Access Board) or ADA (American Disabilities Act) standards. The following is a listing of required alterations required to gain compliance:

- Handrails – Compliant handrails have been added to one of the egress stairs but the other remains non-compliant. Handrails have been installed on the internal ramp but they are not continuous thereby rendering them non-compliant.

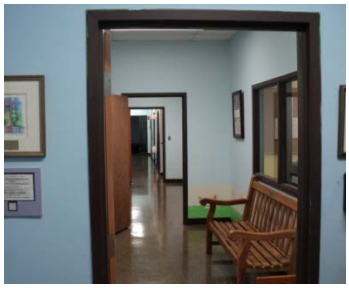
Compliant



Non-compliant

Non-compliant

- Corridor Clearances – Required doors clearances blocked by furniture.



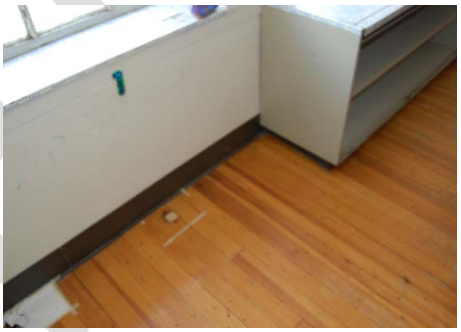
- Elevator is undersized. The shaft will have to be enlarged enough to accommodate a gurney.

- Bathrooms have been upgraded and comply with many accessible requirements, however a number of non-compliant issues remains:
  - Non-compliant clearances at HC stall doors
  - Protruding objects, poorly located waste receptacles, non-compliant mirror height, non-compliant soap dispenser location

- Protruding objects – the water fountain protrudes into the corridor.

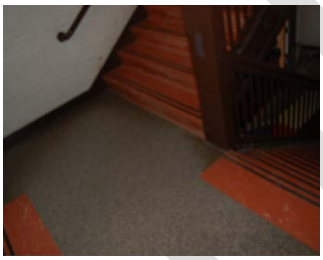
Flooring & Interior Finishes

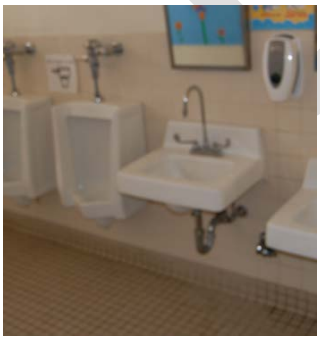
Flooring materials vary throughout the building. Classrooms in the original portions of the building are generally hardwood while classrooms in the 1975 addition are generally VCT.



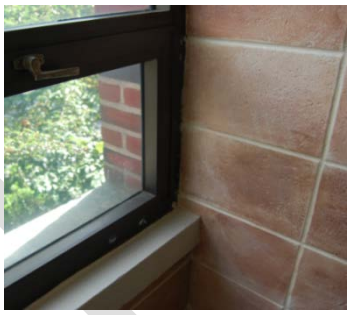
There is a brown patterned linoleum sheeting throughout the building in office locations, hallways, etc. and a 9”x9” gray floor tile in the kitchen and kitchen storage.

The basketball court is hardwood, bathrooms are tile and stair treads/risers appear to be rubber.



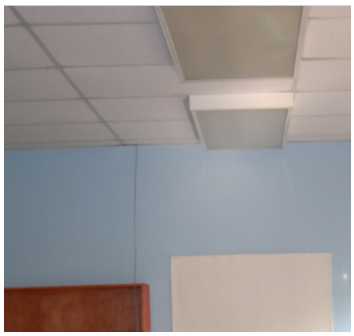


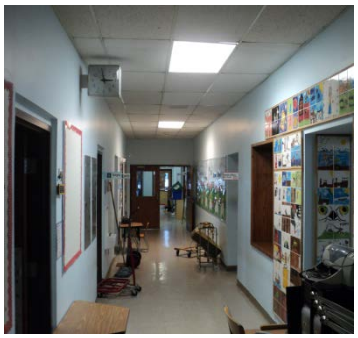
Walls in the original structure are generally painted plaster in the classrooms and hallways and exposed masonry in the stairwells and exposed masonry in the additions. Hallways in the additions are generally glazed CMU to 5’ with painted CMU above.



2 x 4 dropped ceilings are installed throughout and are in fair to poor condition. 1 x 1 ceiling tiles are installed in the hallway outside the women’s bathroom and Tectum ceiling tiles are installed above/between the exposed joists in the gymnasium. Plaster ceilings remain at all stairways.

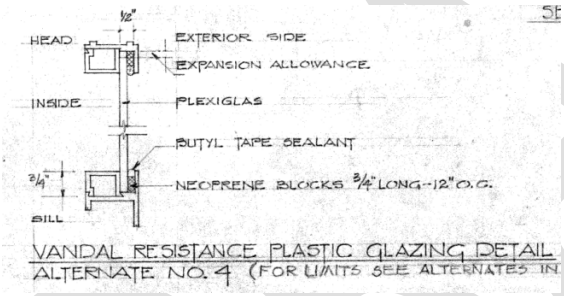
Lighting is generally 1x4, 2x2 or 2x4 surface mounted (and sometimes recessed) fluorescent fixtures.





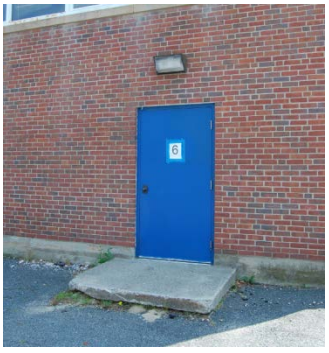
Windows

The exterior windows of the original structure are single glazed double-hung wood windows that appear to be in relatively poor shape. All are in need of paint on both the interior and exterior. Most all of these original windows have screens but no storms. Some have been modified to accept window installed AC units. Windows on the first level are protected by expanded metal.



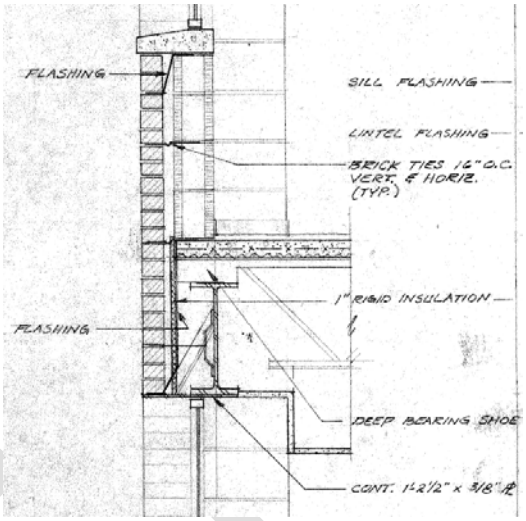
Exterior windows in the three story addition are singled glazed aluminum fixed windows with operable hoppers below. The aluminum frames are not thermally broken and the Plexiglas glazing is weathered etched and scratched.

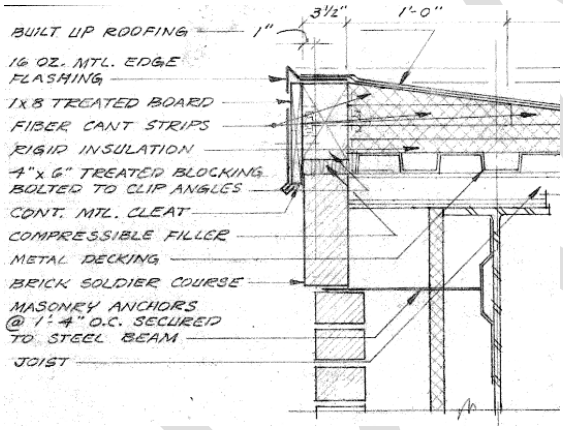
The exterior doors are generally hollow metal and appear to be in fair shape. The main entrance doors have some glazing as do the stair egress doors, but most exterior doors are standard hollow metal with no lites. Doors exiting the original structure generally have transom lites above.



Walls & Insulation

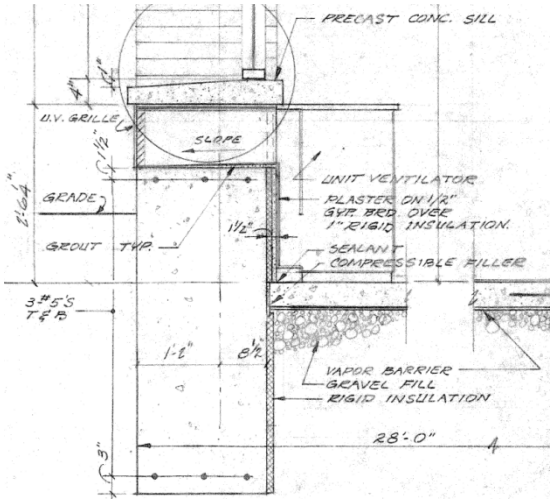
The exterior walls of the original structure are load bearing brick and the 1970's era additions are steel framed structures with brick on CMU back-up. There is likely no insulation in the original walls and drawings from the 1970's additions reveal no insulation except for 1" of rigid at the perimeter steel beams.





Insulation within the existing roof structure is unknown. Drawings from the 1970's additions reveal that 2" of rigid insulation has been added on top of metal decking.

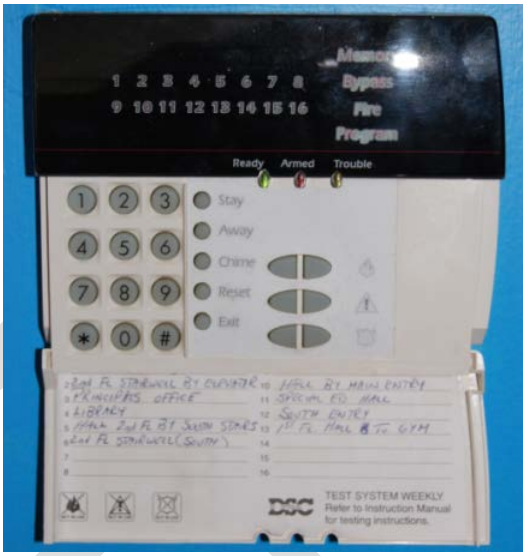
Insulation under the existing slab of the original structure is highly unlikely. Drawings from the 1970's additions reveal that 1" of rigid insulation has been added to the inside face of the foundation but there is no underslab insulation.



Access, Entry & Security Systems

Access/Entry to the building has been covered in the Site Analysis portion of this report.

The security system key pad is located at the main entrance door at the northeast entry. The pad indicates that the system is provided by DSC and detection zones are located in the following areas:



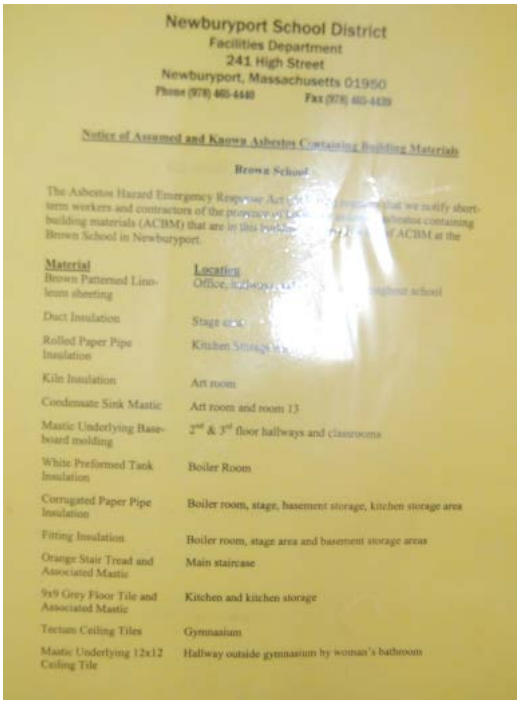
- 2nd floor stairwell by elevator
- Principal's office
- Library
- 2nd floor stairwell and hallway on south side of building
- Hall by main entry
- Special education hall
- South entry
- 1st floor hall to gym

Acoustics

No evidence exists of any acoustic mitigation in either the original structure or the 1970's era additions (or drawings). If converted into residential, acoustic considerations will have to be considered for the floor/ceiling assemblies and the demising walls between units. If residential were limited to the top floor, acoustic mitigation may only be required at the demising wall between units. Further study is required once the program in more defined.

Hazardous Materials/Removal

We are currently awaiting a hazardous material/removal report from the city. At this point in our study, our knowledge of any existing hazardous materials is limited to the list posted on the mechanical room door.


Newburyport School District
Facilities Department
241 High Street
Newburyport, Massachusetts 01950

Notice of Assumed and Known Asbestos Containing Building Materials

Brown School

Material	Location
Duct Insulation	
Kiln Insulation	Art room
Condensate Sink Mastic	Art room and room 13
White Preformed Tank Insulation	Boiler Room
Corrugated Paper Pipe Insulation	Boiler room, stage, basement storage, kitchen storage area
Fitting Insulation	Boiler room, stage area and basement storage areas
Orange Stair Tread and Associated Mastic	Main staircase
9x9 Grey Floor Tile and Associated Mastic	Kitchen and kitchen storage
Tectum Ceiling Tiles	Gymnasium

Code Compliance (Requires additional work here)

Building summary:

Building construction for the Brown School is primarily brick or brick/CMU back up. The Use Group is E-Educational.

Height and Area Limitations:

According to Table 503 of the Mass State Building Code,

Egress Issues:

Egress from the existing building appears to be adequate for the current use and population.

Energy (and Stretch) **Code Implication**s:

[This page was intentionally left blank]

MEP/FP ANALYSIS:

Heating, Ventilating, and Air Conditioning (HVAC) Systems:

The heating for the building is provided from (2) low pressure steam boilers that run on No. 2 fuel oil. The boilers are piped to a common 8" steam header so that either boiler can run independent of the other and one can serve as a backup. These boilers are Weil McLean Model 88 and are rated at 3,392 MBH input/2,724 MBH output. Thus the total output capacity of the system with both boilers running is 5,448 MBH. However, one boiler should easily be able to handle the heating load for the building. The low pressure steam feeds a shell and tube heat exchanger which generates hot water. This hot water system heats the 3- story section of the buiding while the gym is heated with steam. The boilers are over 25 yrs old and in poor condition.

WEIL MCLAIN OIL FIRED BOILER

This hot water is pumped thru the 3 story section of the building via duplex hot water circulation pumps and a 4" hot water supply and return piping system. This hot water system provides all the heating for the 3 story section of the building. The hot water piping feeds (24) individual Unit Ventilators located in each room in the 3 story building. These Unit Ventilators provide heating via a hot water coil and fresh air via an outside air duct. The outside air is mixed with return air utilizing a pneumatic controlled actuator. Also, there is a low pressure steam feed directly to the gymnasium. This steam line feeds a large Heating/Ventilating unit in the gym. This unit also has fresh air connected to it the amount of fresh air is controlled by a pneumatic controlled actuator on the dampers. There are roof exhaust fans which operate in conjunction with the fresh air system on the Unit Ventilators. These exhaust fans will come on and off based on the amount of fresh air introduced into the spaces.

HOT WATER HEAT EXCHANGER

This hot water system was installed in 1975, thus making it almost 40 yrs old. The pumps, heat exchanger and piping are in poor condition. There have been several leaks in the hot water distribution piping recently due to age and deteriorating of the piping.

All of the automatic temperature controls are pneumatic. The compressed air for this pneumatic system is provided by an air compressor located inside the boiler room. This control system was installed 40 years ago and is in poor condition. Pneumatic controls are no longer used except in special applications. These controls are in poor working order and if any of the existing mechanical equipment were to remain, these controls should be replaced with state of the art direct digital controls.

AIR COMPRESSOR FOR PNEUMATIC CONTROLS

The only air conditioning in the building is from small (less than 1 ton) window units that are located in a few of the class rooms. This is inadequate for a fully air conditioned building.

HOT WATER CIRCULATION PUMPS

It is not recommend utilizing the existing heating and ventilation system in the new design because of its age and also due to the fact that there is no air conditioning component. A new system should be considered that would have both air conditioning and heating. A system under consideration is the The Mitsubishi Electric multi-unit system. It uses a variety of air handling units ranging from ductless ceiling units to traditional air handling units. This system uses the heat pump technology and could provide a high efficient heating and cooling system for the space and eliminate the need for the existing hot water heating system.

Electrical System:

The main electrical service is a 120/208v 3 phase 4 wire system fed underground from a National Grid power pole to the main electric room located on the 1st floor. The main power comes into a 24"x24" pull box and from there to a 400 amp main switch. This switch then feeds a Westinghouse 120/208v 3ph 4w -400 amp main distribution panel. This panel serves has the main distribution for the entire building. This distribution includes (6) subpanels, the elevator, and the hot water pumps. The (6) subpanels are rated at 225 amps but fed with 125amp and 150amp breakers.
A summary of these panels is shown below:

400 AMP 120/208V-3P MAIN SWITCH PUMPS

Panel Designation	Location	Voltage/Ph/W	Amp Rating	Breaker Size
Panel L1	1ST Fl Elect Rm.	120/208v/3p/4w	225 Amp	125 Amp
Panel L2	1st Fl Elect Rm.	120/208v/3p/4w	125 Amp	125 Amp
Panel P	Boiler Rm	120/208v/3p/4w	225 Amp	150 Amp
Panel LP1	Boiler Rm	120/208v/3p/4w	225 Amp	150 Amp
Panel LP1	1st Fl	120/208v/3p/4w	225 Amp	150 Amp
Panel LP2	2nd Fl	120/208v/3p/4w	225 Amp	150 Amp
Panel LP3	3rd FL	120/208v/3p/4w	225 Amp	150 Amp

4400 AMP 120/208V-3P MAIN DISTRIBUTION PANELMAIN SWITCH PUMPS

These subpanels provide the distribution to the lighting, mechanical equipment, and general outlets in the area it serves. Most of these panels are Westinghouse or Federal Pacific. Both of these panel types are obsolete and breakers and misc parts are no longer available. The electrical system is approximately 40 years old and in poor condition.

The main service being 120/208v 3ph -400 amps equates to 130 KW of available power. The building has 27,290 Sq. Ft. of space which would result in 4.7 Watts/Sq. Ft. Although, this was sufficient for the existing needs, a typical multiuse office type building should have 8-10 Watts/ Sq. Ft. available. Thus, thus there is no additional power available for any future loads such air new air conditioning equipment. If a new HVAC system is considered for the building then the electrical system needs to be upgraded to accommodate this. The new system should be a 120/208v 3ph 4wire 800 amp system which

would include a main switch and a new 800 amp main distribution panel. There should be adequate spaces provided for subpanels according to the number of tenants utilizing the space. Currently there is one utility meter for the entire building. If the space is subdivided with new tenants, then a new metering cabinet should be included as part of the new electrical service.

Fire Alarm System:

The fire alarm system is a FCI Model 72 Class B fire alarm system. It is a Class B traditional fire alarm system. It is installed in the main electric room on the first floor. FCI is a major fire alarm manufacturer whose parent company is Honeywell. The system consists of the main fire alarm panel along with power booster modules. Grid power pole to the main electric room located on the 1st floor. This system has modular features meaning it is capable of expansion by just adding plug in modules. This system was installed in 1998 and was considered state of the art at the time.

There are smoke detectors located in all the main corridors and inside the class rooms throughout the building. There are pull stations at all exits and spaced according to code in the main corridors. There are heat detectors in the cafeteria and in the boiler room. There was no evidence of a duct smoke detector on the heating ventilating unit located inside the gym. There a CO detectors inside each classroom, however these are stand alone devices and not connected to the central fire alarm system. Strobe devices were not located inside the bathrooms.

Although this system may have been state of the art at the time of installation in 1998, it is now sixteen years old. This model of fire alarm system stopped production in 2005 and replacement parts are no longer available from the factory. Replacement parts maybe still available on the secondary markets or some service companies may still have inventory. Also, this system is a two wire Class B meaning it has two wires going to the devices with an end of line resistor.

This system should be replaced with a Class A 4-wire addressable system when the building is renovated. This type of system has 4 wires going to each device in which two wires are supervisory. Also, each device is identified on the fire alarm system so in the event of a fire, it is possible to pinpoint the location of the device in alarm. The Newburyport Fire Department will probably require this upgrade and even if not it is doubtful that expansion modules could be found for this system.

FCI MODEL FC-72 MAIN FIRE ALARM PANEL – LOCATED IN 1ST FL. ELECTRIC ROOM

Plumbing Systems & Fixtures:

The water supply to the building is from a 2" copper pipe from the City of Newburyport. This feeds the restrooms, cafeteria and the boiler room. The piping appeared to be in satisfactory condition however the insulation was deteriorating in some areas. There is a 80 gallon hot water heater with an oil fired burner located in the boiler room that supplies the hot water to the building. This hot water has a circulating pump to keep hot water at the point of use.

TYPICAL WALL HUNG TOILET WITH A MANUAL FLUSHOMETER.

The waste drain piping for the building is all cast iron. The drainage that was observed was in good condition. This type of piping has a good longevity as long as it has not been exposed to corrosives and there is no indication that has happened in this building. There are floor drains located in the main restrooms.

TYPICAL WALL HUNG SINK

The plumbing fixtures are in satisfactory condition. The toilets are wall hung with manual flushometers. The sinks are wall hung with manual chrome faucets. Although the condition of these fixtures is satisfactory, they have a dated industrial appearance.

Elevator:

The elevator is a small passenger unit with interior dimensions of 47.5” wide x 60” deep, giving it a cab area of 20 sq. ft. The doorway is 32” wide. This elevator is rated for 1500 lbs max.
This elevator is the hydraulic type and has a slow travel rate. It will be undersized for the building if offices and or residential uses are considered.

ELEVATOR WITH 32” DOOR OPENING

STRUCTURAL ANALYSIS:

Structural Systems

Building Description and Noted Conditions

The original George W. Brown School was built in 1922, and has additions for the gymnasium and locker rooms (date unknown), has additions for cafeteria and kitchen dating to 1970, and an infill addition between wings dating to 1975. Overall the condition of the building complex is very good with most of the original building materials in good condition. For the purposes of the following discussions, the front of the building on Milk Street faces north.

Description of the structure

The original 1922 Brown School was U-shaped in plan, three stories, with 20 classrooms and a corridor at the front of the building parallel to Milk Street. The ground level is on grade (no basement) with wood sleepers on some form of prepared subgrade (not visible). The second and third floors are wood-framed and appear to be clear span with the exception of the main corridor interior wall. The main corridor interior wall parallel to Milk Street is loadbearing from the second to the third floor, and from the third floor to the roof. At the second floor, the bearing line transfers out on a line of steel beams and columns. The east and west wings are likely framed in the east-west direction, and the central portion of the building is likely framed north south, with bearing on the interior corridor wall. The depth of wood framing for the second and third floors is indicated on the '74 addition drawings as 1'-2". The roof framing was not observed but is also likely to be wood framed with sloping roof joists and suspended level ceiling framing, creating a plenum between the ceiling and the roof. We did not access the roof, although it appears to have a parapet. Exterior walls of the original building are 20" thick solid brick, transitioning to 16" thick solid brick above the stone water table below the second floor. There may be clay tile in the wall construction, as this was common in this era of construction. Stairwell walls are 8" thick solid brick, and interior stairs are bolted steel framing with terrazzo landings and rubber treads and risers. It appears that most of the interior finishes date to the 1975 renovations.

At the rear of the school is the head house for the basement boiler room, which was part of the 1922 construction. The boiler room is the only basement space in the facility. The boiler house has a concrete foundation, a basement slab on grade, solid perimeter brick bearing walls, and concrete pan joist roof.

The gymnasium and locker rooms were the first addition to the original 1922 Brown School. The 1970 drawings for the cafeteria and kitchen addition show the gymnasium in place at that time. The gymnasium and locker rooms, were added on the west/rear of the building. The gymnasium is approximately 50 feet x 70 feet in plan. The structure of the roof of the gym is a central steel roof truss flanked by steel ridge beams. The sides of the gym walls have steel column framing infilled with 12" CMU and faced in brick veneer, and at the top of CMU glass block infill occurs up to steel beams at the eaves. The roof gable is framed in laminated wood rafters with tectum roof planks.

Drawings for the 1970 cafeteria and kitchen are by J. Williams Beal Sons & Poskus Architects and dated August 1970. The ground level is concrete slab on grade, and the roof framing is steel bar joists with metal roof deck. Perimeter walls are brick veneer on 8" concrete block. Interior wall finishes are structural glazed facing tile (SGFT) on concrete block.

The infill between the wings was added in 1975, as documented in Fenton G. Keyes Associate drawings from January 1974. A new line of steel columns was added at the outside wall along Milk Street and just outside the face of the original exterior wall paralleling Milk Street. Steel bar joists were framed from outside wall to the line of steel beams at the face of the original 1922 building. At the second and third floors, the bar joists are 18J6 at 2'-0" on center with UFS form deck and 2 ½" of concrete. At the roof of the infill frame the bar joists are 24H6 at 6'-0" on center with 1 ½" steel roof deck. Exterior walls of the infill are comprised of brick veneer on concrete block infilling the steel frame. The exterior walls are partially relieved on steel framing above the first floor.

Noted Conditions

The ground floor of the original U-shaped portion of the building, except where modified by the 1975 addition work, has wood sleepers on grade. Depending on what was done at grade, whether concrete slab, bituminous paving, or wood sleepers directly on grade, the condition of the sleepers may be suspect. We recommend that the wood framing on grade be investigated further if alternative uses at the first floor are considered. The condition of the existing wood sleepers may affect newly applied finishes.

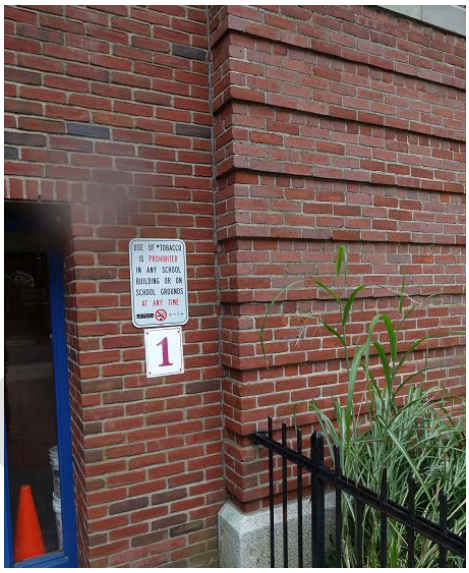
RUSTED JACK LINTELS AT BOILER HEAD HOUSE

Throughout the perimeter of the school, both in the original construction and in the 1975 addition, the steel lintels over masonry openings are not galvanized. In most cases, the lack of galvanizing the lintels has not caused a problem with damage due to rust expansion, but all steel lintels need new robust corrosion protection. The exception is the steel lintels of the boiler room head house at the rear of the building. These lintels have badly corroded and have rust jacked the masonry. We anticipate that those lintels will have to be removed and replaced with new galvanized lintels and the associated masonry work.

NO CORROSION PROTECTION AT LINTELS

The condition of exterior masonry overall is good, and major repointing does not appear to be necessary. An exception to this is the stone belt course above the second floor windows. The head joints between stones are often completely missing the mortar. We recommend that his belt course be repointed throughout.

The sealant joint at the front of the building at the juncture of the original wings and the 1975 infill portion is deteriorated and should be cut out and replaced over the full height. This full height joint occurs in two places.



DETERIORTATED SEALANT JOINTS AT BUILDING ADDITION

Code Compliance for Structural Requirements

All portions of the Brown School were constructed prior to the adoption of seismic requirements in the Massachusetts State Building Code. Existing construction includes solid loadbearing brick with wood joist framing (1922), steel joist framing on steel beams and columns with concrete floors (1975 infill addition), and steel frame infill with wood roof joists and tectum roof panels (gymnasium, unknown date of construction). These various methods of construction would behave differently in a seismic event. Specific vulnerabilities include unreinforced brick masonry, and wood joist framing that may be pocketed to supporting brick but not anchored.

The building code applicable to proposed renovations and reuse of the Brown School is the 8th Edition of the Massachusetts State Building Code referencing IEBC 2009 with Massachusetts amendments dated 4/11/14. For the purposes of this report, the structural requirements of IEBC 2009 with 4/11/14 Massachusetts amendments will be discussed based on the work area, percentage increase in gravity and seismic loads, changes to framed areas, and change in building use. Each one will be discussed in turn.

MISSING MORTAR AT HEAD JOINTS

Work Area Work area is defined as, “That portion or portion of a building consisting of all reconfigured spaces as indicated on the construction documents. Work area excludes other portions of the building where incidental work entailed by the intended work must be performed and portions of the building where work not initially intended by the owner is specifically required

by this code." In the case of Brown School renovations, the proposed work area is anticipated to include the second and third floors, and to exclude the entire first floor. The total building area is roughly 37,700 s.f., and the combined second and third floor area is 18,600 s.f. That means the proposed area of renovation is right at the 50% threshold where specific structural requirements are triggered. Specifically, when the work area exceeds 50% of the building area, under Massachusetts amendment 303.7.1, "…the alteration work shall include installation of wall anchors at the roof and floor levels to resist the reduce IBC-level seismic forces specified in section 101.5.4.2, unless an evaluation demonstrates compliance of existing wall anchorage." In addition, under Massachusetts amendment 303.7.2, "Parapets…shall have bracing installed as needed to resist the reduced IBC-level seismic forces specified in section 101.5.4.2 unless an evaluation demonstrates compliance of such items. Parapet corrective work shall be performed in conjunction with the installation of tension roof anchors…" The above considerations need to be accommodated should the work area exceed 50%.

Note in the following discussions, Alterations Level 2 and/or Alterations Level 3, as defined in Sections 404 and 405 of IEBC 2009 are as follows: Level 2 alterations include the reconfiguration of space, the addition or elimination of any door or window, the reconfiguration or extension of any system, or the installation of any additional equipment. Level 3 Alterations apply where the work area exceeds 50% of the aggregate area of the building. Note that Alterations Level three definitions for structural requirements are somewhat modified in IEBC, as noted in Changes to Framed Areas, below.

Percentage Increase in Gravity Loads Under both Level 2 and Level 3 work, gravity loads on the existing structure may not be increased by more that 5 percent without triggering Code requirements for contemporary gravity load criteria. Increases of more than 5% may trigger upgrade requirements for certain structural elements that are affected. This applies particularly when the weight of renovated floor finishes exceeds existing weights of finishes.

Percentage Increase in Seismic Loads Under both Level 2 and Level 3 work, the demand-capacity ratio of lateral load resisting elements with the alterations considered is more than 10 percent over the ratio with the alteration ignored triggers compliance with reduced seismic loads and seismic upgrade requirements. This trigger can occur in one of two ways: 1) gravity loads and the resulting seismic forces are increased due to changes in finishes, material weights, or additions, or, 2) existing lateral load resisting elements are altered, as in the case of removal of existing unreinforced masonry shear walls, or major new openings in existing walls. This 10% threshold should be carefully considered in the renovations.

Changes to Framed Areas Within Alterations Level 3, there is specific language in the Section 807 – Structural in Chapter 8 of IEBC related to percentage of framed floor and roof areas that trigger compliance with reduced IEBC seismic loads. The trigger is more than 30% of the total framed area being altered. This could mean an infill of an existing open area, the removal and reframing of an area, or the resupport of a large framed area that was on a bearing wall by a new replacement steel

beam. Should this level be exceeded, the entire building needs to be evaluated for 75% of IBC lateral seismic forces. This trigger based on changes in framed area to the building has significant cost implication in the renovations, and should be avoided if at all possible.

Change in Building Use IEBC 2009 with Massachusetts amendments is not favorable to changes in use that go from a lower to a higher seismic hazard category. Seismic hazard categories are as indicated in table 912.4 of IEBC 2009. Of the occupancy categories being considered, the existing use, educational, is hazard index 3. Proposed uses, including multifamily residential, R-2, and artist lofts, which would be considered business use, are hazard categories 3, and 4, respectively. The lower the number the higher the hazard, so in the first case, the hazard is the same, and in the second case, the hazard is lower. It is not anticipated that the change in use of the building will trigger seismic upgrade requirements for IBC level loads should the uses noted above be pursued in the renovations.

[This page was intentionally left blank]

PROPOSED DESIGN

FIRST FLOOR

- Youth Services Program

SECOND AND THIRD FLOORS

- Affordable and/or
- Market Rate Housing and/or
- Senior Housing and/or
- Artist's Lofts and/or
- Artist's Studios