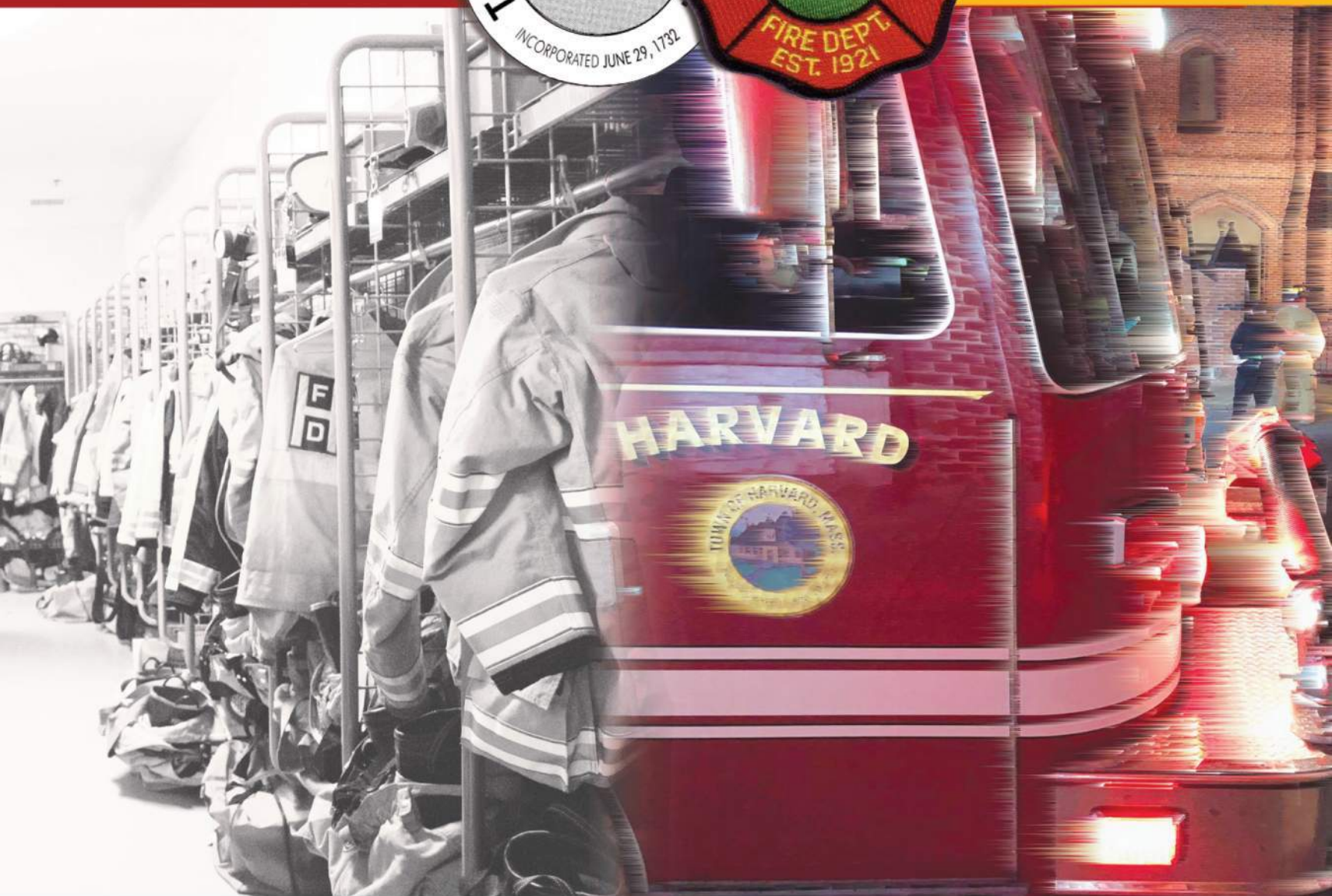


Feasibility and Space Needs Study

HARVARD FIRE HEADQUARTERS



HARVARD, MASSACHUSETTS





HARVARD FIRE STATION *FEASIBILITY STUDY*



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EXECUTIVE SUMMARY



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EXECUTIVE SUMMARY

HARVARD FIRE STATION STUDY

The Harvard Fire Headquarters Feasibility and Space Needs Study commenced in mid 2019 when the Kaestle Boos Associates (KBA) Team was selected by the Town. As part of the KBA team, Mitchell Associates Architects (MAA) was responsible for the Firematic Programming of the study, while Kaestle Boos Associates concentrated on the Evaluation of existing facility, Site Selection/ Analysis and Opinion of Probable Costs.

The Study commenced with a field inspection of the Harvard Fire Department's (HFD) current facility by architectural and engineering staff to determine its current condition. While it was evident that the facility could not meet the operational requirements for a modern Fire Station, formal documentation of the facility was conducted.

Within the existing fire station many of the operations and workspaces are extremely cramped by insufficient space. In all cases, the building has functionally outlived its useful service life for modern fire operations.

Below are examples of non-compliant code or safety standard, conditions observed at the existing station. A complete list is included in the study report. These conditions expose the Fire Department staff to safety hazards and the Town to liability.

1. Building Code:
 - a. Structurally the facilities do not meet current seismic (earthquake) design and would likely suffer major damage in a seismic event, a situation in which demand for emergency response would peak.
 - b. There are no sprinkler systems to protect life safety and apparatus in case of fire.
2. Plumbing Code:
 - a. Fixtures do not meet Federal water conservation requirements
 - b. Fixtures are not handicapped accessible
3. HVAC Code:
 - a. Non-compliant amount of fresh air changes (insufficient ventilation per Code).
4. Electrical Code:
 - a. Most systems (lighting, power, emergency lighting, and fire alarm) no longer meet code requirements or safety standards.
5. ADA/MAAB (handicapped accessibility)
 - a. No public toilets. Public is forced to use existing staff toilet/shower/locker facilities which are not handicapped accessible (turning radius', reach limits, thresholds....)
 - b. No separate toilet/shower/locker facilities for female fire fighters or staff.

All these issues, and others identified in the 'Code Review' & "Existing Conditions Survey" sections of the study will need to be addressed in any addition/renovation or new construction recommendation.



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Concurrently, Robert Mitchell of (MA) issued a department questionnaire and began a series of meetings with key department staff to assess the needs of the department. The product of these meetings was a Space Needs Program developed based on the synergies of combining the Fire Station and Department Headquarters in a single facility. As a result of this analysis it was determined that a 23,500 square foot facility was required to meet both Station and Headquarter requirements

Concurrent with development of the Needs Assessment and Program, our Site Evaluation team worked on analyzing the existing site and two possible alternate sites in town as suggested by the Fire Chief. In the end 3 sites were analyzed; the Town-owned Massachusetts Ave, the privately-owned Ayer Road and the Town-owned existing Fire Station site.

A one and two-story (plus firematic support mezzanine) conceptual design solutions for the new facility was developed based on the Program, selected sites and subsequent meetings with department staff. This plan was used to complete the site analysis, resulting in the existing fire station site being eliminated due to insufficient lot size and circulation.

Further analysis of these sites resulted in the elimination of the existing station and site. Some of the issues that lead to the elimination of the existing site are as follows:

- Unknown structural remediation to the existing structure to comply with the seismic requirement of the current building code.
- Renovating existing spaces results in potential compromises in programmatic/operational adjacencies of spaces – A result of having to ‘fit’ spaces into the space available rather than space required.
- Apparatus maneuverability is too restricted –Survey will need to be done to establish property lines and setbacks.

After escalating the construction costs through the middle of construction (estimated mid 2021), the Opinion of Probable Costs (OPC) for the single-story option results in a total probable project cost of \$17,775,000. Note, it does not include any costs for site acquisition or reuse/development of the existing facility. An OPC the multi-story option was not made as it would result in a higher project cost and was not the preferred option.



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CODE ANALYSIS



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CODE ANALYSIS OF EXISTING FACILITY

APPLICABILITY

This analysis reviews the existing Harvard Fire Station at 13 Ayer Road in Harvard, MA, with regard to the Massachusetts State Building Codes (“Code”) for new construction. The 9th Edition consists, in part, of the 2015 International Building Code (IBC) and the 2015 International Existing Building Code (IEBC) with Massachusetts Amendments to these codes.

Codes used in this analysis are:

- International Building Code (IBC, 2015)
- International Existing Building Code (IEBC, 2015)
- International Energy Conservation Code (IECC, 2015)
- Massachusetts State Building Code Amendments (780 CMR 9th Edition)
- Architectural Access Board Rules and Regulations (521 CMR, 2006)
- Uniform State Plumbing Code (248 CMR)

Mechanical systems, including electrical, plumbing, and fire protection systems, are reviewed in separate sections of this study. Investigative demolition was not performed and comments in this report are based on visual observation and the Town provided information regarding the existing building in the form of original construction drawings.

Renovations to existing structures must be reviewed for code compliance by one of three separate methods in the IEBC: The Prescriptive Method, the Performance Method, and the Work Area Method. Within these methods, the modifications required for compliance vary dependent upon the extent of the renovation work; renovation work is classified as *Repair*, *Alteration Level 1*, *Alteration Level 2*, and *Alteration Level 3*. When the extent of the repair and alteration work exceeds 50% of the aggregate area of the building, this work is classified as *Alteration Level 3* and, under this classification; compliance with requirements of *Alteration Level 1* and *Alteration Level 2* is also required. *Alteration Level 2* requirements are enforced when the work involves reconfiguration of spaces or systems, but not more than 50% of the total building area. *Alteration Level 1* requirements are enforced when the work is cosmetic or replacement of existing materials with similar materials, such as re-roofing projects. All analyses in this study is based on the worst-case assumption of a renovation to more than 50% of the building and so is classified as *Alteration Level 3* and under the Work Area Method.

Upgrades and corrections to existing structures undergoing renovations are limited to specific items under the IEBC. During renovations, not all existing safety issues and non-compliant conditions are required to be corrected; typically, only items within each renovated area is required to be corrected. However, non-compliant conditions at egress elements, accessibility, and fire protection (sprinklers) are required to be corrected or provided as required by the IBC. Because this building was originally constructed in 1975, existing conditions which may be allowed to remain, or “grandfathered”, under the limited requirements of the IEBC may also be in conflict with current life safety standards. Over time since it’s construction, life safety standards have been improved in reaction to tragic events. In order to provide life safety conditions in accordance with the most current intent, current IBC and Fire Safety codes and regulations are also used as a basis for judging compliance. All modifications that are required by the IBC but which



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are discretionary (not necessarily required by the IEBC for this renovation) are noted in the recommendations.

Compliance with Chapter 148 Section 26G of the State Fire Code is required by the IEBC for all new buildings, additions, and renovations classified as *Alteration Level 3*. This regulation also requires that in all existing buildings in which renovations will exceed 7,500 square feet in area or in which major alterations are planned, as defined by the statute, must provide a full sprinkler fire suppression system if available water flow and pressure is available. A major alteration is reconfiguration of walls, doors, windows, mechanical systems, etc., which effectively makes installation of sprinkler systems easier and which affects more than 33% of the building area or more than 33% of the assessed value of the building.

Accessibility in public buildings is regulated by 521 CMR, which is enforced by the Massachusetts Architectural Access Board (MA AAB) and the Building Inspector of the municipality. ADA (the Americans with Disabilities Act) is a federal law; while this is not enforced by the local authority compliance is still required and any person may file suit for compliance. 521 CMR, as issued in 2006, is used for this review. MA AAB 5.1 Definitions states:

“Public Buildings: A building privately or publicly financed that is open to and used by the public, including but not limited to ..., municipal buildings, commercial buildings, buildings having places of assembly, [etc.] ...”

Harvard Fire Station is a public, municipal building and is required to be accessible in accordance with 521 CMR.

Currently, the AAB regulates only areas and conditions accessed by the “public”; areas occupied solely by staff are not included in the regulation. Staff areas are included in the ADA Accessibility Guidelines as part of federal law, but these are not directly enforceable as part of the Building Code. However, in an effort to unify compliance requirements with the recently adopted IBC as the State Building Code, the AAB will be revising the regulation to include staff areas as well as public areas. In anticipation of the release of this revised AAB document, all discussions below regarding accessibility will include compliance of staff areas.

Applicability of the AAB Regulations for renovations of existing buildings is based on the value of the renovations as a percentage of the current assessed value of the building only (100% valuation). According to AAB 3.3, partial compliance is required when the value of the renovations exceeds \$100,000 and full compliance of the entire facility is required when the value of the renovations exceeds 30% of the assessed value of the building. An exception to this rule is for maintenance work on MEP systems, sprinkler systems, roofs, replacement windows, masonry repair, site utilities, landscaping, and septic system which in aggregate is less than \$500,000.

As stated in AAB 3.3 (paraphrased):

“3.3 EXISTING BUILDINGS

All additions to, reconstruction, remodeling, and alterations or repairs of existing public buildings or facilities ...shall be governed by all applicable subsections in 521 CMR.

- 3.3.1 a. if the work costs less than \$100,000, then only the work being performed is required to comply with 521 CMR...,
 - b. if the work costs \$100,000 or more, then the work being performed is required to comply with 521 CMR. In addition, an accessible public entrance and an accessible toilet room, telephone, drinking fountain (if toilets, telephones and drinking fountains are provided) shall also be provided in compliance with 521 CMR...,

3.3.2 If the work performed, including the exempted work, amounts to 30% or more of the full and fair cash value (see 521 CMR 5.00) of the building the entire building is required to comply with 521 CMR. “



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Also, according to AAB 3.5, any work performed, even if under separate contracts or building permits, within a 3-year period must be included in the aggregate construction cost. This includes sitework and building renovations, whether done separately or together. Future Change Orders and future building projects within 3 years before or after the permit date for this project, could also trigger full compliance if the aggregate value exceeds the 30% limit.

Energy conservation, as required by the IECC for new construction, is not required for renovations to existing structures under the IEBC. However, any new elements or alterations to the exterior building envelope, such as new windows or new roofing, must comply to the greatest degree possible. As stated in the IEBC Alteration Level 3 Section 808 Energy Conservation “*Essentially, the entire building is not required to meet the energy provisions, but only improvement in the energy performance of the building is intended to be achieved by making the new elements meet the IECC...*”. Overall upgrade of the exterior envelope of the building is not required

According to the Town of Harvard Assessor’s Office, the current assessed value of the building (not including the site) is \$279,700 and so the threshold value of the cost triggers for accessibility and fire protection are, respectively:

- if the cost of permitted renovations exceeds \$83,910 (over a consecutive 3-year period), then the entire building and site must be modified to be accessible,
- if the cost of permitted renovations exceeds \$92,301 (over the current 5-year period), or if the renovation area exceeds 7,500 square feet, then the entire building must be sprinklered.

Information for work requiring building permits was not available from the Town of Harvard Building Department. As such, the aggregate cost for permitted work in the last 5 years is not considered in the calculation of the cost threshold for compliance. Also, as the cost of a renovation under this study is presumed to exceed these 30% and 33% cost thresholds shown below, the entire site and building must be made to comply with current accessibility codes and fully sprinklered as part of a renovation of the building.

COST THRESHOLDS FOR ACCESSIBILITY AND FIRE SUPPRESSION COMPLIANCE	
Assessed Value of Harvard Fire Station (Structure Only)	\$279,700
30% Cost Trigger for Accessibility Compliance	\$ 83,910
33% Cost Trigger for Fire Protection	\$ 92,301

BUILDING CODE

IBC Ch. 3 – Use and Occupancy

(IBC 305.1) Primary Use: Group B – Business
(IBC 305.1) Mixed Use Areas: Group R-2 Residential (Bunk Area)
Group S-2 Storage (Apparatus Bay, Storage)

IBC Ch. 2B – Types of Construction

(IBC Table 601) The existing building was built in 1975. The building was constructed of masonry (load



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bearing) structure with non-fire rated concrete masonry units and metal stud interior framing for walls. The roof is framed with open web steel joists and steel beams. The roof deck is made up of cementitious panels with insulated panels on the exterior. As a worst case, this open web joist frame construction conforms to the requirements for Type II-B (“II” references roman numeral 2, “B” references unprotected construction) construction in the current IBC. The structure is not protected with spray fireproofing or other fire-rated construction. Interior partitions are typically non-load bearing metal studs stud with plaster or drywall.

Type II-B Construction Type Min. Fire Resistance Rating Requirements (780 CMR Table 601)

Building Elements	Required Fire Resistance Rating (Hrs.)
Structural Frame (including columns, girders, and trusses)	0
Exterior Bearing Walls	0
Interior Bearing Walls	0
Exterior Non-Bearing Walls and Partitions	0
Interior Non-Bearing Walls and Partitions	0
Floor Construction (including support beams and joist)	0
Roof Construction (including support beams and joist)	0

Table 601 establishes the required minimum fire rating of construction elements and is related to the allowable height and area discussed in Table 503 below. Type II-B (2-B) construction does not require that the exterior bearing wall structural members to be protected (fire rated) and that all interior structural members do not need to be fire rated. The exterior masonry walls are assumed, to be inherently fire rated for a minimum of 2 hours. The tradeoff for not protecting the interior building structure under Classification II-B is a reduction in the allowable height and area that can be built; essentially, the greater the fire protection of building structural elements, the larger the building height and area which is allowed.

IBC Ch. 5 – General Building Limitations

Height and area limitations are presented below based on the allowable limits stated in Table 504 for Building Height and in Table 506 for Building Area for the building Use Groups and Construction Type noted above. Because the requirements of MGL Chapter 148 Section 26G will most likely require that a sprinkler system be installed, the allowable height and area referenced from Tables 504 and 506 are from this category.

Other uses within the mixed-use building cannot exceed an area proportional to the percentage of the area that Use Group occupies in the building. Because future uses of the building are unknown, the allowable area is calculated based on the Business Use Group only.

(Table 504.3, 504.4 & 506.2) The allowable height and area for Use Groups under Type II-B (2-B) Construction is:



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USE GROUP	Allowable Height (Sprinklered)	Allowable Area (Sprinklered)	Accessible Perimeter +25% (Average)	Total Allowable Area per Floor with Allowable Increases
B	3 Story (55 Feet)	69,000 sf.	+ 5,750 sf.	74,750 sf.
S-2	3 Story (55 Feet)	78,000 sf.	+ 6,500 sf.	84,500 sf.
R-2	4 Story (55 Feet)	48,000 sf.	+ 4,000 sf.	52,000 sf.

The occupied floor area for the building is shown below. It is as reported in the Town of Harvard Assessor's Card for the building and are not based on construction documents or field measurements. For the purpose of estimating the number of occupants, occupancy in the residential area is estimated based on the number of bunk beds in the sleeping room and not by allocating specific Use Groups to floor areas.

First Floor:	Total Area: 5,586 GSF	59 occupants (6 R-2 and 53 Business Use)
TOTAL BUILDING AREA: 5,586 GSF		

(IBC 508.2.4 and Table 508.4) Table 508.4 shows the fire separation requirements between Use Groups. A 2-hour fire rated partition and ceiling/floor is required between a B Use and an R-2 while there is no fire separation between a B Use and an S-2 Use in an unsprinklered building. This condition exists in the current building, but these use groups are not separated by fire rated partitions.

In 508.2.4, rooms used for storage (S-2) and residence (R-2) may be considered to be accessory to the primary Use Group (B) if the aggregate area of these rooms is less than 10% of each floor area and smaller than the area allowed by Table 503. Spaces considered to be accessory to the primary use are not required to be separated from the primary use by fire rated partitions.

- The Storage S-2 use (Apparatus Bay) and the Residential R-2 use (dormitory) are more than 10% of the floor area on which each use exists and so these areas cannot be considered accessory uses.

Alternatively, the building may be classified entirely under the most restrictive Use Group, Residential R-2, and void the requirements for fire separations between use groups. This is essentially a trade-off for using the lesser allowable area of the most restrictive use group.

- In this instance, the current building would comply if considered to be entirely of the R-2 use group. This classification is only for the purposes of determining compliance with allowable height and area provisions of the Code; in all other aspects of the Code, these areas shall be classified by their own use.

IBC Ch. 7 – Fire and Smoke Protection

(Table 706.4 Fire Walls) The floor area of the existing Fire Station is approximately 5,586 Gross Square Feet (GSF) on one floor.

- All floor areas of the building are less than the allowable gross area stated in Table 506 and are compliant. Fire walls to separate building are not required.

IBC Chapter 10 - Means of Egress

(Table 1004.1) Occupancy load in the existing facility is determined by the functions in each area of the building and not the primary use group. According to the IBC Table 1004.1.2, Business functions require an occupant load calculated at 100 gross square feet (gsf) per person, dormitory functions are calculated at 50 net square feet (nsf) per person, Apparatus Bays are calculated as Parking Garages at 200 gsf per person, and Mechanical/Storage areas are calculated at 300 gsf per person. The summary above estimates



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the relative areas for each use group.

The egress capacity (0.15"/ per occupant for unsprinklered buildings) for a typical single 36-inch wide egress doorway is approximately 240 occupants. The First Floor is estimated to have an occupancy of 59 persons.

(IBC 1015.2.1) requires that in unsprinklered buildings on floors with more than one exit, that these exits are separated by a minimum of ½ of the overall diagonal distance of the entire building.

- The egress man-doors are all located on opposite sides of the building, so the separation of exits does comply.

(IBC 1008.1.1) requires that all egress doorways provide a minimum clear width of 32 inches from the face of the door to the frame.

- As most of the doors and doorways in the residential areas of the building are sized for 36-inch wide doors, these openings do comply.

(IBC Table 1017.2 Exit Access Travel Distance)

Occupancy	With Sprinkler System (feet)
B	300
R	200
S-2	300

(IBC 1014.3) Common path of egress travel in Business occupancy is limited to 75 feet.

- All areas of the building comply.

(IEBC 705.6) In buildings of a Business, Storage, and Residential occupancy with a sprinkler system, the allowable length of a dead-end corridor is 50 feet.

- All areas of the building comply.

(248 CMR 2.10 Plumbing Code: Fixtures) The tables below outline the plumbing code requirements for fixture quantities. Fixtures may be within a 300' allowable travel distance and one floor above or below the occupied level.

Use Group	Rate for	Occupants	Fixtures Required
B (Business)	Male: 1 toilet / 25 Female: 1 toilet / 20	53 occupants (27 Male/ 26 Female)	Male: 2 Fixtures Female: 2 Fixtures
R-2 (Residential)	Male: 1 toilet/ 6 Female: 1 / 8	6 occupants (3 Male / 3 Female)	Male: 1 Fixtures Female: 1 Fixtures
Employee, Non-industrial (Storage, Apparatus Bay)	Male: 1 toilet / 25 Female: 1 toilet / 20	35 occupants (18 Male / 18 Female)	Male: 1 Fixtures Female: 2 Fixtures
Total fixtures required:			Male: 4 Fixtures Female: 5 Fixtures
Total fixtures provided:			Male: 2 Fixtures Female: 1 Fixtures



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In the existing facility, there are a total of 2 toilet fixtures and these are not segregated for male and female staff. The existing toilet fixture count does not meet the requirement above for staff population and none of the toilets fully comply with accessibility regulations. Additionally, there are no toilets for public use.

Accessible toilet facilities will be discussed in more detail in AAB Chapter 30, further on in this report.

ACCESSIBILITY

AAB Chapter 11 – Commercial Facilities (521 CMR 11.1)

All Public Areas, Toilet rooms, and other areas accessible to the public within commercial facilities are required to be accessible. This is expected to be revised in a pending release of the AAB to include employee areas and facilities.

- Accessible transaction counter at First Floor Public Lobby is not provided.
- Accessible male and female toilet rooms are not provided for public use.

AAB 14 – Places of Assembly

(AAB 14.2) Places of assembly are not provided in the existing building.

AAB 19 – Recreational Facilities (Locker Rooms)

(AAB 19.4) There are no public locker rooms and so are not reviewed. Turn out gear storage is in the Apparatus Bay and presents a hazard.

AAB 20 - Accessible Routes

(AAB 20.1) Accessible routes within the building generally comply with requirements for width, passing space, protruding objects, headroom, etc.

- Doorways reviewed do not provide the required clearance for accessibility.

(AAB 20.6.1) Objects projecting from walls with their leading edges between 27 inches and 80 inches above the finished floor must not protrude more than 4 inches into walks, halls, corridors, passageways or aisle and must not have sharp edges.

- There does not appear to be any non-compliant conditions.

AAB 23.00 Parking and Passenger Loading Zones

The parking lot is accessed directly from the street. There are no accessible public parking spaces provided onsite.

AAB 24.00 – Ramps

There are no ramps required on the interior of the building. Please refer to the Landscape section of this study for information regarding site accessibility.

AAB 25.00 – Entrances

(AAB 25.1) All public entrances to the building must be accessible and be on an accessible route.

- The public entrance to the building is at grade, pull side clearance on the exterior side appear to be compliant



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AAB 26.00 – Doors and Doorways

(AAB 26.1.1) All doorways shall provide a 32-inch clear width and accessible routes shall be a minimum of 36-inches clear width.

- Many doorways in this building are typically 36-inches in width and do comply.

AAB 26.6 – Maneuvering Clearances

- Most of the doors throughout the building provide required pull and push clearances for accessible doors, except at toilet rooms and at Admin and Dormitory room.

AAB 26.11 - Door Hardware

With the exception of exterior doors, existing hardware throughout building is not compliant and replacement with lever-type hardware at all doors is recommended.

AAB 26.1.2 - Exterior Exit Doors

- Exterior exit door from the south exit accessed by steep ramp and is not compliant.

AAB 30.00 – Public Toilet Rooms

(AAB 30.1) Although not currently regulated by AAB, staff toilets will be regulated under the revised AAB to be published in the near future. Access to staff toilet rooms is required under Federal ADA Guidelines. Civilian staff, such as the Fire Chief's Administrative Assistant, are not required to be ambulatory and must be provided with accessible facilities. At a minimum, it is recommended that existing toilet rooms be reconstructed to provide single fixture toilet rooms with lockable doors for civilian staff use. There are not any public toilet rooms currently at the fire station. These should be provided for public use by visitors to the station.

AAB 31.00 – Public Bathing Rooms

(AAB 31.7) There are two shower stalls in the building as part of the staff toilet room provided for able-bodied staff only and compliance is not required. These stalls are not accessible but do have a changing area. Consequently, if a staff of the opposite sex is taking a shower access to the toilet room adjacent to the dormitory area is not available. However, the plumbing code requires separate toilet/shower rooms for men and women; although unisex rooms are allowed for compliance with AAB, this is not compliant with the plumbing code.

AAB 32.00 - Kitchens

(AAB 32.1) Commercial kitchens are not regulated by the AAB and the Day Room kitchen is restricted to fire department staff only. Although this kitchen is currently only used by fire department staff who are required to be ambulatory. If this is to be used by civilian staff, then access and accessible counter space must be provided.

AAB 36.00 – Drinking Fountains

(AAB 36.1.1) Drinking fountains are not provided within the building. These must be provided in accordance with plumbing code requirements and must have 2 level spouts for ADA / AAB compliance.

AAB 41.00 – Signage

(AAB 41.00) Room signage with braille is missing throughout the building and must be provided at all 'permanent rooms and spaces' as well as code required egress signage. Directional signage, where



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provided, shall be compliant. Symbols of Accessibility are missing throughout building. Where exit signs indicate an accessible route, if all routes are not accessible, these signs shall include the symbol of accessibility.

RECOMMENDATIONS FOR CODE COMPLIANCE:

- Provide a sprinkler system throughout the building.

Any renovation will likely require the entire building to be accessible.

- Provide accessible ramp at all exits.
- Provide all doors with accessible lever hardware
- Toilet rooms are not accessible and does not have door and fixture clearances and fixtures do not comply. An accessible route is not provided as the access to the toilet room is too narrow.
- Toilet/shower room is not accessible as it does not have door and fixture clearances, fixtures do not comply, shower stall does not comply, and grab bars are not provided. An accessible route is not provided.
- Provide accessible drinking fountains.
- All inaccessible doors should be modified to achieve minimum clearance on both sides of doors.
- Provide AAB compliant signage throughout the building.



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EXISTING CONDITIONS REPORT

- 3.1 ARCHITECTURAL
- 3.2 STRUCTURAL SYSTEMS
- 3.3 PLUMBING SYSTEMS
- 3.4 MECHANICAL SYSTEMS
- 3.5 ELECTRICAL SYSTEMS



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ARCHITECTURAL ANALYSIS OF EXISTING FACILITY

OVERVIEW

This Architectural Existing Facilities Evaluation of the Harvard Fire Station at 13 Ayer Road includes assessment of the construction and weather tightness of the exterior envelope and of the finish and function of interior elements. General observations common to most areas of the facility are discussed and issues regarding individual spaces are further detailed, as necessary, in following reports provided by consultants with expertise in other engineering disciplines. Also, although a review of the facility with regard to the Building Code is provided in a separate section of this Study, references to specific Code conditions are included in this section, as well as in sections by other engineering disciplines. Investigative demolition was not performed and comments in this report are based on visual observation only; and construction drawings of the building provided by the Town.

According to the construction drawings, the current Fire Station was constructed in 1976 and is 5,750 gross square feet in area on one floor. The building houses the Apparatus Bays, Reception/Dispatch Office, Administration Offices, bunk room, kitchen/Day Room for Firefighters, and mechanical rooms.

The Fire Station consists of an original structure with no additions or expansions. The building and its four (4) apparatus bays face Ayer Road to the east. The Apparatus Bays are primarily back-in only, with one bay being drive through. The site is essentially entirely paved on the east and north sides with minimal space to abutting lot line to the south. Unassigned parking spaces are located to the north and east of the building.

EXTERIOR ENVELOPE

Exterior Walls

Based on the construction drawings and visual observation, the original building is constructed of load bearing masonry walls on the exterior. The sloped roof is framed with steel trusses and the flat roofs are framed with steel joists.

The exterior envelope of the building appears to consist predominately of double wyth masonry cavity wall construction, consisting of a 4" brick veneer with 6" & 8" concrete masonry block (cmu) with minimal air cavity. The brick veneer and cmu are set in a running bond pattern. All walls are uninsulated and cavity wall weeps are readily visible at window heads and harder to find at the base of wall.

The existing exterior walls in the building are not constructed up to current code requirements for insulation value and moisture mitigation. We recommend that the wall construction be revised to provide proper weeps, vents, air and vapor barrier and insulation to the wall assembly to bring it up to code compliance. The brick veneer itself is generally in very good condition. There are few locations where cracks, failing mortar, and failing caulking. Exterior steel and cast stone lintels over windows and doors are generally in good condition.



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Exterior Windows

The exterior wood windows are true divided lite with single pane glass. Aluminum storm windows have been added to help with energy efficiency. While these windows are in good condition, they do not comply with current State energy code requirements. The wood frames need to be scraped, repainted and the perimeter caulking needs to be replaced.



Exterior Doors

There are five exterior man doors in the fire station: one at the main entrance one at the firefighter's dayroom/kitchen, one directly into the apparatus bay near the administrative & bunk rooms, and one each into the mechanical and work rooms. All doors are painted wood in hollow metal frames. They are generally in good condition and need to be scraped and painted. None of these doors has accessible hardware or code compliant level areas at the front approach. None of the doors have been outfitted with a "crash-bars"; though many of the doors are typically equipped with lever handles.



Overhead doors to the apparatus bays are the same size. Facing Ayer Road, there are four sectional overhead doors that are 12'-0" wide and 12'-0" tall. These doors are too small for current fire apparatus and evidence of the rear door frame having been scraped by the engines pulling in and out of the bay. It was also reported that a number of years ago an apparatus struck the front of the building requiring the front of the apparatus



HARVARD FIRE STATION *FEASIBILITY STUDY*



bay to be rebuilt. Compounding the problem with the width of the bay door is that three of the bays on the front of the building are back-in bays which require the apparatus to back in from the apron.



Roofing

Steep sloped roofing is asphalt shingles. The asphalt shingles appear to be in good condition although areas of moss was observed on the south side.



Step flashing at roof to wall locations appears to be in good condition, however, the face is not sealed in a reglet and water can readily infiltrate the roof and building.





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Caulking at mechanical curbs was observed to be failing and needs to be replaced.



Waves in the shingles were observed on the north side. It appears that the roof deck may have begun to delaminate. Further investigation is required.



Low slope roofing is a single ply membrane roofing that appears to be EPDM on tapered rigid insulation, which is nearing the end of its useful life. At the single ply roof areas, patches were observed and the roof was soft and spongy indicating water saturated insulation trapped beneath the membrane. The moisture is a problem which could lead to the growth of mold and mildew. In these spots, standing water was also observed. Additionally, there were a few patches observed.





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There are no gutters or downspouts on the building, allowing the rainwater to shed onto the asphalt and walking surfaces. At a minimum, gutters and down spouts should be provided above all walking surfaces to prevent ice buildup which will cause a walking hazard in the winter months

Overall, the exterior shell of the building is in good condition and in minimal repair is needed.

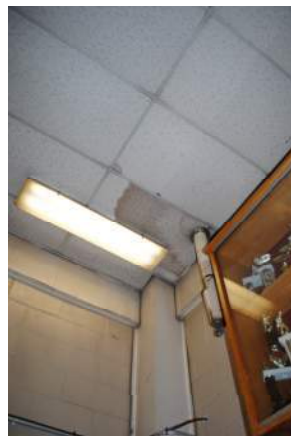
INTERIOR BUILDING ELEMENTS

Interior Finishes

Walls: Interior wall finishes are mostly painted masonry, with some painted drywall/plaster in occupied spaces. These surfaces appear to be in good condition but require some patching at gouged/water damaged finishes and corners. Wood trim is generally in good condition but exhibit ware and need to be painted.

Flooring: The concrete floor slab on grade in the Apparatus Bays is painted and appears to be in good condition. Finish flooring in offices is carpet and is in poor condition. In the toilet rooms, the floor appears 12"x12" vinyl tile and in poor condition. The shower area is ceramic porcelain tile and in poor condition. The kitchen, dayroom, bunks and corridors are also 12"x12" vinyl in poor condition.

Ceilings: Ceilings in most of the building, including the Apparatus Bay, are a 2x4 suspended acoustical tile system with surface or recessed mounted lighting fixtures. In general, most of the ceiling grids exhibit signs of age or rust in some locations, and tiles exhibit physical damage from water/moisture. Moisture problems and/or leaks from the roof system are the cause of this damage. The lighting seems inadequate in general and the light fixtures are in poor condition. Refer to the electrical section of this report for more information.





HARVARD FIRE STATION FEASIBILITY STUDY



Interior doors and windows: Throughout the building, original doors (36" wide), are varnished flush wood doors in painted hollow metal frames and window casings and sills are wood. Doors to and from the Apparatus Bay are flush hollow metal with hollow metal frames, are exhibiting wear and need to be painted. Most interior doors have doorknobs and have not been outfitted with ADA compliant lever-style handles. The doors hardware is worn and will require new hardware and refinishing. Doors and windows are worn and in fair condition.



Signage, Miscellaneous Accessories and Equipment: Room signage is almost nonexistent. Any addition or renovation would require the installation of signage with braille to comply with ADA. Fire extinguishers are located sporadically throughout the building but appear to be inadequate in number. Window treatments in the building consist of manually operated horizontal blinds, shades and curtains or none at all. All are in fair to poor condition and need to be replaced.

Kitchen/Dayroom: Located in the rear of the building and utilizing painted cmu and gypsum walls, with vinyl composition tile flooring and suspended acoustical tile ceiling with recessed and surface mounted lights. All finishes are in fair condition and should be replaced. Cabinets and counter tops exhibit some wear. Appliances appear to be in good condition.





HARVARD FIRE STATION *FEASIBILITY STUDY*

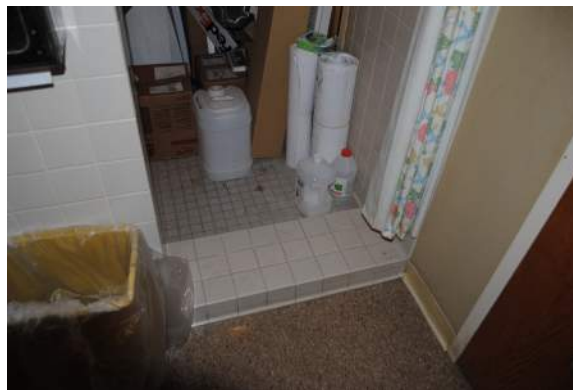


Toilet Rooms: The toilet rooms utilize painted gypsum walls, with vinyl composition tile flooring and suspended acoustical tile ceiling.

The shower room adjacent to the bunk room utilizes ceramic tile walls, with ceramic tile flooring. Shower compartments have ceramic tile walls and suspended acoustical ceiling tile. All of these finishes are worn and are at the end of their useful life.

The fixtures do not meet ADA requirements. The sinks do not have insulated drain piping or approved lever style faucets handles and thus are non-complaint. The toilets do not have proper grab bars and or clearances. Additionally, there are no separate toilet/shower facilities for male and female use.

Our recommendation would be to execute a total renovation of these spaces. The fixtures, partitions and accessories should be replaced with new.



PROGRAM COMPONENTS

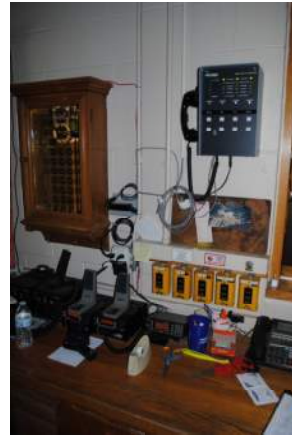
Communications Center: The dispatch center/radio room does not comply with NFPA 1221 which sets the design standard for emergency dispatch centers. This code requires two-hour fire separation from the remainder of the building, protection against civil unrest and an isolated air handling system among many other requirements. Neither an isolated air handling system nor two-hour fire separation assemblies were



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not evident. Additionally, this room appears to be used for a variety of other programmatic functions including report preparation and multi-purpose room. These functions are not conducive to providing an appropriate environment for dispatchers to communicate with citizens in emergency circumstances.



Bunk Rooms: There is one bunk room with bunk beds to sleep six (6), but is currently used for storage of miscellaneous materials. They utilize painted cmu and gypsum walls, suspended 2x4 acoustical tile ceiling in a metal ceiling grid with surface mounted lights and VCT floor tile. All the finishes are in poor condition and need to be replaced.



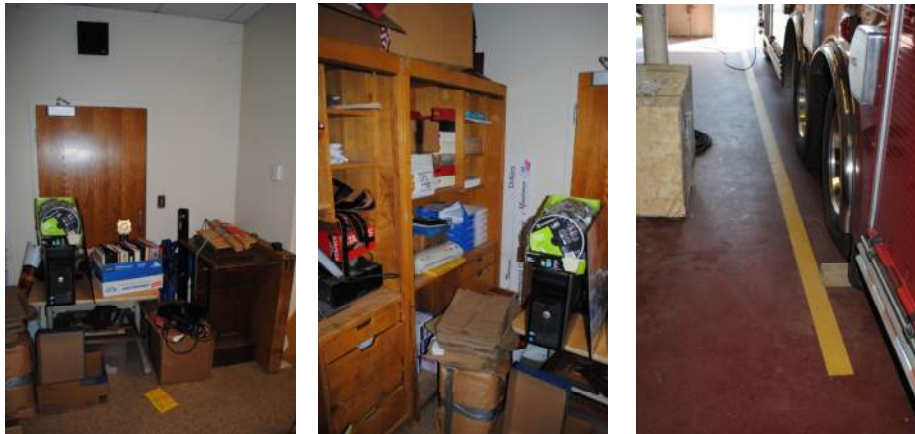
Apparatus Bays: The apparatus bays utilize painted cmu walls, suspended acoustical tile ceiling with surface mounted lights and stained/painted concrete floors. All of the finishes are in fair to poor condition. The ceiling exhibits signs of water damage, most likely the result of current and/or past roof leaks. The overhead door openings are too narrow & short and barely allow passage of the current apparatus. The circulation space around the apparatus is too narrow per recognized fire station facility design standards. The apparatus doors are insulated metal clad pre-finished sectional overhead doors, which were installed in 2019 and are in like new condition. The vehicle exhaust system was installed in 2004, and is in excellent condition. Additionally, the bays house the turnout gear lockers, decontamination area, hose/supply storage and work areas. All these spaces should be in their own spaces.



HARVARD FIRE STATION *FEASIBILITY STUDY*



Storage Facilities: There appears to be inadequate storage facilities for archival records, training materials, department equipment, and supplies.



Recommendations:

1. Replace all flat roofing with new EPDM or PVC roof membranes. Provide reglets with counterflashing at all building wall interfaces.
2. An interior, insulated wall with a vapor barrier should be provided on the entire station to upgrade the exterior wall to current energy conservation standards.
3. Flooring finishes should be replaced.
4. Replace acoustical ceilings and repaint all drywall ceilings and soffits.
5. All wall surfaces must be patched and repainted.
6. Install new aluminum gutters and downspouts with adequate capacity to provide continuous free flow of water to grade.



HARVARD FIRE STATION *FEASIBILITY STUDY*



7. It is our recommendation that a comprehensive survey of hazardous materials be conducted. The scope of the survey should include asbestos, lead paint, mercury and PBC's.

Summary:

Below are examples of non-compliant code or safety standard, conditions observed at the existing facilities. A complete list is included in the study report. These conditions expose the Fire Department staff to safety hazards and the Town to liability.

1. Building Code:
 - a. Structurally the facilities do not meet current seismic (earthquake) design and would likely suffer major damage in a seismic event, a situation in which demand for emergency response would peak.
 - b. There are no sprinkler systems to protect life safety and apparatus in case of fire.
2. Plumbing Code:
 - a. Fixtures do not meet Federal water conservation requirements
 - b. Fixtures are not handicapped accessible
3. HVAC Code:
 - a. Ductwork is too small.
 - b. Non-compliant amount of fresh air changes (insufficient ventilation per Code).
4. Electrical Code:
 - a. Most systems (lighting, power, emergency lighting, and fire alarm) no longer meet code requirements or safety standards.
5. ADA/MAAB (handicapped accessibility)
 - a. No public toilets. Public is forced to use existing staff toilet/shower/locker facilities which are not handicapped accessible (turning radius', reach limits, thresholds....)
 - b. No separate toilet/shower/locker facilities for female fire fighters or staff.

All of these issues, and others identified in the 'Code Review' & "Existing Conditions Survey" sections of the study will need to be addressed in any addition/renovation or new construction recommendation.



HARVARD FIRE STATION *FEASIBILITY STUDY*



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- 3.1 ARCHITECTURAL
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- 3.4 MECHANICAL SYSTEMS
- 3.5 ELECTRICAL SYSTEMS



HARVARD FIRE STATION *FEASIBILITY STUDY*



Structural

Existing Facility Evaluation

Existing Fire Department Building

The structural components of the existing building are as follows:

Existing Roof System

The existing roof is constructed of open web sloped steel roof joists that are supported on load bearing masonry walls and steel beams. There are three steel columns in the middle of the apparatus bay that supports the center main ridge which the steel roof joists are supported from. The roof decking is a Tectum roof deck planking with a plywood nailer overlay to allow shingles to be nailed to. The roof decking plank spans perpendicular to the roof joists.

Existing Bearing Walls

The bearing walls are comprised of 6" and 8" concrete masonry units (cmu) that are mortared in place. Per the existing drawings there is only horizontal joint reinforcing wire in the walls except for the masonry beam that spans the rear apparatus bay drive isle wall opening. The exterior masonry wall also have a cavity and brick veneer. Normally the brick veneer is not a load bearing building component however in this building there are areas in which the brick veneer supports bearing plates for the steel roof framing. The main masonry bearing wall is 6" in width. At the top of the wall the masonry wall changes to two courses of 8" cmu that is grouted and is reinforced however this top continuous bond beam is not mechanically tied or doweled to the lower 6" cmu load bearing wall. This detail can be observed on the existing drawing sheet S-5 and when viewing the top of the masonry wall in the apparatus bay. When reviewing the exterior wall condition it was found that some of the existing window sills were loose and appear to have no bond to the supporting brick.

Existing Foundation System

The existing foundation is not visible at this time thus the following description is solely based upon what is observed on the existing building drawings. The existing foundation is comprised of typical cast in place concrete spread and continuous footings of various widths with a 10" wide cast in place concrete wall. The continuous wall footings are unreinforced and the walls have only (2)-#5 continuous top and bottom reinforcing bars. The walls are not doweled or mechanically connected to the footings.

Addition and Renovation

One concept is that there will be an addition and renovation to the existing fire station building. The following are structural items that will need to be addressed if an addition and renovation moves forward.

Given the Massachusetts State Building Code this building would need to be upgraded to meet the building code that is in place at this time. Given what was observed and the existing drawings this building would require substantial upgrades to accomplish this task. The following items are the most



HARVARD FIRE STATION *FEASIBILITY STUDY*



significant structural building elements that would need to be upgraded if an addition and renovation design was to move forward.

1. The 6" existing bearing walls are unreinforced and would need to be upgraded. The existing 6" un-reinforced masonry wall has very low shear resistance when the walls are used in a bearing shear wall configuration as they are in this building.
2. The connection of the 8" continuous bond beam to the lower 6" load bearing wall interface would need to be addressed. Refer to photo 10 attached below.
3. The front (east) elevation has large garage door openings with only 3' wide masonry wall pilasters in between each door thus there is very low lateral resistance in this end wall.

The new addition portion of the building can be constructed from the following structural systems.

Existing Sub-Grade Preparation:

At this time a geotechnical report has not yet been generated. However, based upon the foundation system used for the existing fire station that is on the same property, standard conventional frost wall walls and spread footings were used thus it could be assumed that the soil subgrade is suitable for this foundation system at the proposed new building.

The exterior building perimeter frost wall footings could be at least 2' wide and 1' thick with building spread footings at least 3'x3'x1' in size. Based upon the existing drawings foundation details the soil bearing capacity would most likely be between 3000-4000 psf. This value along with other specific soil property values will be fully quantified in a geotechnical report.

Once a full geotechnical report has been provided to the design team the foundation systems might have to be revisited to reflect the recommendations that are to be set forth by the geotechnical engineer.

Foundations:

The new building will be comprised of perimeter concrete frost walls with interior spread footings. At this time there is no basement space thus the perimeter foundation walls will only need to go down to the minimum frost depth of 4' or deeper if required per the recommendations of the geotechnical engineer. The interior floor will consist of a 4" concrete slab on grade in the main offices area a 8" thick concrete slab if new apparatus bays are constructed in the new addition foot print area. The slab on grade in the apparatus bay will be pitched to interior trench drains. If there are interior wood or masonry load bearing walls there will be 12" deep x 24" wide haunched slab/footings reinforced with (4)-#4 continuous bars under these interior bearing walls.

The concrete for the walls, footings and slab on grade will be 3500 psi compressive strength concrete. The slab on grade will have a 15 mil poly vapor retarder and the concrete mix will contain the Barrier One moisture transmission retarding admixture. The concrete steel (rebar) reinforcing will be typical A615 or A706 grade 60 ksi material. The 4" concrete slab on grade shall contain 6x6 W2.1/W2.1 welded wire fabric reinforcing. The 8" concrete slab on grade in the apparatus bay will be reinforced with #4 at 12" o.c. each way and 6x6 x W2.1/W2.1 welded wire fabric reinforcing over the radiant heat piping. The #4 slab reinforcing will be set on continuous chairs with the radiant heat piping set on top of the #4's and the 6x6 W2.1/W2.1 welded wire fabric set over the radiant heat piping.



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Second Floor Structure

Given the limited building site area the addition will most likely have a second floor. The second floor construction will be as follows. The second floor will be comprised of a 5" concrete slab on metal decking (1 1/2"-20 gage galvanized composite steel decking with 3 1/2" of normal weight concrete). The floor slab will be reinforced with 6x6 W2.1/W2.1 welded wire fabric. The floor slab system will be supported on steel wide flange beams and columns down to the foundation level.

Roof Structure:

The new addition roof will most likely be a pitched style roof arrangement that will be created by using wood pitched top chord roof trusses that are supported on wide flange steel beams or concrete masonry bearing walls. In some of the taller truss space areas there could be the need for attic style roof trusses to create an attic service walkway to allow for the servicing of any mechanical units or filters that will be installed above the ceiling in the open truss space. The steel beams will be supported on steel columns down to the concrete foundations at grade. The roof diaphragm will be comprised of plywood roof sheathing that will be attached to the wood roof trusses. The insulation and roofing finish system will be called out by the architect and will cover the roof decking to create a weather tight assembly.

If a new apparatus bay is scheduled to be constructed typically these bays are tall and require a large open structure to allow for the tall fire truck clearance. In this area of the building the roof could be constructed from HSS (hollow structural sections, i.e. steel tubes) trusses that will clear span the front to back direction of the apparatus bay. Spanning between the trusses will be either steel beam or steel open web joist infill beams. 1 1/2" deep-20 gage galvanized wide rib steel decking will span between each roof beam or joist thus creating the roof diaphragm. The insulation and roofing finish system will be called out by the architect and will be placed over the steel roof decking to create a weather tight assembly.

Steel Framing / Wind and Seismic Lateral System:

The structural steel will be comprised of HSS tube steel columns with wide flange steel girder and infill beams. The lateral system will most likely consist of moment frames or brace frames to create rigidity in the building framework.

The steel materials used shall be as follows:

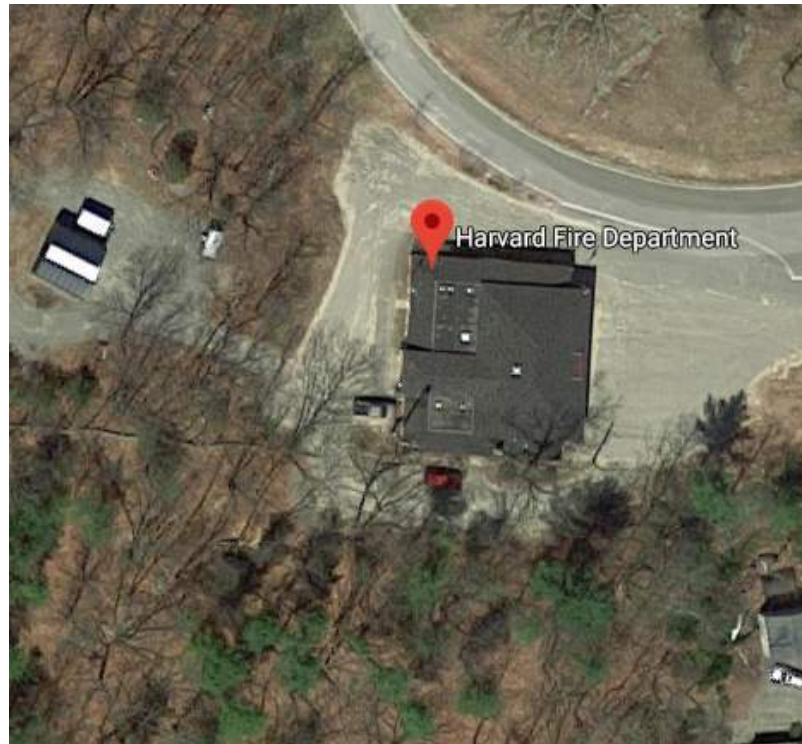
HSS Tube Sections ASTM A500 Grade B $F_y=46$ ksi
Plates, Angles, Channels, Solid and Flat Bars ASTM A36 $F_y=36$ ksi,
Wide Flange Beams ASTM A992 Gr 50 ksi
Anchor Rods ASTM F1554 Gr 55 ksi

All structural steel to be shop primed painted. Any exterior exposed angle, beam or plate lintels to be hot dip galvanized. The exterior exposed carport beams and columns will be prime painted, and finish painted per the architect specifications.

For additional information regarding the existing fire station refer to the photos below.



HARVARD FIRE STATION *FEASIBILITY STUDY*



Aerial View Photo 1



Slope steel joist
roof system

Typical masonry
load bearing walls

East Elevation Photo 2



HARVARD FIRE STATION *FEASIBILITY STUDY*



Precast window
lintels typical

Typical masonry
load bearing walls

West Elevation Photo 3



South Elevation Photo 4



HARVARD FIRE STATION *FEASIBILITY STUDY*



North Elevation Photo 4



Precast window
sill and lintel

Existing precast lintels and sills Photo 5



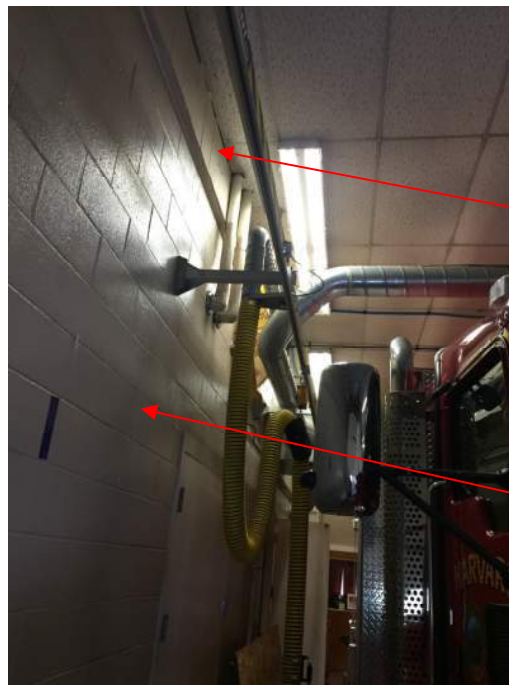
HARVARD FIRE STATION *FEASIBILITY STUDY*



Tectum roof decking

Existing open web
steel roof joists

Sloped roof joists and Tectum roof decking Photo 6



Transition between 6"
and 8" masonry wall,
refer to photo 10 below

6" load bearing
masonry wall

Load bearing masonry wall Photo 7



HARVARD FIRE STATION *FEASIBILITY STUDY*



Reinforced
masonry beam

Masonry beam over rear bay wall opening Photo 8

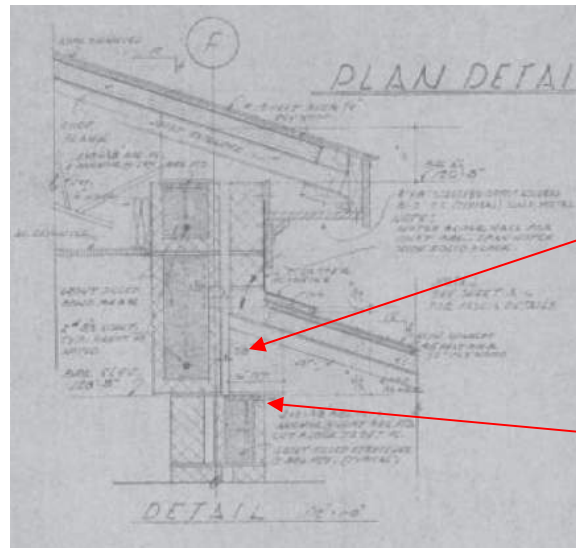


Typical steel column
support typical of 3
locations inside the
apparatus bay

Interior column inside the apparatus bay Photo 9



HARVARD FIRE STATION FEASIBILITY STUDY



8" CMU upper wall stacked and not mechanically connected to the 6" CMU below

The 4" brick veneer is used to support vertical loading of the low roof

Existing 8" masonry stacked on top of 6" Photo 10

Should the proposed scope of the project change the above structural narrative should be adjusted to reflect these modifications.



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- 3.4 MECHANICAL SYSTEMS
- 3.5 ELECTRICAL SYSTEMS



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PLUMBING

Existing Facility Evaluation

1. Plumbing:

- a. The existing building plumbing systems consist of the following:
 - 1) Water Service – The existing water service enters the building in the Work Shop. A water meter could not be located. Currently there is an existing gate valve for the main shut-off.
 - 2) Sanitary System – The sanitary piping is cast iron piping which runs underground.
 - 3) Domestic Hot Water – The domestic water heater is located in the mechanical room. The water heater is a Maytag 50 gallon, 40,000 btu gas fired water heater. The water heater was manufactured in May of 2005, and is in fair/poor condition. Hot and cold water piping in the boiler room is not insulated.



Hot Water Tank



HARVARD FIRE STATION *FEASIBILITY STUDY*



- 4) Fuel Source – The natural gas service/meter assembly is located on the exterior of the building. A 2" low pressure gas line enters the building at the mechanical room. The gas line serves the heating boilers and water heater located in the mechanical Room. No deficiencies were observed on the gas piping.



Gas Service/Meter

- 5) Fixtures – The plumbing fixtures are not ADA compliant. Toilets are tank type floor mounted. The locker rooms contain one (1) shower in each room (male and female). The plumbing fixtures should all be replaced with low flow, ADA compliant fixtures, per current Code.



Plumbing Fixtures



Shower



HARVARD FIRE STATION *FEASIBILITY STUDY*



Recommendations

1. The plumbing piping systems serving the building appear to be original to the building and are past their useful life expectancy. Domestic water piping can be expected to show signs of leaking or overall failure due to age. Plumbing fixtures appear to be original to the building and are past their useful life expectancy. Fixtures need to be updated to accommodate ADA requirements. Low flow fixtures, flush valves, faucets and showers should be installed to conserve water and comply with current code.
2. The existing 50 gallon gas fired water heater should be removed and replaced with a new gas fired, high efficiency water heater. A complete hot water supply and return system would be required to meet current code.
3. The existing sanitary system does not appear to have any major issues based on discussions with facility personal.



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MECHANICAL

Existing Facility Evaluation

1. Mechanical (HVAC) Systems:

- a. The HVAC system serving the building is a heating only hot water system consisting of a boiler, pumps, piping, hot water base board, and unit heaters. The boiler, pumps, and main distribution piping is located in the mechanical room.
 - 1) Boiler was manufactured by Lochinvar and is approximately 5 to 7 years old. Name plate information with model number and capacity could not be located. Boiler appears to be in
 - 2) good condition.
 - 3) Primary and secondary pumps appear to be in fair condition. Manufacturer, model number and age unknown.
 - 4) Main piping distribution in the boiler room is in fair condition. Piping insulation is missing in many locations.
 - 5) Distribution piping located above the ceiling throughout the building is in fair condition. Piping insulation is in disrepair and missing in many locations.



Boiler



Pump and Piping

- b. Heating elements throughout the building are in poor condition.



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- 1) Baseboard heaters throughout the building are damaged and covers are missing in several locations. Heating elements are very dirty and covered with debris. Control valves and thermostats appear to be operational but are in poor condition.
- 2) Unit heaters throughout the building are in poor condition with access doors missing or damaged. Heating elements are very dirty and covered with debris. Control valves and thermostats appear to be operational but are in poor condition.



Baseboard



Unit Heater

- 3) Roof exhaust fans are in varies states of operation and disrepair.
 - a) Bathroom exhaust fans appear to be working but are in poor condition.
 - b) Kitchen exhaust fan appears to be operating but at very low airflow. Fan is in poor condition.
 - c) Multi-purpose room exhaust fan is operating but in poor condition.
 - d) Work room exhaust fan is not operational.
 - e) Apparatus bay CO/NO2 emergency exhaust fan is not operational.
 - f) Living area exhaust fan operation unknown but is in poor condition.



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Roof Fans

- 4) Plymovent system is in disrepair and is not operational. System capture hoses are torn and rendering the system unusable. Subsequent to this observation, repairs were made and system is fully operational.



Plymovent System Hose



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- 5) Existing Apparatus bay hot water unit heaters are in poor condition. Operational status of the unit heaters is unknown.

Unit Heater



- 6) Air conditioning is provided to the Multi-purpose room and Bunk room with through wall window type units. Units are in poor condition.



Window Unit



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Recommendations

1. Apparatus bay is unsafe and requires the following..
 - a. Installation of a gas detection system with CO/NO₂ sensors and control panel.
 - b. Repair of the existing Apparatus bay exhaust system and integration into the new gas detection panel.
 - c. Installation of make-up air louver to work in conjunction with Apparatus bay exhaust system and new gas detection control panel.
2. The building has no fresh air systems to properly pressurize the occupied spaces keeping them positive to the Apparatus bay. In this case the occupied spaces exhaust fans are drawing air from the Apparatus bay bringing CO/NO₂ gasses through the occupied spaces. Two existing CO detectors are located in the sleeping area and corridor, however no NO₂ detection was noted. Recommend at a minimum adding proper CO/NO₂ detection throughout the building.
3. Repair and/or replace existing exhaust fans as required.
4. Repair, clean and/or replace existing heating elements and covers.
5. Repair existing piping insulation throughout the building.
6. Mechanical room has no heat. It was reported on site that this space has pipe freezing issues on cold winter days. Recommend adding heat to the mechanical space.



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EXISTING CONDITIONS REPORT

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ELECTRICAL

Power Distribution System

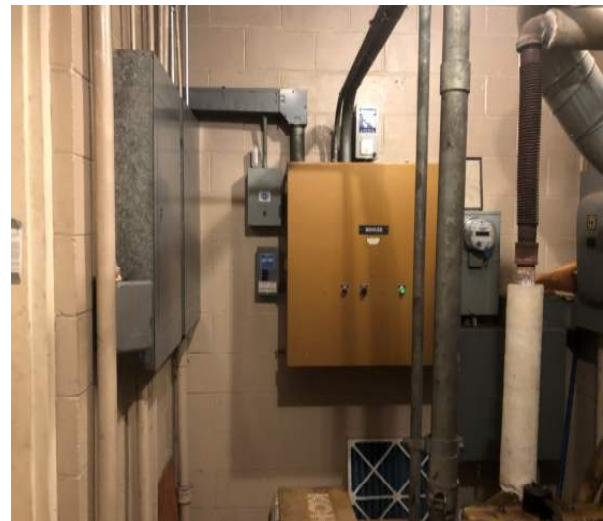
1. The building is served by an underground electrical service fed via an existing utility pole which is located adjacent to the southeast corner of the building.



Utility Riser Pole

2. The electrical service is rated 300 amperes, 120/240 volt, 1 phase, 3 wire. The main disconnect switch, utility C/T cabinet and meter, automatic transfer switch/generator, and the building electrical panel are located within the building's mechanical-electrical room. The electric service conductors are routed from the main disconnect switch via the automatic transfer switch. This arrangement connects the panel and all associated loads to the generator (except the Plymovent system), however the standby generator can only provide 104 amperes.

Electrical Equipment in Mechanical-Electrical Room



3. The building is equipped with a single double-tub electrical panel which serves all loads/equipment (except the Plymovent system). The panelboard appears to be original to the building's construction and currently does not have space for the installation of additional circuit breakers (panel is full). It



HARVARD FIRE STATION FEASIBILITY STUDY



was noted that the panels code required working clearances are impeded by the automatic transfer switch and the standby generator.

Standby Power System

1. The building is equipped with a Kohler Natural Gas fueled standby generator rated at 25kW/25kVA, 120/240 volt, 1 phase, 3 wire and is equipped with a single 100A output circuit breaker. The generator and the associated automatic transfer switch are located within the mechanical-electrical room and is capable of providing the facility with 100 amperes of standby power. The generator and automatic transfer switch appear to be original building equipment, are in fair condition and have reached the end of their anticipated service life. It was noted that this equipment does not have the code required working clearances.

Generator



2. The existing generator's output rating is 104 amperes and does not have the capacity to provide standby power to all building equipment/loads simultaneously.
3. It was noted that a separate enclosed circuit breaker serving the Plymovent System is labeled "wired to street side of generator" and therefore cannot be powered by the generator with its current arrangement.



Plymovent System Circuit Breaker



HARVARD FIRE STATION FEASIBILITY STUDY



4. The existing standby power system does not meet present code requirements with respect to fire separation or fuel source.

Lighting

1. The existing lighting system within the building consists of a mixture of fluorescent and incandescent fixtures, most of which appear to be original and have been upgraded with new T-8 lamps and ballasts or LED replacement lamps. Recessed 2'x4' and surface mounted 1'x4' fluorescent lensed fixtures serve the day room, control room, and office areas. Surface mounted 1'x4' x 1'x8' fluorescent fixtures with lenses are provided in the Apparatus Bay and various surface/recessed fixtures are located in bathrooms and bunk room. Lighting controls within the building are provided by manual toggle switches. Several light fixtures within the Apparatus Bay were noted to have cracked, broken or missing lenses.
2. Exterior lighting is provided by building mounted floodlight fixtures controlled by photocells or integral motion sensors. Recessed incandescent lenses fixture are also present above each entrance door and surface mounted decorative fixtures are located on the front of the building. An additional floodlight fixture located on a utility pole was also noted.
3. Exit signs with integral battery backup have been provided at each egress door. Code compliant dedicated emergency lighting has not been provided within the facility.
4. In general, all lighting is in fair condition.

Devices and Branch Circuit Wiring

1. In general, there are grounding type duplex receptacles installed in all areas with GFCI receptacles located where required by code. The devices appear to be in average condition.
2. Branch circuit wiring observed consists of conductors installed in conduit or type MC cable. An extension cord is being used to serve the fire boat storage structure located behind the Fire Station which is a code violation as extension cords cannot be used as a substitute for fixed wiring.



Extension Cord to Boat Storage Structure



HARVARD FIRE STATION *FEASIBILITY STUDY*



Fire Alarm System

1. The existing fire alarm system is an addressable system as manufactured by Silent Knight and is connected to a Sig-Com radio master box for system monitoring. Device coverage includes manual pull stations at each egress door and smoke/heat detector coverage throughout the building. Fire alarm notification devices are provided in main circulation areas, bathrooms, bunk room, and on the building exterior. Separate CO detectors have been installed in the bunk room and adjacent corridor.



Building Fire Alarm Equipment

2. The notification device installed within the bunk room does not appear to have a low frequency type sounder that is required by present code.
3. In general, all fire alarm system devices and components appear to be in good condition.

Security

1. The building does not have security cameras or a security system.

Telecommunications

1. The telephone and data services to the building originate at the utility pole located at the southeast corner of the building. Tel/data service cables are routed overhead from this pole into the building's hose room and is distributed from this location to rack mounted equipment in the bunk room.



Tel/Data Equipment Rack



HARVARD FIRE STATION *FEASIBILITY STUDY*



2. The building's tel/data equipment rack is located in the southwest corner of the bunk room along with radio transmission filtering/equipment. Central fire alarm monitoring/receiving equipment for the Town's master boxes is located within the control room.



Control Room Fire Alarm Monitoring Equipment

3. In general, tel/data system wiring appears to be adequate, although installed in a somewhat haphazard manner in a few locations.



HARVARD FIRE STATION *FEASIBILITY STUDY*



Recommendations

1. Remove existing standby generator and associated automatic transfer switch and replace with new equipment. New generator recommended to be diesel fueled and be pad mounted with weatherproof enclosure and fuel tank. Generator to be sized to support entire facility with new automatic transfer switch.
2. Install self-contained emergency battery light fixtures throughout all common areas and bathrooms to comply with code requirements. For Life-Safety lighting, include the exterior or each egress door.
3. Remove and replace existing panelboard with new equipment to provide adequate space for all present and anticipated future equipment loads plus additional spare capacity. A new electric service with additional capacity may be required if significant building expansion is anticipated.
4. Remove all existing fluorescent/incandescent light fixtures and replace with new LED fixtures for better performance, to reduce maintenance and maximize energy efficiency.
5. Provide occupancy/vacancy room lighting controls and/or time based lighting controls to comply with present energy code requirements.
6. Provide fire alarm system low frequency notification appliances in all sleeping areas.
7. Remove extension cord to boat storage structure and install permanent power by a code approved method (conduit & wire).



HARVARD FIRE STATION *FEASIBILITY STUDY*



SPACE NEEDS

Fire Station Program Document**Project Name: Harvard Fire Station**1st Program Meeting Date: 6/26/19Printout Date: **August 30, 2019**

Filename: Harvard Fire Program.docx

This document is not meant to be limited to an inventory of what you currently have.***Indicate what you currently need for proper operations and try to forecast what you will need for the future.*****A General Information**A1. Staffing level at station: total: **30** active: **28** female: **2** **All are On-Call**A2. Future Possible: **Anticipate some paid staff within the life of the building**A3. Typical Turnout: **11**A4. Number of Shifts: **NA**A5. Number of calls/year at station: **375 FD, 375 Ambulance, 8 structure fires**A6. Number of stations: **3**A6.1. **Main station (1976)**A6.2. **Small 1860's garage behind Town Hall**.6.2.1. **Forestry truck**.6.2.2. **SAFE materials**A6.3. **Still River substation (1948)**.6.3.1. **2nd forestry truck (Class A pumper)**.6.3.2. **Reserve engine (looking to dispose of this)**.6.3.3. **Antique (1929 Seagrave, which runs in parades)**A7. Administrative Staffing: **Three – Chief, Recent full time, part time administrator (8 hrs/week)**

A8. Building Committee:

Meeting Attendance/Date:	6/26	7/25	8/15	8/22	8/29			
A5.1. Chief Sicard	☒	☒	☒	☒	☒	☐	☐	☐
A5.2. _____	☐	☐	☐	☐	☐	☐	☐	☐
A5.3. _____	☐	☐	☐	☐	☐	☐	☐	☐
A5.4. _____	☐	☐	☐	☐	☐	☐	☐	☐
A5.5. _____	☐	☐	☐	☐	☐	☐	☐	☐
A5.6. _____	☐	☐	☐	☐	☐	☐	☐	☐
A5.7. Kevin Witzell	☒	☒	☒	☐	☒	☐	☐	☐
A5.8. Bob Mitchell	☒	☒	☒	☒	☒	☐	☐	☐

A9. Type of entity:

A9.1. Municipality: **Department**A10. Number of Companies or Departments involved: **One**A10.1. Names: **Harvard Fire Department**

B Functional Activities in Building

B1. Types of response:

B1.1. Fire: **X**

B1.2. EMS: **X (1/3 of firefighters are on ambulance squad, which is currently in another building)**

B1.3. Heavy Rescue: **X (No trench or high angle)**

B1.4. HAZ MAT: **X (First responder only)**

B1.5. Water Rescue: **X (Boat and surface ice)**

B1.6. Ambulance: **Not yet**

B2. Training activities in building:

B2.1. **Bail out, confined space extrication, mask confidence, entanglement, etc.**

B3. Training activities on site:

B3.1. **All aspects except live fire, including roof prop and car cutting**

B4. Training activities for community:

B4.1. **Home escape planning for 1st to 3rd graders**

B4.2. **Lego models – winner gets breakfast at the fire station and a ride to school on the fire truck. Winning class gets a trophy**

B4.3. **S.A.F.E. – Student Awareness Fire Education**

B4.4. **Fire Explorer Post**

B5. Training activities on site:

B5.1. **All aspect**

B6. Fuel Filling Station: No

B7. Other uses of apparatus bay:

B7.1. **Inside training**

B7.2. Social events: **400 people at turkey raffle**

B7.3. Craft fairs: **None anticipated**

B8. Sleeping Over:

B8.1. Now

.8.1.1. Intermittent, short duration: **Storm Coverage**

.8.1.2. Long term: **None**

B8.2. Future

.8.2.1. Intermittent, short duration: **Bunk rooms**

.8.2.2. Long term: **Within the 100-year life of the building, live-in staff will exist**

B9. Standing by: Yes

B9.1. Will other fire companies park their apparatus in the bay under certain circumstances: **Yes**

.9.1.1. Describe: **Mutual Aid**

.9.1.2. Is their access to the building to be limited: **Yes**

.9.1.3. Describe: **Apparatus bay, radio room, ready room**

B10. Emergency Shelter:

B10.1. Who stays in building: **Firefighters & emergency personnel**

B10.2. Special needs: **Food preparation for emergency personnel, & cots**

B10.3. Special storage: **Cots**

B11. Firematic Business:

B11.1. Describe:

.11.1.1. **Full time Chief**

.11.1.2. **Full time employee – 50% fire prevention & 50% EMS**

.11.1.3. **Part-time administrator (currently 8 hrs/week)**

B12. In-Station Meetings:

B12.1. Type: **Officers**; size: **10**; frequency: **Monthly**

B12.2. Type: **Department**; size: **50**; frequency: **Monthly**

B13. Social Life: **This is a family friendly department!**

B13.1. Daily recreation – describe: **None**

B13.2. Periodic recreation – describe: **Association dinner 2 times/year for 50 people**

.13.2.1. **One at Fruitlands**

.13.2.2. **One at Retired Chief's yard**

B13.3. Outdoor recreation – describe: **None**

B14. Access control:

B14.1. Electronic access: **Yes**

B14.2. Vendor's access to drop off material: **Yes**; where: **TBD**

B15. Miscellaneous Notes:

B15.1. **Recently spent \$54 million on school, and \$2 million on senior center**

B15.2. **Average property tax is \$12,000. Scholl project increased the average by \$1,200**

B15.3. **Department runs an Explorer Scout Post**

APPARATUS

1 Apparatus Bays

1.1 Number of vehicles: **8**; # of bays: **4**

Front Line Vehicles

1.1.1 Name: **Engine 2**; type: **Pumper**; length: **30'-10"**; weight: **47,000**

1.1.2 Name: **Ambulance**; type: **Ambulance**; length: **25'-8"**; weight: **16,500**

1.1.3 Name: **Tanker**; type: **Tanker**; length: **31'**; weight: **60,000**

1.1.4 Name: **Tower**; type: **Aerial**; length: **38'-6"**; weight: **44,000**

Second Line Vehicles

1.1.5 Name: **Engine 1**; type: **Pumper**; length: **29'-8"**; weight: **43,000**

1.1.6 Name: **Engine 3**; type: **Pumper**; length: **25'-6"**; weight: **35,000**

1.1.7 Name: **Engine 4**; type: **Pumper**; length: **32'-4"** weight: **47,000**

1.1.8 Name: **Forestry**; type: **Brush Truck**; length: **22'**; weight: **19,000**

1.2 Type of bays:

1.2.1 Drive-through: **Yes**; quantity: **4**

1.2.2 Double deep: **Yes**; quantity: **4**

- 1.3 Wash bay: **No, wash in place**
- 1.4 Plan for future expansion of bays: **No**
- 1.5 Overhead doors:
 - 1.5.1 Front:
 - 1.5.1.1 Number: **4**
 - 1.5.1.2 Width: **13'-4"**; Height: **14'**
 - 1.5.1.3 Windows: **2 rows of glass**
 - 1.5.2 Rear:
 - 1.5.2.1 Number: **4**
 - 1.5.2.2 Width: **13'-4"**; Height: **14'**
 - 1.5.2.3 Windows: **1 row of glass**
- 1.6 Signage requirements: **I Am Responding**
- 1.7 Trench drains: **Yes**; Layout: **Centerline of trucks**
- 1.8 Wall mounted water hose reels: **Yes**; Quantity: **Yes**; Tempered: **Yes**
- 1.9 Fume exhaust: **Yes**; Type: **Plymovent**
- 1.10 Truck fills:
 - 1.10.1 Wall hydrant: **Yes**; Quantity: **1**
 - 1.10.2 Outdoor hydrant: **Yes**; Quantity: **1**
- 1.11 Overhead electrical drops: **Yes**; Quantity: **8**
- 1.12 Overhead airdrops: **Yes**; Quantity: **8**
- 1.13 Compressed air for tools: **Yes**
- 1.14 Wall mounted air hose reels: **Yes**; Quantity: **1 on center column**
- 1.15 Hand wash sinks: **Yes**; Where: **Near doors to cold zone**
- 1.16 Water fountain/bottle filling station: **Yes**
- 1.17 Storage of Diesel Exhaust Fluid: **In work room**
- 1.18 Epoxy flooring: **Yes**
- 1.19 Wall construction type: **CMU**
- 1.20 Size: **5,707/ sq ft**

2 Secondary Apparatus Bay

- 2.1 Number of vehicles: **5**; # of bays: **5**
 - 2.1.1 Name: **Boat**; length: **22'** (**16"** boat – **22'** w/ trailer)
 - 2.1.2 Name: **Special Ops Trailer**; length: **18'**; Comment: **Pulled by Forestry**
 - 2.1.3 Name: **Emergency Mgt. Trailer**; length: **16'**; Comment: **Pulled by Forestry**
 - 2.1.4 Name: **Antique (1929)**; type: **Pumper**; length: **20'**
 - 2.1.5 Name: **B-Model (1956)**; type: **Pumper**; length: **23'-9"**
- 2.2 Type of bays:
 - 2.2.1 Single deep: **Yes**; quantity: **5**
- 2.3 Wash bay: **No**
- 2.4 Plan for future expansion of bays: **No**

- 2.5 Overhead doors:
 - 2.5.1 Front:
 - 2.5.1.1 Number: **4**
 - 2.5.1.2 Width: **10'**; Height: **10'**
 - 2.5.1.3 Windows: **1 row**
- 2.6 Signage requirements: **No**
- 2.7 Catch basin drains: **Yes**; Layout: **Vehicle centers**
- 2.8 Wall mounted water hose reels: **No**
- 2.9 Fume exhaust: **No**
- 2.10 Overhead electrical drops: **Yes**; Quantity: **4**
- 2.11 Overhead airdrops: **No**
- 2.12 Compressed air for tools: **No**
- 2.13 Utility sinks: **No**
- 2.14 Hand wash sinks: **No**
- 2.15 Water fountain/bottle filling station: **No**
- 2.16 Storage of Diesel Exhaust Fluid: **No**
- 2.17 Epoxy flooring: **No**
- 2.18 Wall construction type: **CMU**
- 2.19 Size: **1,720 sq ft**

3 Carport

- 3.1 Number of vehicles: **3**
 - 3.1.1 Name: **Car 1 – Ford Interceptor**; type: **SUV**; length: **16'-5"**
 - 3.1.2 Name: **Car 2 – Ford Interceptor**; type: **SUV**; length: **16'-5"**
 - 3.1.3 Name: **Pickup w/ plow**
- 3.2 Comments: **Possible solar array on roof**
- 3.3 Size: **1,035 sq ft**

FIREMATIC SUPPORT

4 Mezzanine

- 4.1 Use: **Training & storage**
- 4.2 Training Features: **Ladder evolutions, bail out, confined extrication, mask confidence, etc.**
- 4.3 Manhole size/type: **TBD**
- 4.4 Location: **Adjacent apparatus bay**
- 4.5 Size: **1,138 sq ft**

5 Storage Room #1

- 5.1 Use: **Firematic equipment & supplies**
- 5.2 Specific items to be stored:
 - 5.2.1 **Four fire extinguishers**
 - 5.2.2 **Ice sled**
- 5.3 Security: **Yes**
- 5.4 Adjacencies: **Apparatus Floor**
- 5.5 Size: **216 sq ft**

6 Storage Room #2

- 6.1 Use: **Firematic equipment & supplies in shelves**
- 6.2 Security: **Yes**
- 6.3 Adjacencies: **Apparatus Floor**
- 6.4 Size: **216 sq ft**

7 EMS Supplies

- 7.1 Operational Comments:
 - 7.1.1 **All medical supplies needed for stocking the ambulance**
- 7.2 Security: **Yes**
- 7.3 Adjacencies: **Apparatus bay**
- 7.4 Comments: **Easily decontaminated surfaces**
- 7.5 Size: **199 sq ft**

8 Turnout Gear Storage Room

- 8.1 Operational Comments:
 - 8.1.1 Response pathway
 - 8.1.1.1 **Respond to station**
- 8.2 Quantity of Lockers: **42**
- 8.3 Describe Lockers: **Wire mesh**
- 8.4 Locker Size: **24" x 24"**
- 8.5 **2 Gumby suits, rolled into storage bag & placed in 2 lockers, with ropes & rescue slings**
- 8.6 Adjacencies: **Apparatus bay**
- 8.7 Comments: **Easily decontaminated surfaces, floor drain**
- 8.8 Size: **559 sq ft**

9 DeCon/Laundry

- 9.1 Operational Comments:
 - 9.1.1 **Essential decontamination of equipment, PPE and personnel**
- 9.2 Chemical, biological, radiological and nuclear (CBRN) environments: **Yes**
- 9.3 Sink(s): **One**; Foot pedal supply: **Yes**; Knee operated drain: **Yes**; Number of sink chambers: **2**
- 9.4 Gear washer/extractor: **One**, size: **65**
- 9.5 Cabinet gear dryer: **One**

- 9.6 Residential type clothes washer & dryer: **Yes**
- 9.7 Drench shower: **Yes**
- 9.8 SCBA Washing: **Yes**; Describe: **Machine**
- 9.9 Backboard/Etc. cleaning: **Yes, sprayed in gross decon area**
- 9.10 Holding tank: **Maybe, discuss with sewer plant operator**
- 9.11 Special needs: **Decontaminate Gumby Suits**
- 9.12 Adjacencies: **Apparatus bay**
- 9.13 Comments: **Easily decontaminated surfaces, floor drain**
- 9.14 Size: **326 sq ft**

10 Hot Side Shower(s)

- 10.1 Operational Comments:
 - 10.1.1 **Single occupant private showers**
 - 10.1.2 **Comply with recommendation of a hot shower within an hour of exposure**
- 10.2 Quantity: **3**
- 10.3 Adjacencies: **Decon laundry, and hot side lockers**
- 10.4 Comments: **Easily decontaminated surfaces, floor drain**
- 10.5 Size: **121 sq ft**

11 Hot Side Lockers

- 11.1 Operational Comments:
 - 11.1.1 **Clean clothes to replace those contaminated at scene**
 - 11.1.2 **Comply with recommendation of a hot shower within an hour of exposure**
- 11.2 Quantity: **60 @ 12" x 12" ½ high**
- 11.3 Adjacencies: **Hot side showers**
- 11.4 Comments: **Easily decontaminated surfaces, floor drain**
- 11.5 Size: **142 sq ft**

12 Hazardous Waste Storage

- 12.1 Location: **Under tower stair**
- 12.2 Security: **Yes**
- 12.3 Comments:
 - 12.3.1 **Containment floor, polymer door & frame**
 - 12.3.2 **55 gal poly drum for red bag**
 - 12.3.3 **Easily decontaminated surfaces**
- 12.4 Size: **12 sq ft**

13 Hose Storage

- 13.1 Operational Comments:
 - 13.1.1 **Recess with rack above washer**
- 13.2 Hose racks: **Darley**
- 13.3 Hose drying: **No**

- 13.4 Hose washer: **Yes - Groves**
- 13.5 Hose winder: **Yes**
- 13.6 Inventory:
 - 13.6.1 3" LDH: **6@ 50'** [4 ½" footprint]
 - 13.6.2 2" LDH: **6 @ 50'** [3 1/2" footprint]
 - 13.6.3 Total LF of hose rack = **4'+**
- 13.7 Location: **Under mezzanine edge**
- 13.8 Comments: **Recess w/ washer below, and rack above**
- 13.9 Size: **16 sq ft**

14 Work Room

- 14.1 Use: **Repair & maintenance of essential firematic equipment**
- 14.2 Workbench: **Yes – 10'**
- 14.3 **Parts bin system**
- 14.4 Tool storage: **Rolling toolbox 45" w x 22" d x 40" h**
- 14.5 Stationary power tools: **Pedestal mounted grinder, drill press, parts washer**
- 14.6 Water/Sink: **Yes**
- 14.7 Air hose reel: **Yes**
- 14.8 Flammable Storage: **Yes 35" w x 19" d x 65 ½" h**
- 14.9 Security: **Yes**
- 14.10 Location: **Near apparatus bay**
- 14.11 Size: **266 sq ft**

15 Utility Recess

- 15.1 Operational Comments:
 - 15.1.1 **To support truck cleaning**
- 15.2 Slop sink: **Yes**
- 15.3 Truck cleaning tool & supplies: **Yes**
- 15.4 Garbage & recycling: **Yes**
- 15.5 Curb & floor drain: **Yes**
- 15.6 Adjacencies: **Apparatus bay**
- 15.7 Size: **32 sq ft**

16 Hydration

- 16.1 Operational Comments:
 - 16.1.1 **Water and ice for rehab**
- 16.2 Refrigerator with water bottles: **Yes**
- 16.3 Ice machine: **Yes**
- 16.4 Shelving for coolers & portable water container: **Yes**
- 16.5 Location: **Warm or cold zone**
- 16.6 Adjacencies: **Apparatus bay**
- 16.7 Size: **36 sq ft**

17 SCBA Compressor Room

- 17.1 Air compressor size: **TBD**
- 17.2 Sound attenuation panels: **Maybe**
- 17.3 Ladder tank feed line: **Yes**
- 17.4 Cascade: **Yes**
- 17.5 External feed lines: **Yes, to ladder @ 14' AFF**
- 17.6 House Air Compressor: **Yes**
- 17.7 Location: **On Mezzanine**
- 17.8 Security: **Yes**
- 17.9 Comments: **Adequate ventilation for compressor heat**
- 17.10 Size: **127 sq ft**

18 SCBA Fill Station Room

- 18.1 "Public" access: **No**
- 18.2 Sink: **Yes, 3 bowl SS**
- 18.3 Filling station: **Yes**
- 18.4 SCBA storage: **Spare packs & bottles**
- 18.5 SCBA repair: **Very minor, batteries, O-rings, etc.**
- 18.6 Air Bottles – Size & Quantity: **3**
- 18.7 Back Packs – Size & Quantity: **3**
- 18.8 Location: **Under mezzanine compressor room**
- 18.9 Security: **No**
- 18.10 Comments: **Easily decontaminated surfaces, floor drain**
- 18.11 Size: **120 sq ft**

19 Yard Storage

- 19.1 Items to be stored:
 - 19.1.1 **Mowers**
 - 19.1.2 **Snow blower**
 - 19.1.3 **Garbage & recycling**
 - 19.1.4 **Grill**
 - 19.1.5 **Etc.**
- 19.2 Location: **Not critical**
- 19.3 Security: **Yes**
- 19.4 Comments: **Easily decontaminated surfaces, floor drain**
- 19.5 Size: **249 sq ft plus 2 ft**

20 Janitor's Closet

- 20.1 Mop Receptor: **Yes**
- 20.2 Floor Machine: **Yes**
- 20.3 Shelving: **Yes**
- 20.4 Mop/Broom Rack: **Yes, w/ wet mop to drip over mop receptor**

- 20.5 Adjacencies: **Apparatus bay**
- 20.6 Comments: **Easily decontaminated surfaces, floor drain**
- 20.7 Size: **64 sq ft**

21 Apparatus Floor Rest Room

- 21.1 Quantity: **1**
- 21.2 Fixture: **Sink, toilet & urinal?**
- 21.3 Shower: **No**
- 21.4 Lockers: **No**
- 21.5 Adjacencies: **Apparatus bay**
- 21.6 Comments: **Easily decontaminated surfaces, floor drain**
- 21.7 Size: **78 sq ft**

22 Ready Room

- 22.1 Operational Comments:
 - 22.1.1 **Staffing hangout adjacent apparatus bay**
- 22.2 Seating for how many: **8**
- 22.3 Food Counter: **Yes**
- 22.4 Sink: **Yes**
- 22.5 Refrigerator: **Yes, small**
- 22.6 Adjacencies: **Bay**
- 22.7 Comments: **“Dirty side” meeting, waiting, etc.**
- 22.8 Size: **169 sq ft**

23 Radio/Watch Room

- 23.1 View control: **Bay, apron and entry**
- 23.2 Operational Comments:
 - 23.2.1 **Backup dispatch**
- 23.3 Seating for how many: **3**
- 23.4 Items:
 - 23.4.1 Door operator switches: **Yes**
 - 23.4.2 Traffic device control: **Unknown**
 - 23.4.3 Light switches for app bay: **Yes**; Outside: **Yes**
 - 23.4.4 Internal paging system: **Yes**
 - 23.4.5 Siren trigger: **Yes**; Shutoff: **Yes**; Siren location: **TBD**
 - 23.4.6 Computer equipment: **2 workstations**
 - 23.4.7 Closed Circuit TV, Phones, Weather Station: **Yes**
 - 23.4.8 File cabinets: **Yes**; Describe: **2 @ 2-drawer**
 - 23.4.9 Wall mounted items: **Flat screens (closed circuit)**
 - 23.4.10 Rechargeable items (flashlights, pagers): **Yes**
 - 23.4.11 Lockable storage: **No**
- 23.5 Items to be located in this space (from current inventory):

23.5.1 **Vision – Radio box control station**

23.6 Security: **No**

23.7 Adjacencies: **Bay & front entry**

23.8 Size: **186** sq ft

24 Training Tower

24.1 Describe: **Similar to Holden**

24.2 Size: **144** sq ft on 1st floor, **135** sq ft on three additional levels

ADMINISTRATION

25 Staff Lobby

25.1 Items to be located in this space:

25.1.1 **Bulletin board**

25.1.2 **Service window to radio room from vestibule**

25.1.3 **Small counter in vestibule**

25.1.4 **Forms holder in vestibule**

25.2 Adjacencies: **Radio room**

25.3 Size: **100** sq ft

26 Conference Room

26.1 Uses:

26.1.1 **Officer meetings**

26.1.2 **Small training**

26.1.3 **Work committees**

26.2 Seat how many: **10** at table; **0** at wall

26.3 Is there a workstation with a computer to be shared by all users: **No**

26.4 Location: **Offices**

26.5 Security: **Yes**

26.6 Adjacencies: **Chief**

26.7 Size: **252** sq ft

27 Chief's Office

27.1 Seat how many: **1 @ desk, 4 @ table**

27.2 Security: **Yes**

27.3 Adjacencies: **Administrative assistant & conference room**

27.4 Size: **229** sq ft

28 Administrative Assistant

- 28.1 Seat how many: **1 at desk, 2 opposite**
- 28.2 Security: **Yes**
- 28.3 Adjacencies: **Lobby & Chief**
- 28.4 Comments: **Service counter to lobby**
- 28.5 Size: **154 sq ft**

29 Office Support Workroom

- 29.1 Purpose:
 - 29.1.1 **Copier**
 - 29.1.2 **Fax**
 - 29.1.3 **Recycling**
 - 29.1.4 **Mailboxes**
 - 29.1.5 **Work Surface**
 - 29.1.6 **Storage Cabinets**
- 29.2 Security: **No**
- 29.3 Adjacencies: **Admin assistant**
- 29.4 Size: **129 sq ft**

30 Fire Prevention Office

- 30.1 Seat how many: **1 at desk, 1 opposite**
- 30.2 Use: **Plan review**
- 30.3 Location: **Office area**
- 30.4 Security: **Yes**
- 30.5 Adjacencies: **None required**
- 30.6 Comments: **Drawing storage, room to roll out drawings, large flat screen**
- 30.7 Size: **175 sq ft**

31 Training Office

- 31.1 Seat how many: **2**
- 31.2 Use: **development of training curriculum for the department**
- 31.3 Location: **Office area**
- 31.4 Security: **Yes**
- 31.5 Adjacencies: **None required**
- 31.6 Size: **119 sq ft**

32 EMS Office

- 32.1 Seat how many: **2**
- 32.2 Use: **Administration of emergency medical services**
- 32.3 Location: **Office area**
- 32.4 Security: **Yes**
- 32.5 Adjacencies: **None required**
- 32.6 Comments: **HIPAA privacy**
- 32.7 Size: **166** sq ft

33 Office Area ADA Compliant Rest Room

- 33.1 Quantity: **1**
- 33.2 Fixture: **Sink, toilet & urinal**
- 33.3 Location: **Office area**
- 33.4 Comments: **Easily decontaminated surfaces, floor drain**
- 33.5 Size: **67** sq ft

34 Fire Education Storage

- 34.1 Seat how many: **1**
- 34.2 Is there a workstation with a computer: **Yes**
- 34.3 Items to be located in this space:
 - 34.3.1 **Fire prevention paraphernalia**
- 34.4 Location: **Office area**
- 34.5 Security: **Yes**
- 34.6 Adjacencies: **None required**
- 34.7 Size: **100** sq ft

35 Records Storage

- 35.1 Items to be located in this space:
 - 35.1.1 **File cabinets**
- 35.2 Location: **Office area**
- 35.3 Security: **Yes**
- 35.4 Adjacencies: **None required**
- 35.5 Size: **100** sq ft

FIREFIGHTERS

For current planning assume 2-person EMS shift at station. In future, plan on 4-person shift in the station at all times

36 Day Room

- 36.1 Kitchen – not a commercial kitchen
 - 36.1.1 Number people to work at one time: **3**
 - 36.1.2 Equipment:
 - 36.1.2.1 Stove size: **Large 4 burner**
 - 36.1.2.2 Describe refrigerators: **For future, allow space for 2 refrigerators & 1 freezer**
 - 36.1.2.3 Describe sinks: **1 general, 1 ADA**
 - 36.1.2.4 Dish washer: **Yes**
 - 36.1.2.5 Describe pantries: **Allow space for 4 shift pantries, and one shared**
 - 36.1.3 Access to exterior?: **If possible**
- 36.2 Dining/Eating
 - 36.2.1 Seat how many: **10**
- 36.3 Sitting Area
 - 36.3.1 Seat how many: **5**
- 36.4 Location: **Living area**
- 36.5 Size: **705 sq ft**

37 Living Room

- Seat how many: **5**
- Activities other than T-V?: **No**
- Adjacencies: **Day Room**
- 37.1 Comments: **Sound dampening walls, gasketed door**
- Size: **293 sq ft**

38 Study Room

- 38.1 Seat how many: **3**
- 38.2 Adjacencies: **Dining & living**
- 38.3 Comments: **Sound dampening walls, gasketed door**
- 38.4 Size: **130 sq ft**

39 Physical Training

- 39.1 Equipment:
 - 39.1.1 **Cardio**
 - 39.1.2 **Weights**
 - 39.1.3 **Weight Machines**
- 39.2 Location: **Living area**
- 39.3 Security: **No**

- 39.4 Adjacencies: **TBD**
- 39.5 Comments: **Sound dampening walls, gasketed door**
- 39.6 Size: **615 sq ft**

40 Firefighters' ADA Compliant Rest Room

- 40.1 Quantity: **One**
- 40.2 Fixture: **Sink, toilet & urinal**
- 40.3 Comments: **Easily decontaminated surfaces, floor drain**
- 40.4 Size: **70 sq ft**

41 Lockers/Shower

- 41.1 Showers: **1**
- 41.2 Lockers: **18 ½ high**
- 41.3 Other: **Bench**
- 41.4 Adjacencies: **Physical Training**
- 41.5 Comments: **ADA Compliant**
- 41.6 Size: **100 sq ft**

42 Bunkers/Bedrooms

- 42.1 Number of rooms: **4**
- 42.2 Beds per room: **1**
- 42.3 Storage: **4 individual lockers**
- 42.4 Desks: **No**
- 42.5 Location: **Living area**
- 42.6 Security: **Yes**
- 42.7 Comments: **Sound dampening walls, gasketed door, bedding cubbies**
- 42.8 Size: **104 sq ft**

43 Storm Coverage Bunkroom (same footprint as 2 bunkrooms)

- 43.1 Number of rooms: **1**
- 43.2 Beds per room: **6 Bunk Beds**
- 43.3 Storage: **Cubbies**
- 43.4 Desks: **No**
- 43.5 Location: **Living area**
- 43.6 Security: **No**
- 43.7 Comments: **Sound dampening walls, gasketed door**
- 43.8 Size: **287 sq ft**

44 Bunker's Bathrooms

- 44.1 Quantity: **2**
- 44.2 Details: **Uni-sex, single occupant**
- 44.3 Fixtures: **Toilet, urinal, shower, sink & bench**
- 44.4 Security: **Privacy lock**

- 44.5 Adjacencies: **Bunk rooms**
- 44.6 Comments: **Easily decontaminated surfaces, floor drain**
- 44.7 Size: **72 & 91 sq ft**

45 Bunker's Area Laundry Room

- 45.1 Details: **Washing of bedding & station uniforms**
- 45.2 Location: **Bunking area**
- 45.3 Comments: **Easily decontaminated surfaces, floor drain**
- 45.4 Size: **72 sq ft**

PUBLIC SPACES

46 Public Entry Area

- 46.1 Display case: **2' x 6', floor to ceiling**
- 46.2 Bulletin board: **Yes**; Size: **4' x 6'**
- 46.3 Plaque: **Yes**
- 46.4 Comments: **Admin. Assistant's service window w/ writing surface & forms holder**
- 46.5 **Museum – Allow for possible display area for antique paid for by subscription**
- 46.6 Size: **200 sq ft**

47 Coat Recess

- 47.1 Number of coats: **50**
- 47.2 Location: **Hallway**
- 47.3 Adjacencies: **Meeting/Training**
- 47.4 Size: **26 sq ft**

48 Meeting/Training Room

- 48.1 Intended population: **49, sub-dividable**
- 48.2 Public access: **Yes**
- 48.3 Uses:
 - 48.3.1 **Department meetings**
 - 48.3.2 **Training, incl. outside trainers & outside groups**
 - 48.3.3 **Group meetings**
 - 48.3.4 **EOC**
 - 48.3.5 Fundraising dinners: **No**
 - 48.3.6 Rental: **No**
- 48.4 Number of tables & size: **12**
- 48.5 Number of chairs: **80**
- 48.6 Trophy case: **No**
- 48.7 Whiteboard: **Yes**
- 48.8 Bulletin board: **Yes**

- 48.9 Projector & screen: **yes**
- 48.10 Location: **Near public lobby**
- 48.11 Adjacencies: **Table/chair storage, training props, kitchen**
- 48.12 Security: **Yes**
- 48.13 Comments: **sub-dividable. Additional electronic infrastructure for EOC**
- 48.14 Size: **748 sq ft**

49 Meeting/Training Room Table & Chair Storage

- 49.1 Table rack quantity: **1 @ 10 tables each**
- 49.2 Chair rack quantity: **5 @ 16 chairs each**
- 49.3 Adjacencies: **Meeting/training**
- 49.4 Security: **Yes**
- 49.5 Comments: **Robust walls**
- 49.6 Size: **56 sq ft**

50 Training Prop Storage

- 50.1 Adjacencies: **Meeting/Training**
- 50.2 Security: **Yes**
- 50.3 Size: **77 sq ft**

51 Meeting/Training Room A/V Equipment

- 51.1 Adjacencies: **Meeting/Training**
- 51.2 Security: **Yes**
- 51.3 Size: **4 sq ft**

52 Kitchen to serve 30

- 52.1 Uses: **Departmental monthly, and other meetings**
- 52.2 Equipment types and size:
 - Refrigerator/freezer: **Yes**
 - Sink(s) Pot: **Yes**; Scrub: **Yes**; Disposal: **No**
 - Dishwasher: **Yes**
 - Stove: **Large 4 burner, w/ oven**
 - Hood: **Yes**
- 52.3 Shuttered opening: **Yes**
- 52.4 Door to exterior: **If possible, but indirect**
- 52.5 Dish storage: **Base & wall cabinets**
- 52.6 Pantry/food storage: **Base & wall cabinets**
- 52.7 Locked storage: **Base & wall cabinets**
- 52.8 Adjacencies: **Meeting/Training**
- 52.9 Security: **Yes**
- 52.10 Comments: **Easily decontaminated surfaces, floor drain**
- 52.11 Size: **204 sq ft**

53 Public Rest Rooms

- 53.1 Quantity: **2, uni-sex**
- 53.2 Adjacencies: **Meeting/training**
- 53.3 Comments: **Handicapped accessible**
- 53.4 Size: **182 sq ft**

MISCELLANEOUS SPACES

54 Entry Vestibules (2)

- 54.1 Size: **60 sq ft**

55 House Keeping Storage

- 55.1 Size: **50 sq ft**

56 Office Side Janitors Closet

- 56.1 **Mop Receptor**
- 56.2 **Slop Sink**
- 56.3 **Floor Machine**
- 56.4 **Shelving**
- 56.5 **Mop/Broom Rack**
- 56.6 Location: **Not critical (2 if a 2-story building)**
- 56.7 Comments: **Easily decontaminated surfaces, floor drain**
- 56.8 Size: **78 sq ft**

57 File Server

- 57.1 Location: **Not critical**
- 57.2 Security: **Yes**
- 57.3 Comments: **Adequate AC**
- 57.4 Size: **84 sq ft**

58 Mechanical, Electrical, Plumbing, HVAC, Sprinkler, Alarm, etc.

- 58.1 Fuel type at site: **Natural gas**
- 58.2 Heating type in apparatus bay: **In-floor radiant**
- 58.3 Heating type elsewhere: **Ducted**
- 58.4 Building to be sprinklered: **Yes**
 - 58.4.1 Adequate water pressure: **TBD**
 - 58.4.2 Storage tank: **TBD**
- 58.5 Hose bibs for exterior: **Yes**
- 58.6 Bay lighting type: **Linear LED**
- 58.7 Site lighting type: **LED, w/ additional apron lighting**

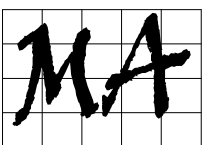
- 58.8 Generator: **Yes**
 - 58.8.1 Fuel: **Diesel**
 - 58.8.2 Location of generator: **On site**
 - 58.8.3 Circuits on generator: **All**
- 58.9 Access control type: **Fobs, plus a few keypads**
- 58.10 Security cameras: **Yes**
- 58.11 Siren: **Yes, electronic pole mounted**; Mounting location: **TBD**
- 58.12 Size: **350** sq ft

59 Sprinkler Room

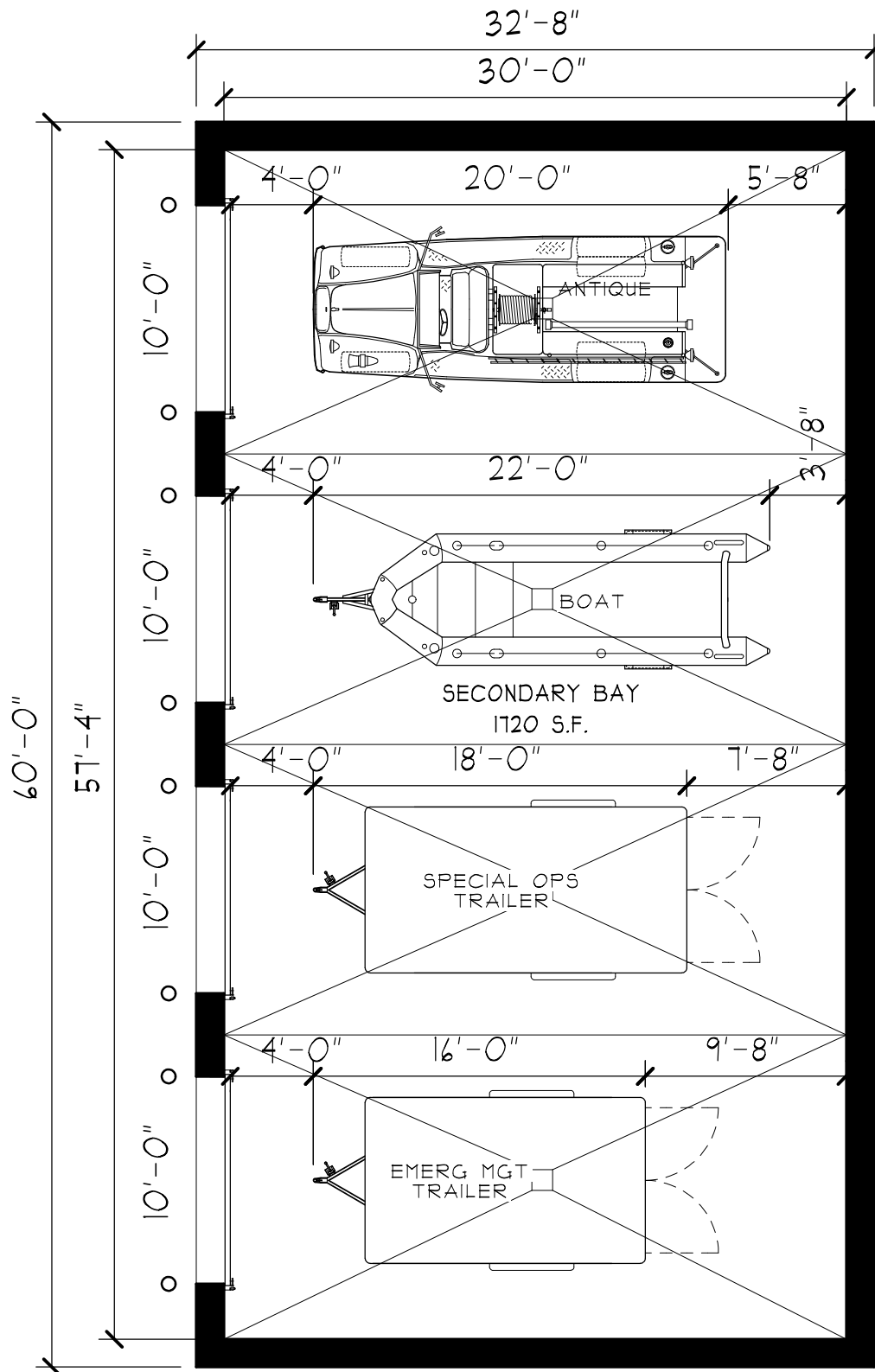
- 59.1 Assume **70** sq ft

60 Miscellaneous Issues

Comments: **If Hazel site is selected, should extend sewer**



ROOM #



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SECONDARY APPARATUS BAY

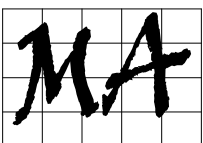
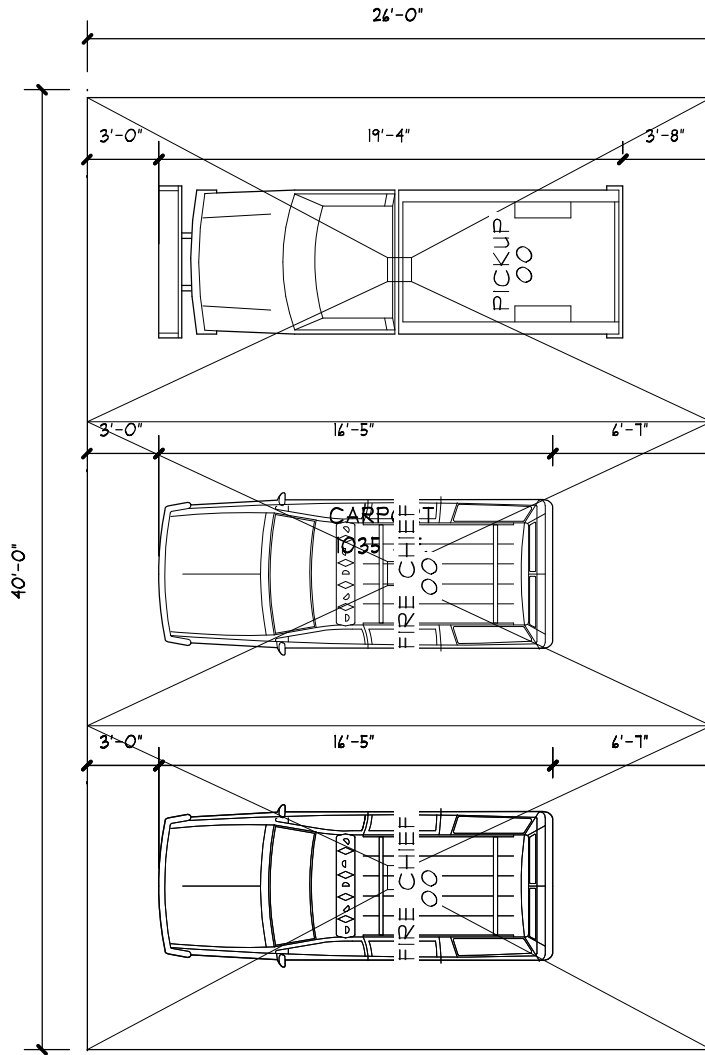
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DATE: 8/29/2019

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02

ROOM #



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CARPORT

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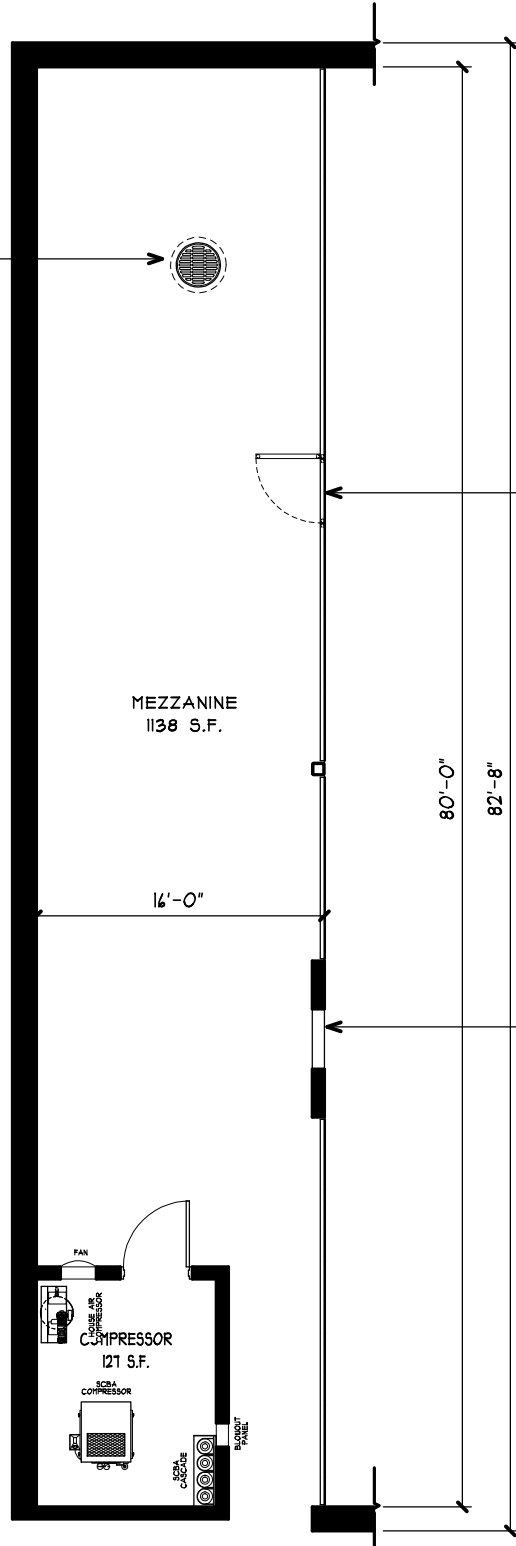
DATE: 8/19/2019

03

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ROOM #

CONFINED
SPACE
EXTRICATION
TRAINING
HATCH



LOADING
GATE

BAIL OUT & LADDER
EVOLUTION
TRAINING OPENING

TRAINING TOWER
WITH STAIR



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MEZZANINE & COMPRESSOR RM

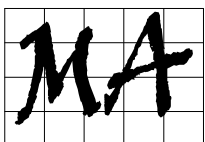
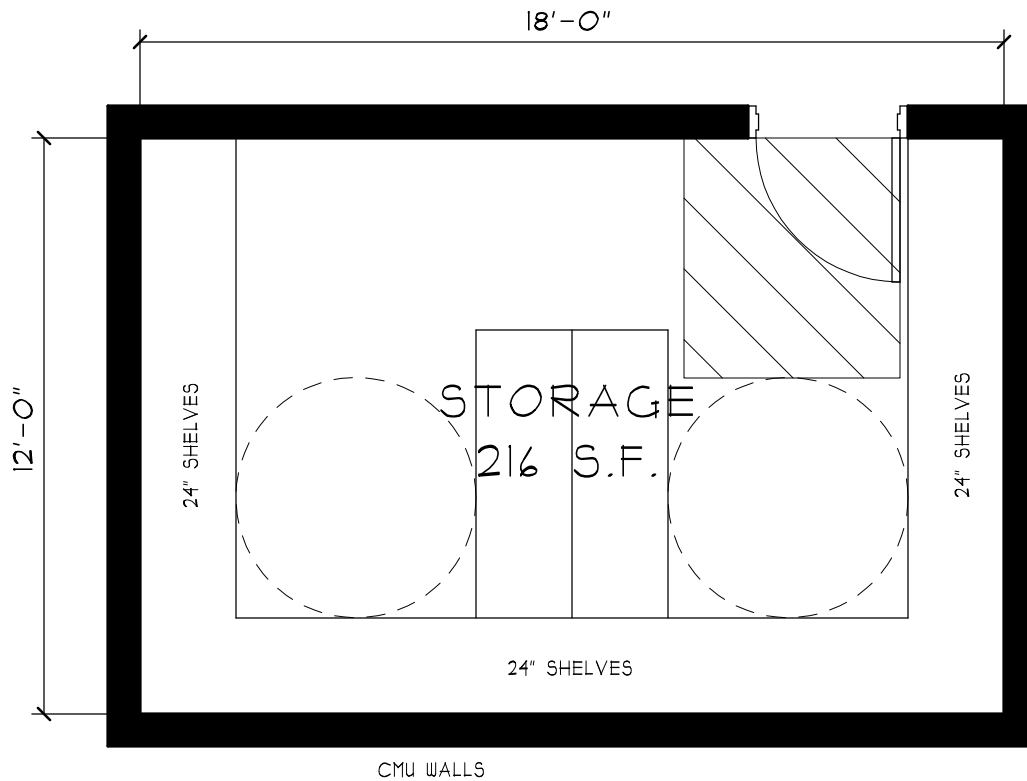
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DATE: 8/30/2019

04 & 17

ROOM #

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STORAGE

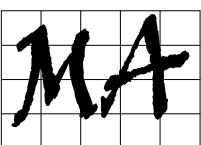
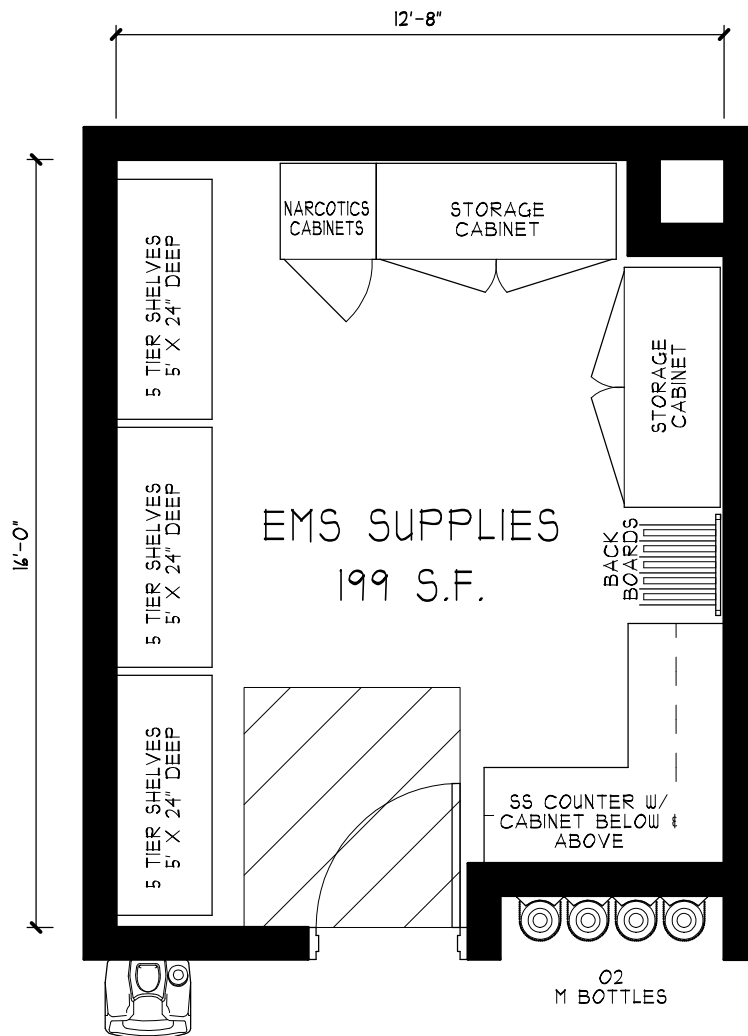
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05 & 06

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ROOM #



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EMS SUPPLIES

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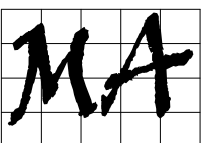
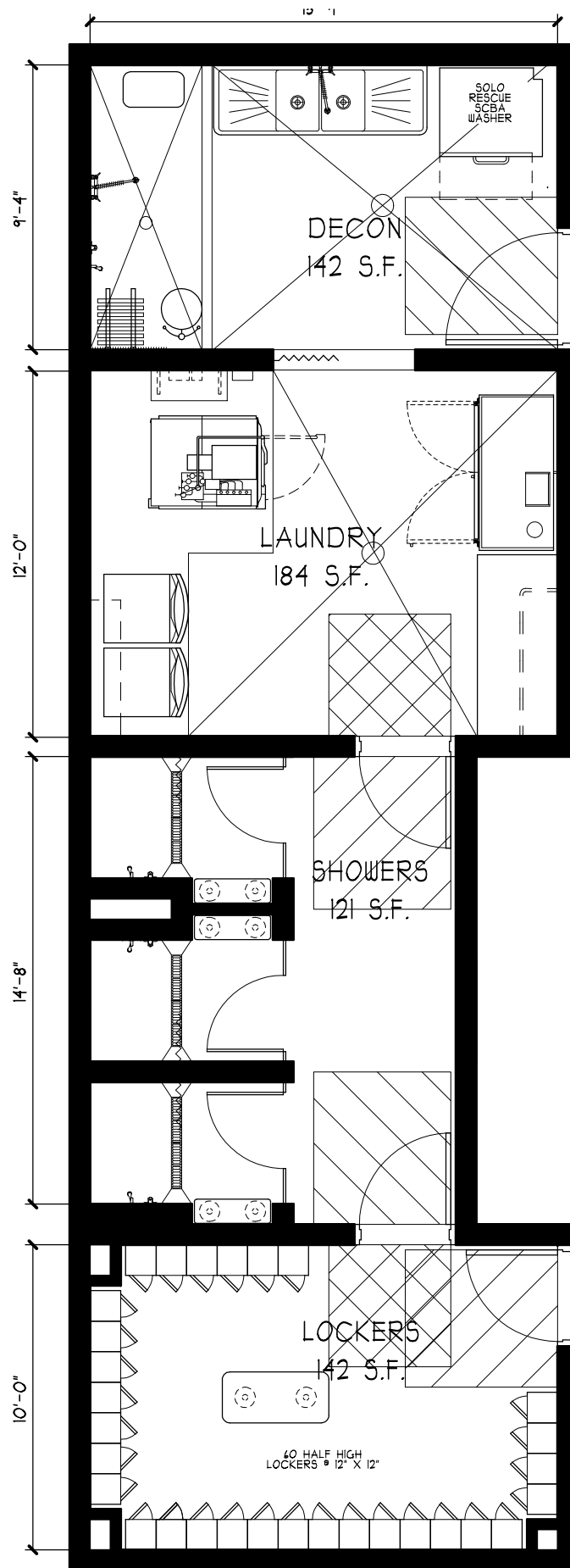
01

ROOM #



08

ROOM #



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DECON THRU LOCKERS

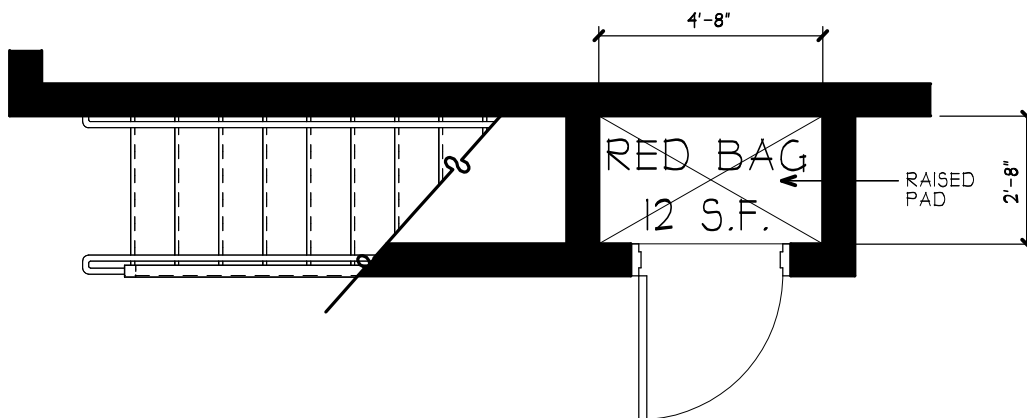
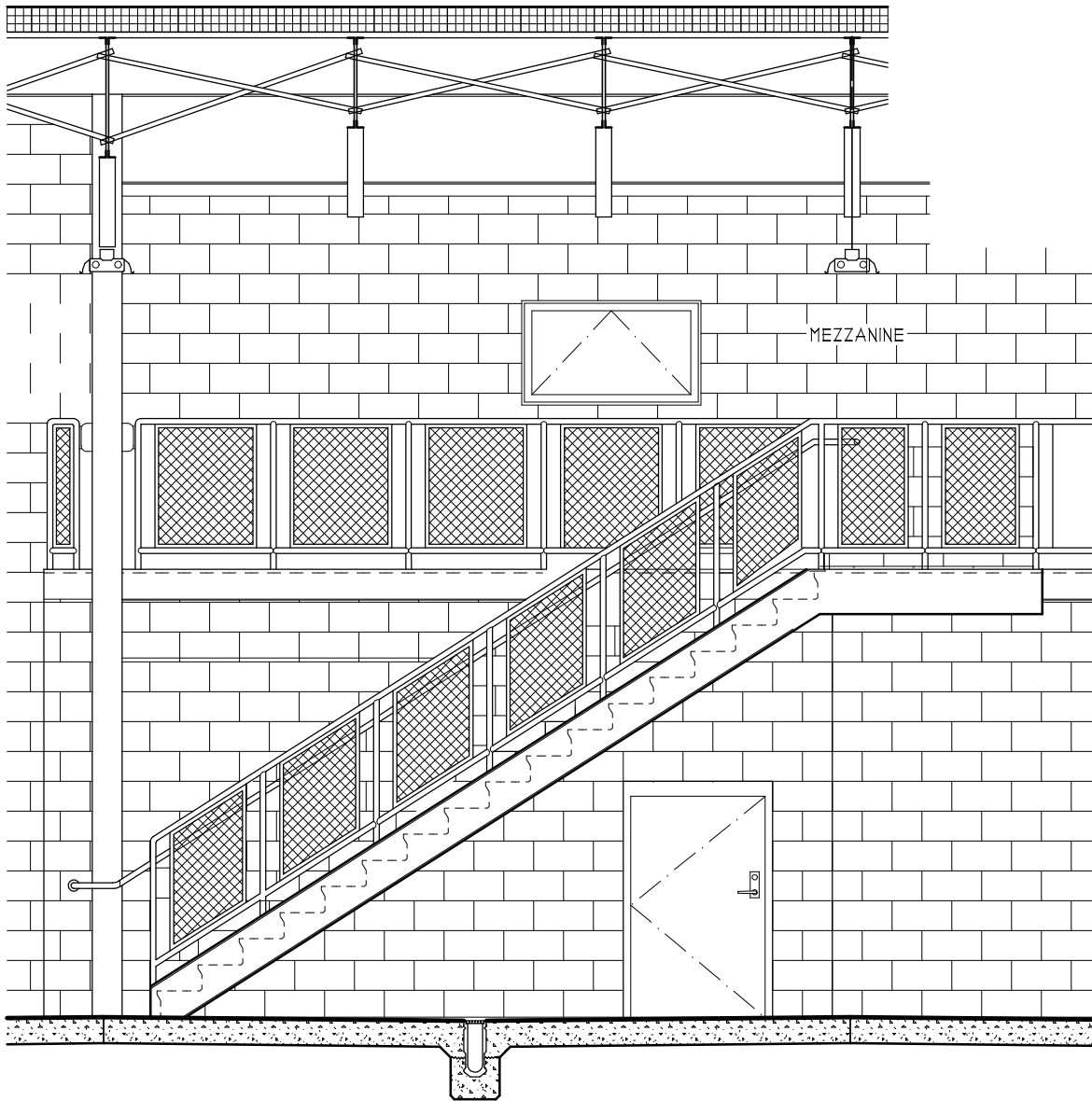
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09 TO 11

ROOM #

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HAZARDOUS WASTE STORAGE

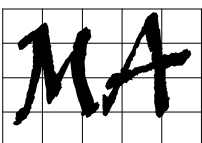
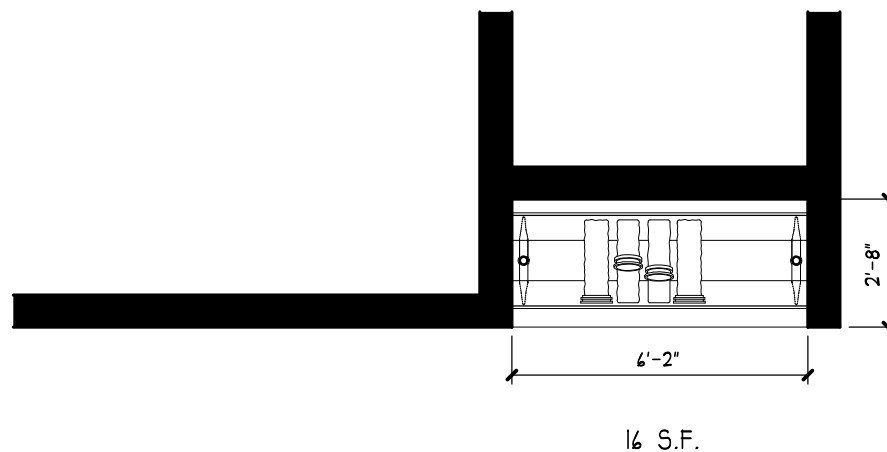
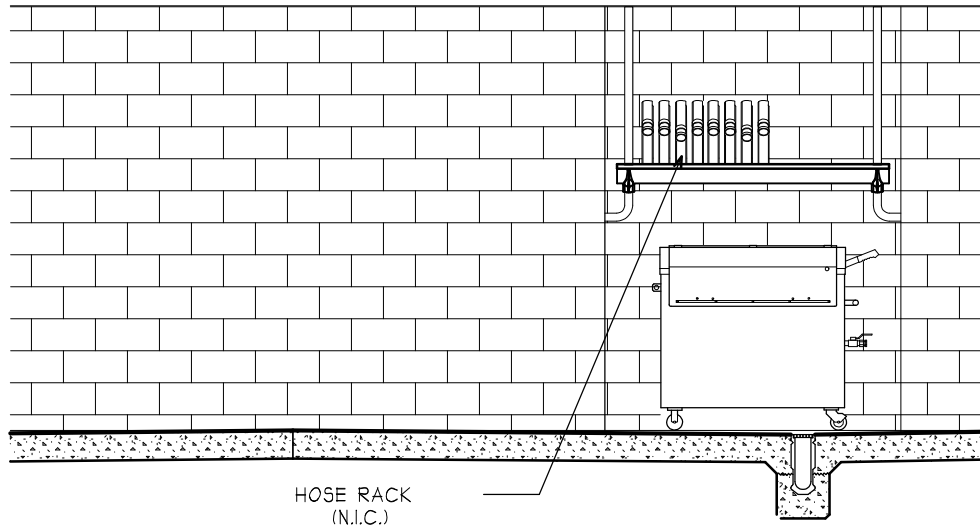
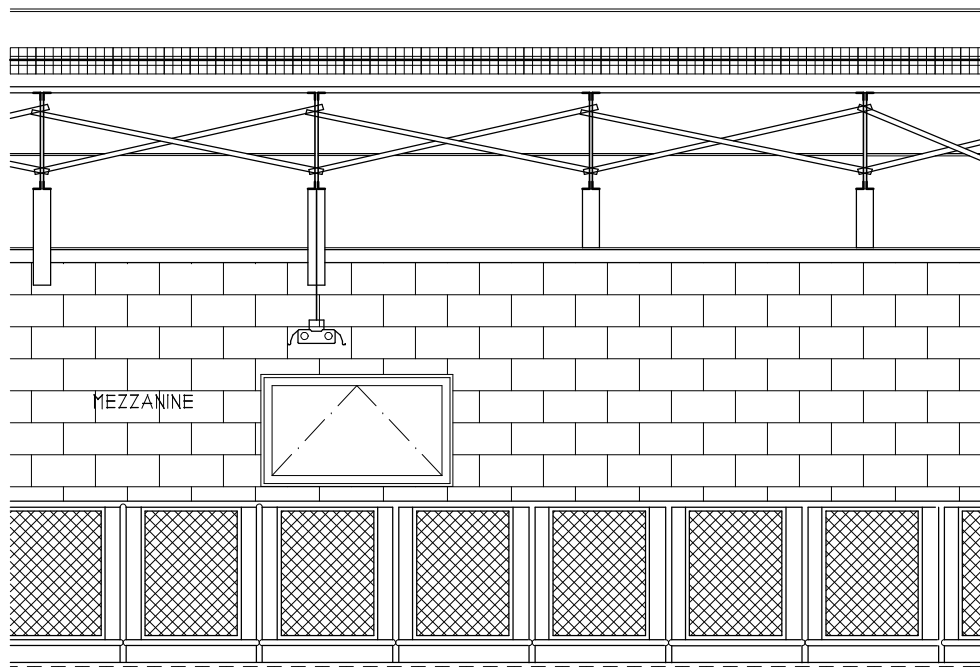
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DATE: 7/28/2019

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12

ROOM #



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HOSE RECESS

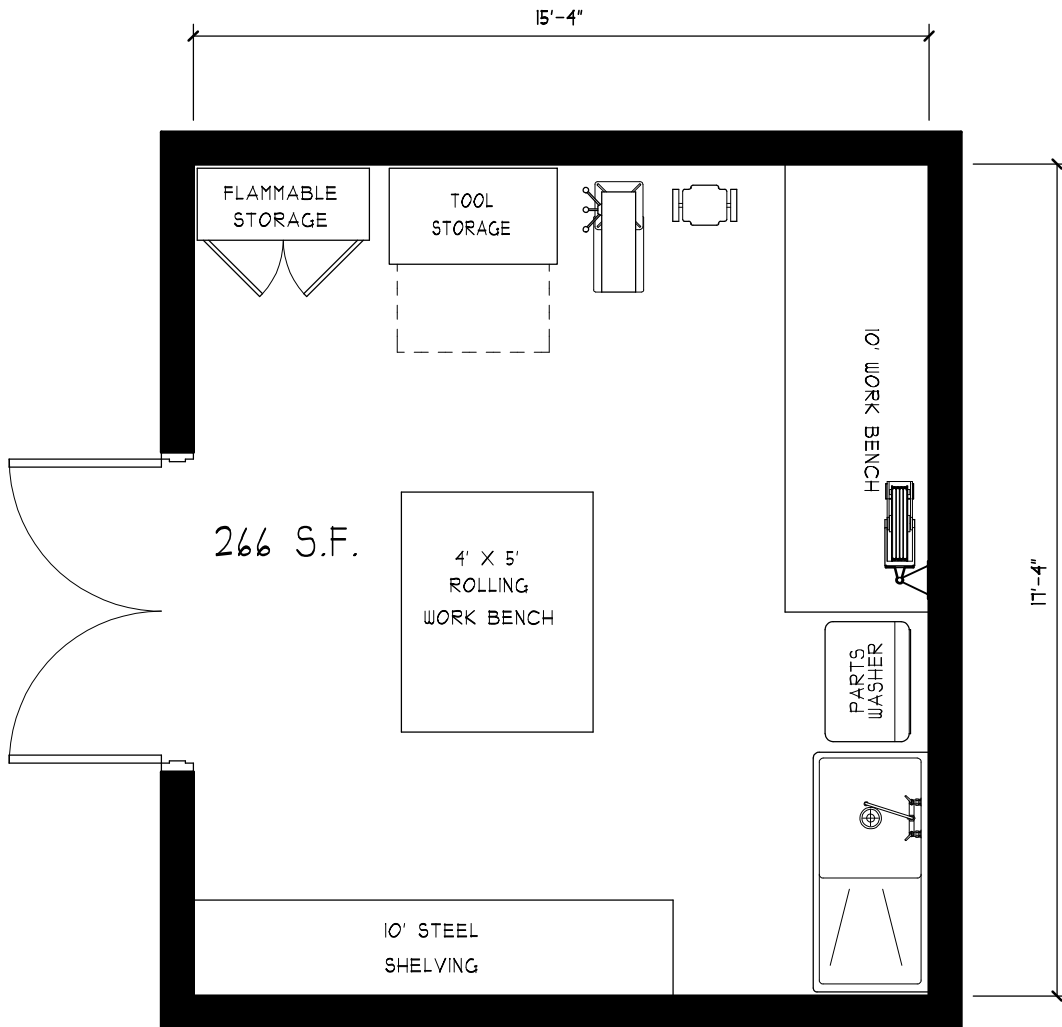
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13

ROOM #



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WORKROOM

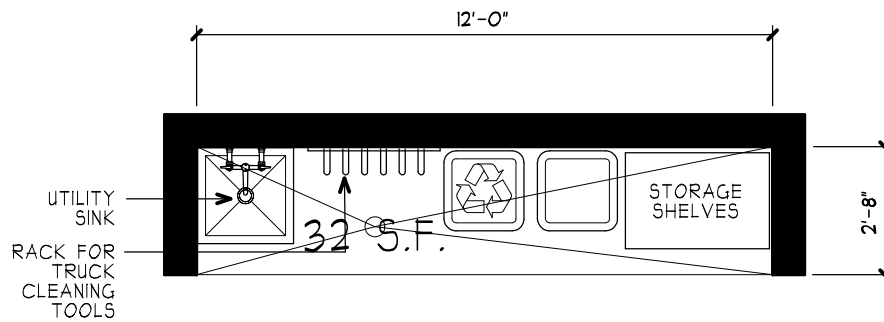
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14

ROOM #



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UTILITY RECESS

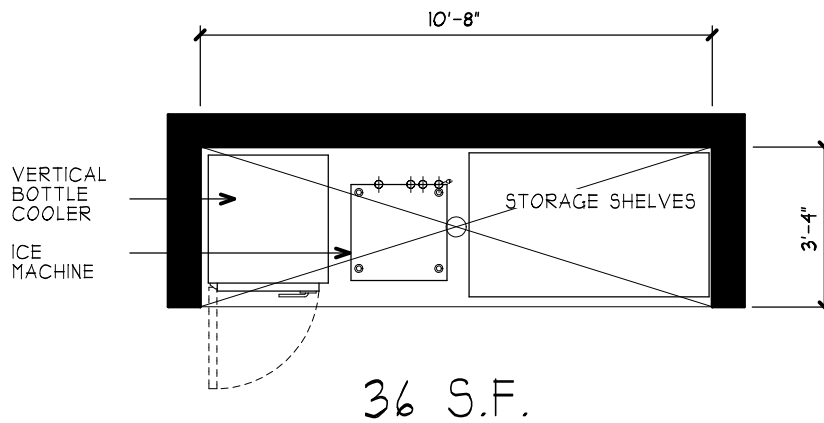
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15

ROOM #



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HYDRATION

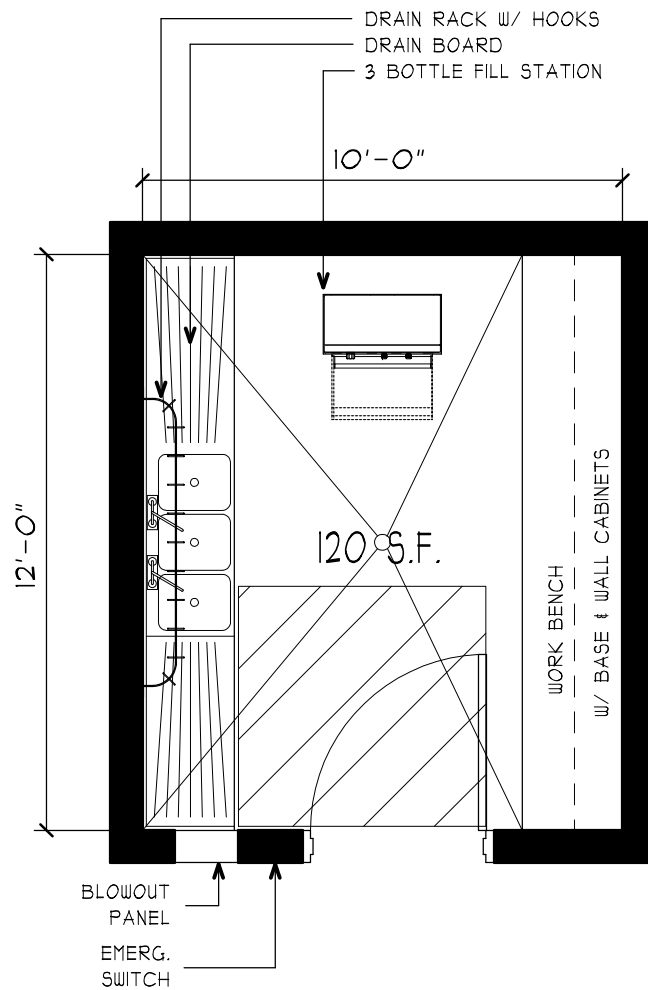
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16

ROOM #



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SCBA FILL

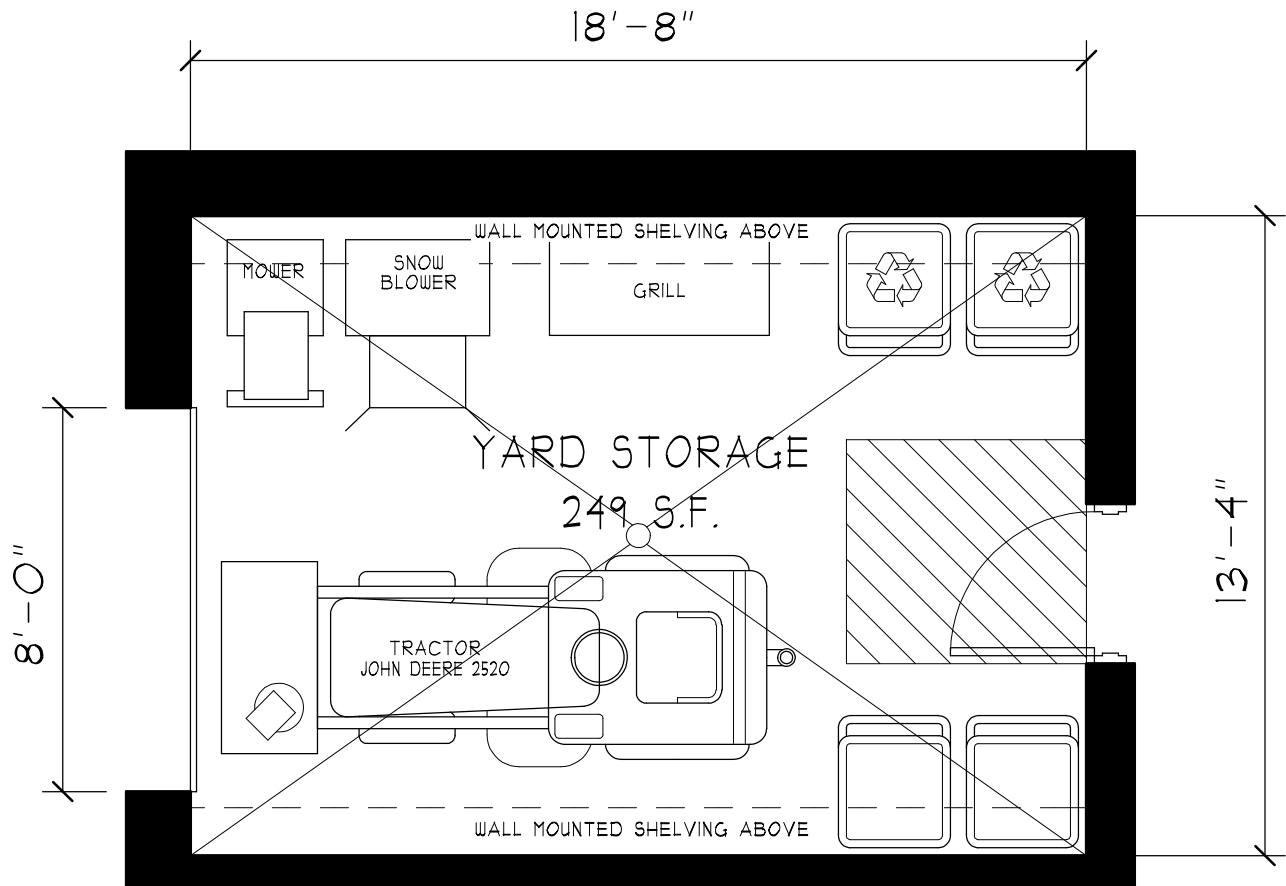
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18

ROOM #



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YARD STORAGE

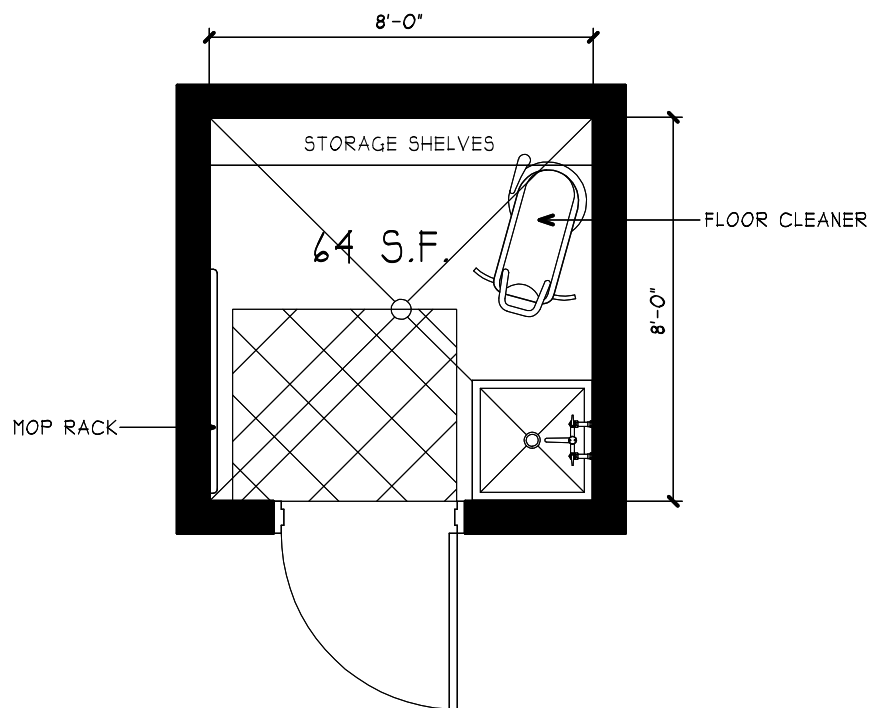
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19

ROOM #



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BAY JANITOR'S CLOSET

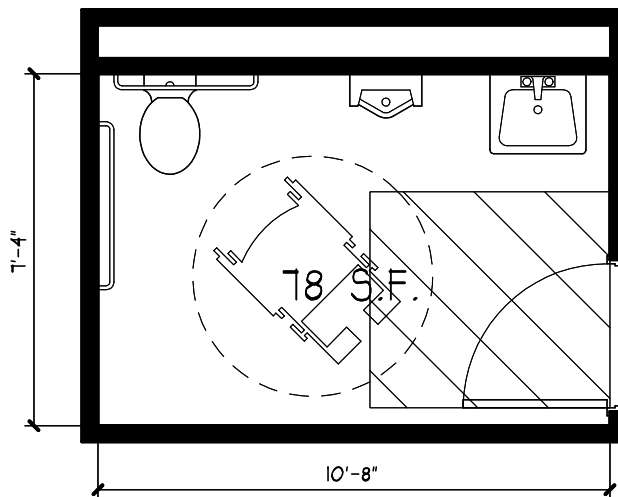
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20

ROOM #



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APPARATUS BAY BATHROOM

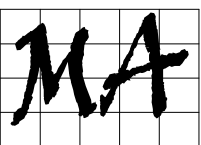
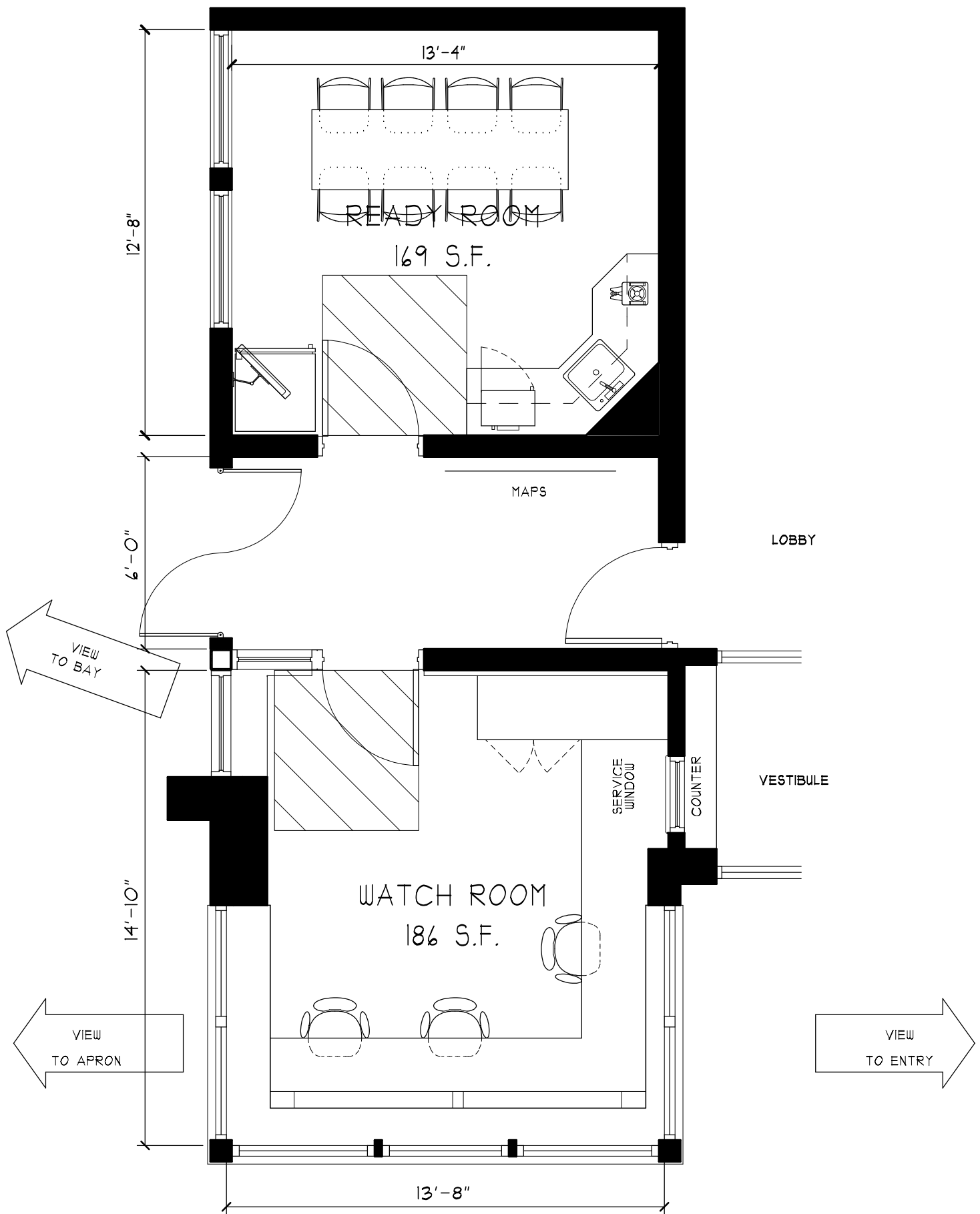
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21

ROOM #



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WATCH & READY ROOMS

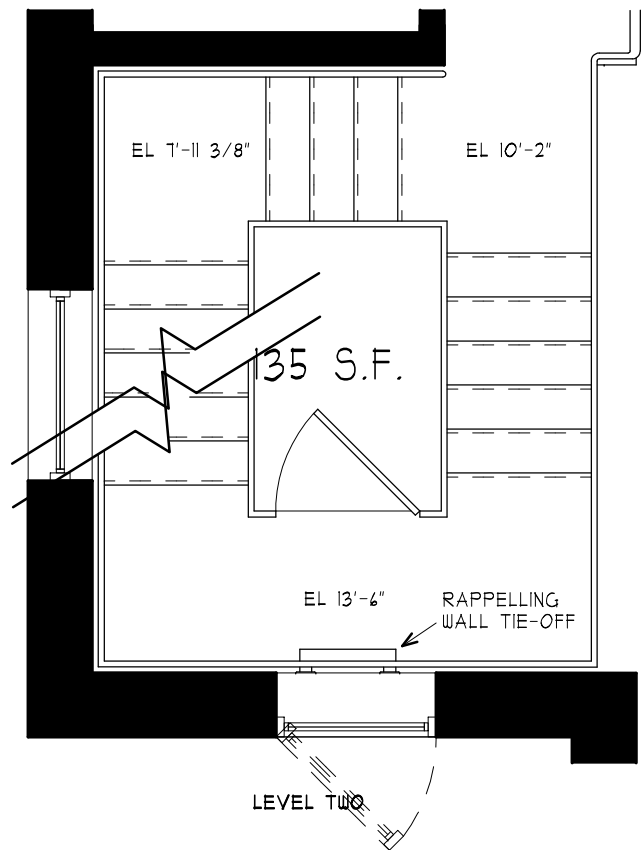
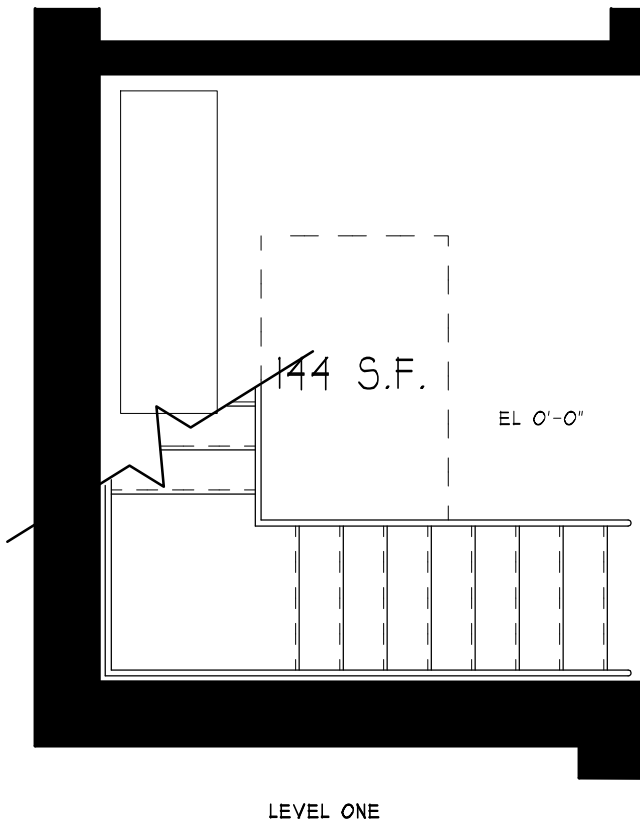
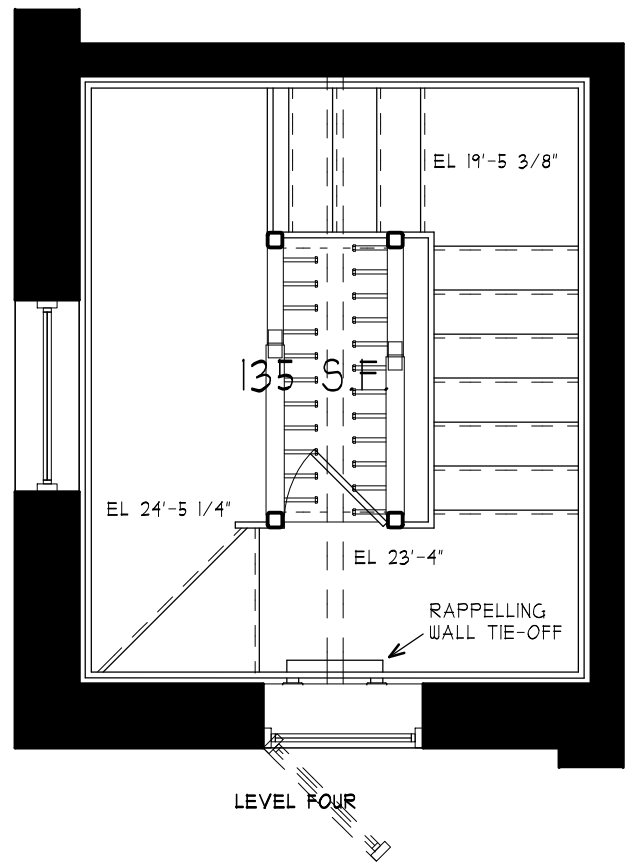
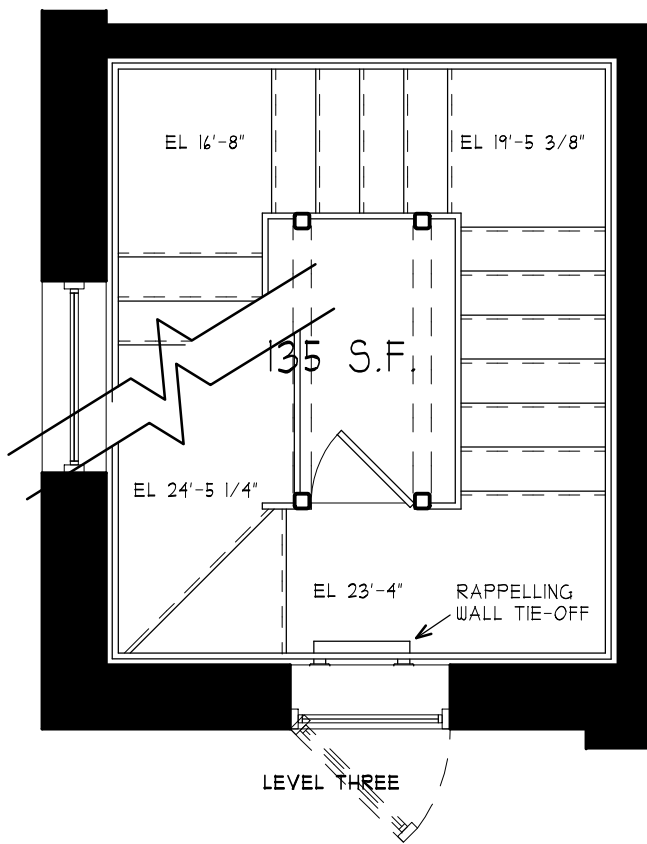
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22 & 23

ROOM #



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TRAINING TOWER

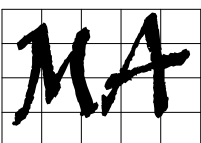
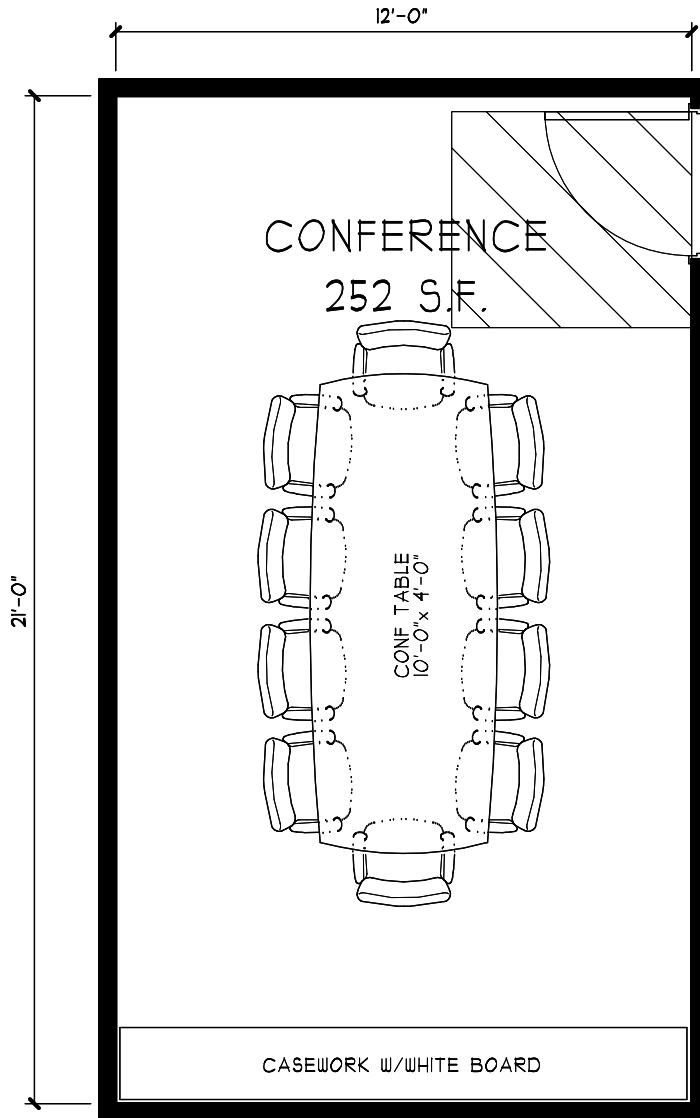
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21

ROOM #



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CONFERENCE ROOM

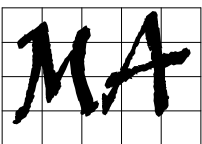
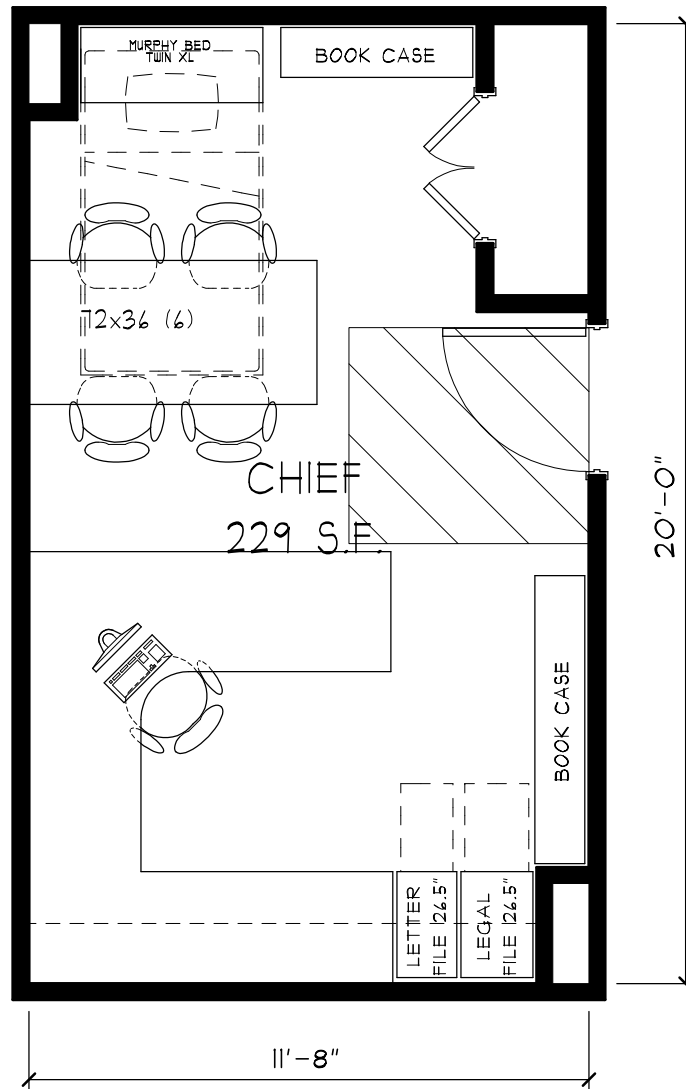
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26

ROOM #



**MITCHELL
ASSOCIATES
ARCHITECTS**

CHIEF

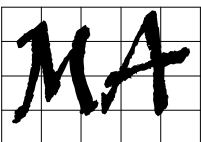
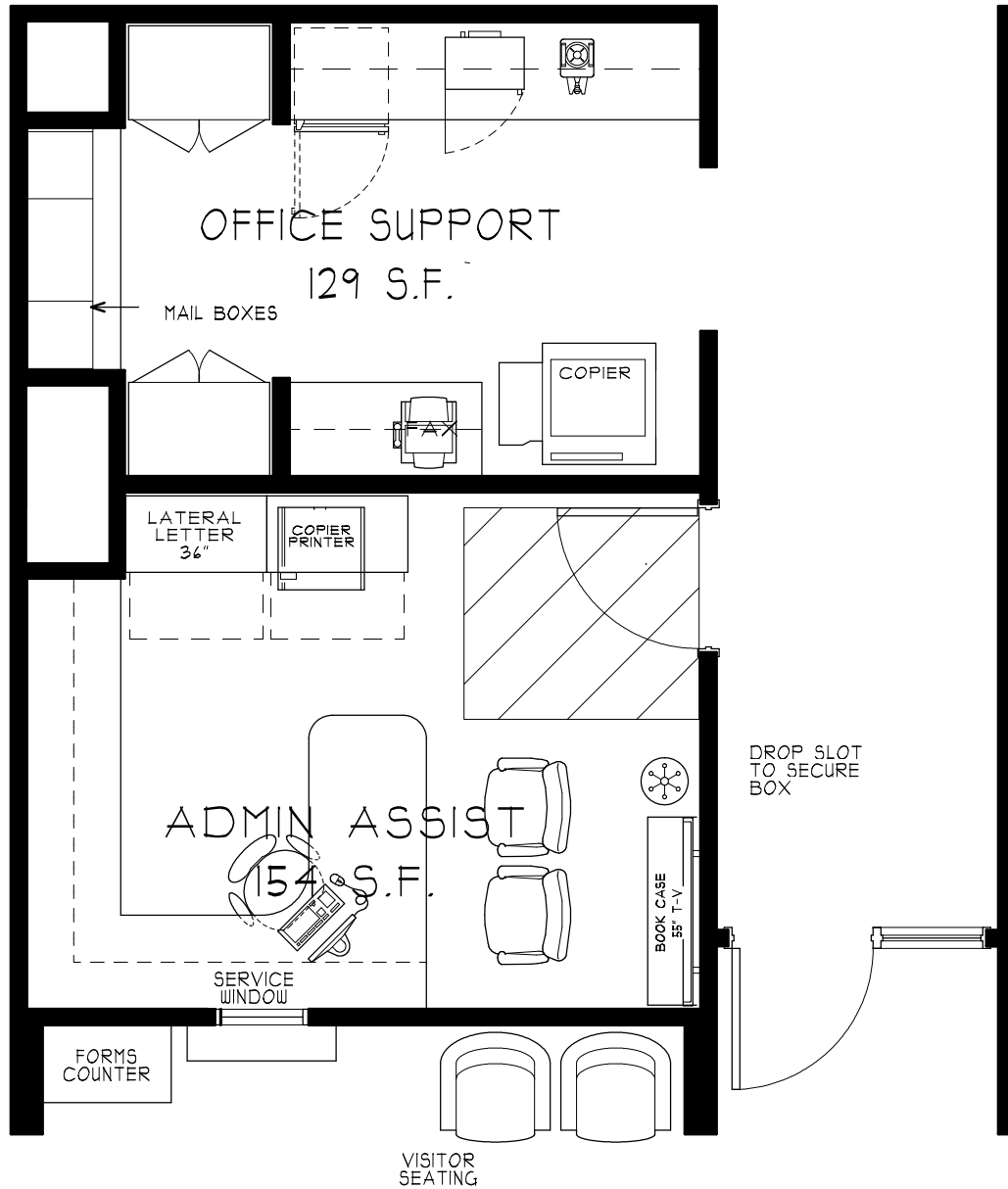
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DATE: 8/19/2019

21

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ROOM #



**MITCHELL
ASSOCIATES
ARCHITECTS**

ADMINISTRATION

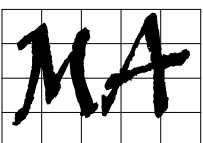
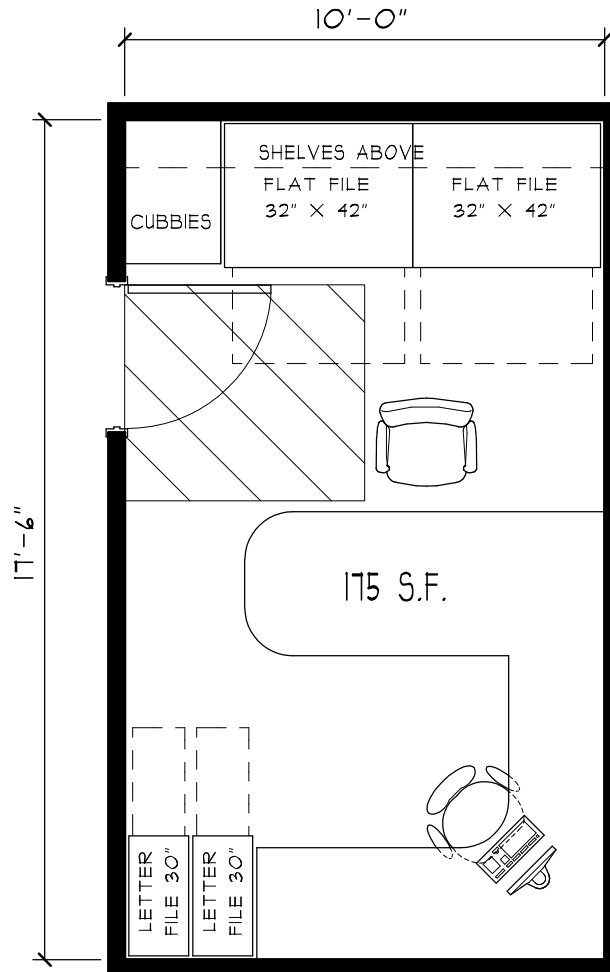
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DATE: 8/19/2019

28 & 29

S:\J Drive\Kaestle Boos\Harvard\Individual Rooms\2 - Administration\28 & 29 - Admin Asst

ROOM #



MITCHELL
ASSOCIATES
ARCHITECTS

FIRE PREVENTION

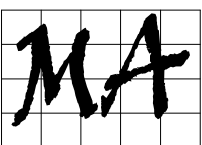
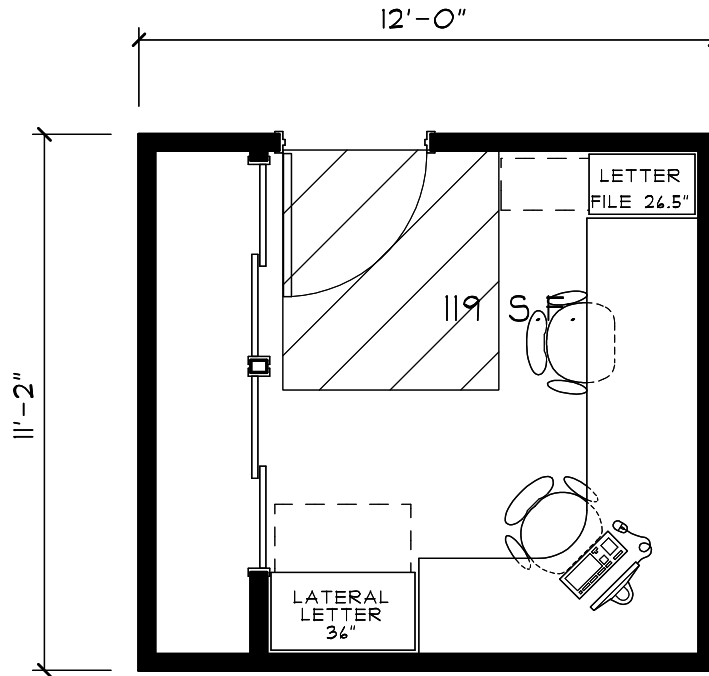
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DATE: 8/22/2019

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30

ROOM #



MITCHELL
ASSOCIATES
ARCHITECTS

TRAINING OFFICE

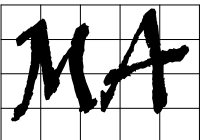
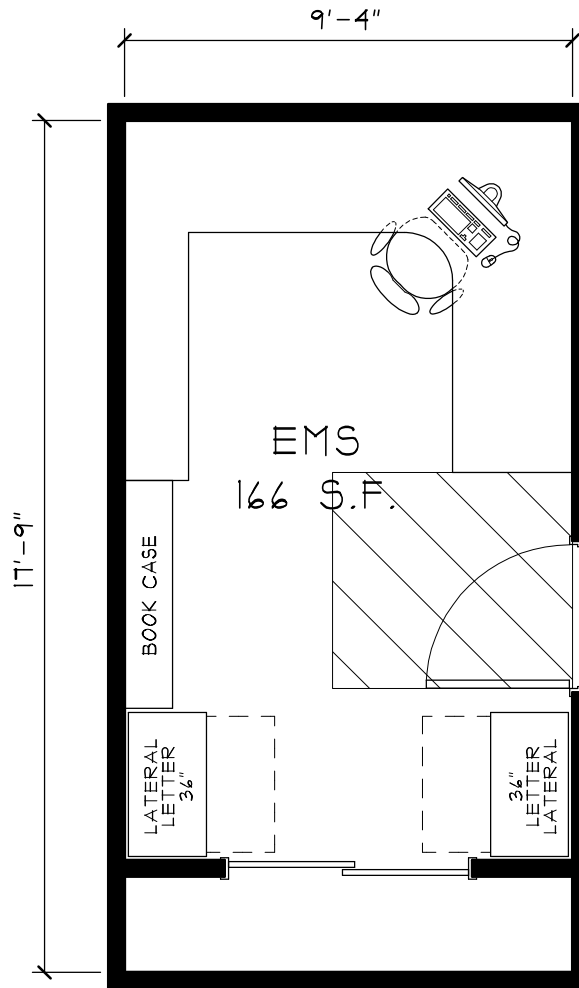
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DATE: 8/19/2019

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31

ROOM #



MITCHELL
ASSOCIATES
ARCHITECTS

EMS OFFICE

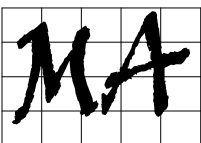
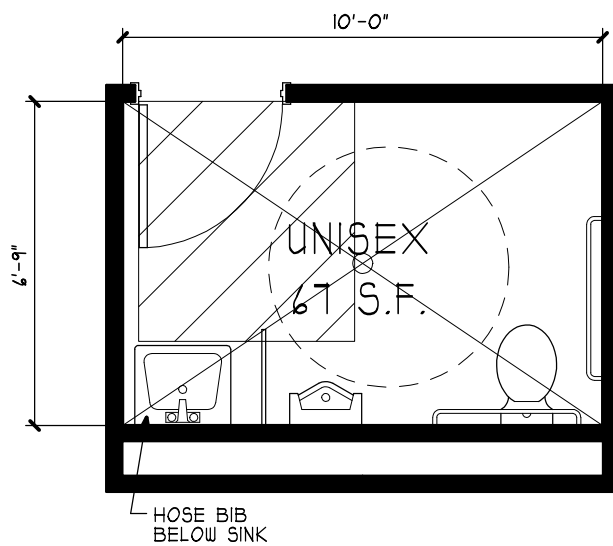
SCALE: 1/4"

DATE: 8/22/2019

S:\J Drive\Kaestle Boos\Harvard\Individual Rooms\2 - Administration\32 - EMS Office

32

ROOM #



MITCHELL
ASSOCIATES
ARCHITECTS

OFFICE AREA BATHROOM

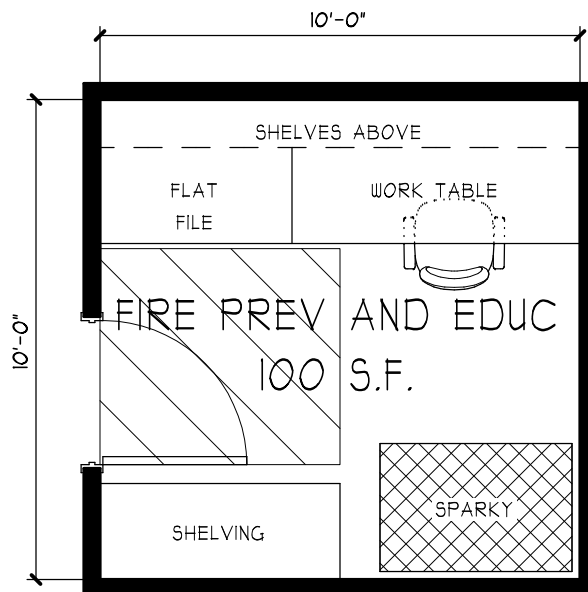
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DATE: 8/19/2019

S:\J Drive\Kaestle Boos\Harvard\Individual Rooms\2 - Administration\33 - Admin Bathroom

33

ROOM #



MITCHELL
ASSOCIATES
ARCHITECTS

FIRE EDUCATION STORAGE

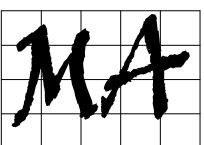
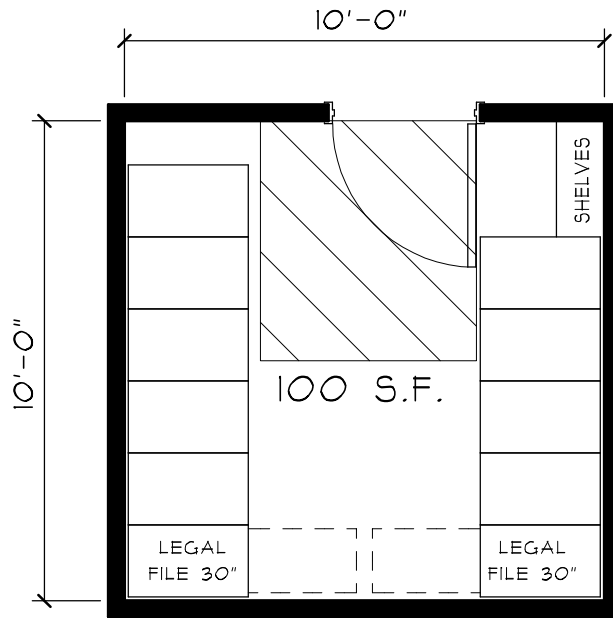
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DATE: 8/19/2019

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34

ROOM #



MITCHELL
ASSOCIATES
ARCHITECTS

RECORDS STORAGE

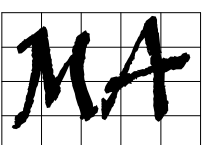
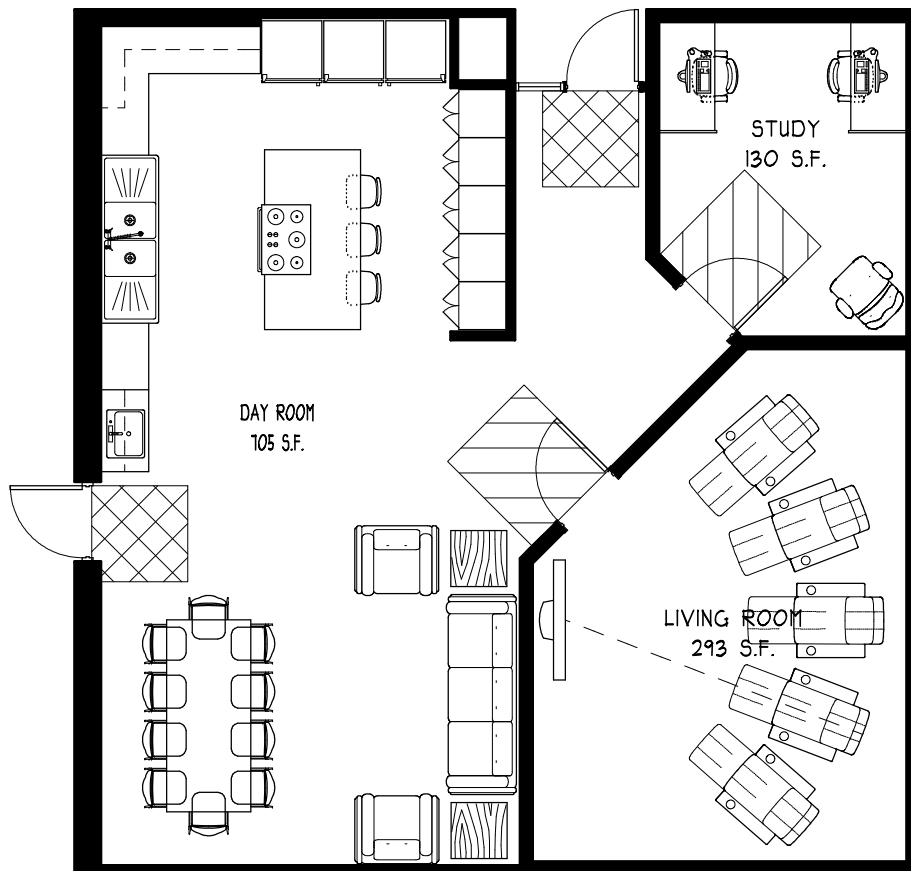
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DATE: 8/19/2019

S:\J Drive\Kaestle Boos\Harvard\Individual Rooms\2 - Administration\35 - Records Storage

35

ROOM #



**MITCHELL
ASSOCIATES
ARCHITECTS**

DAY ROOM, LIVING ROOM & STUDY

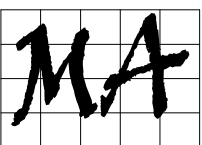
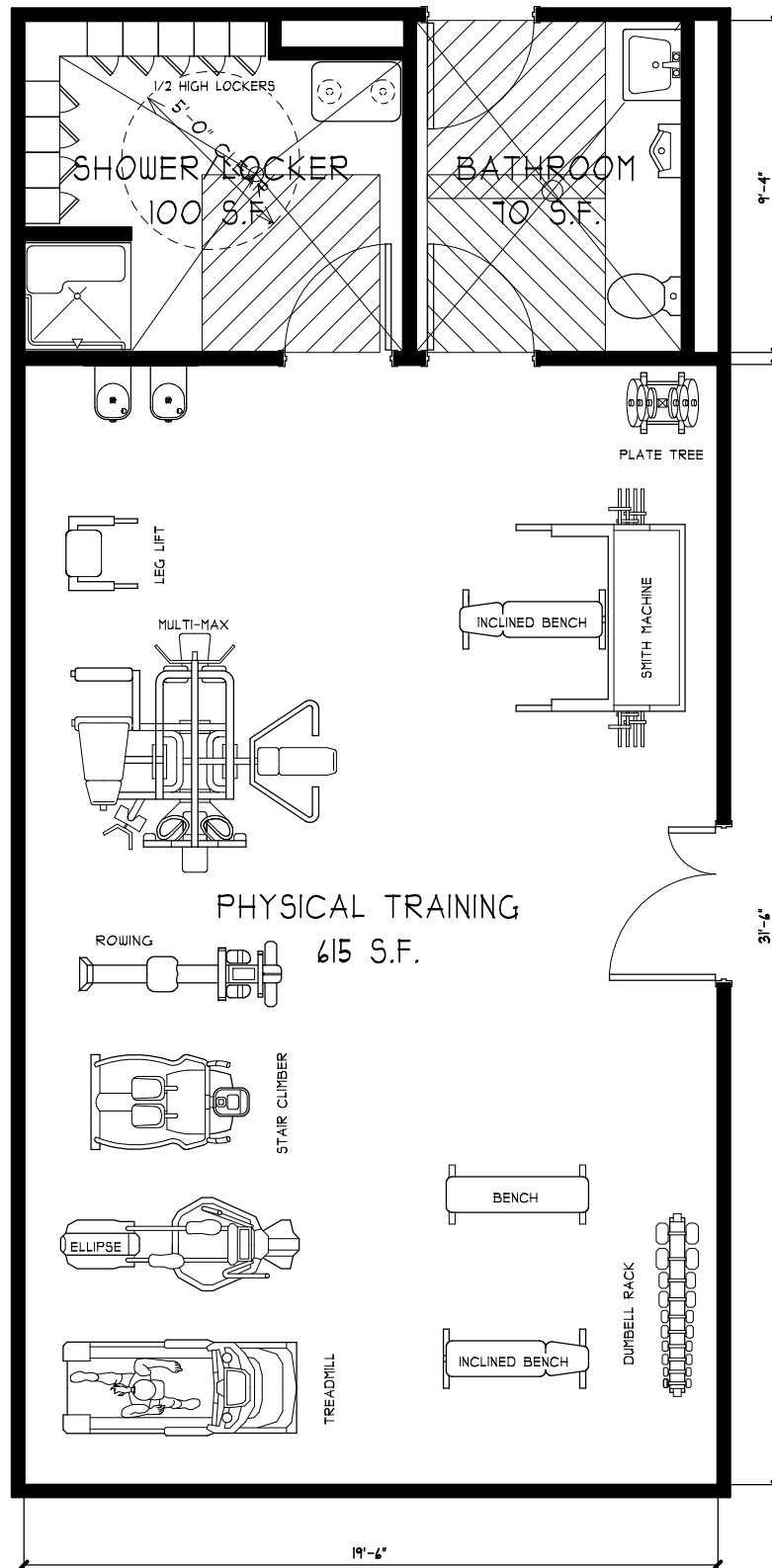
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DATE: 8/22/2019

36 - 38

S:\W Drive\Kaestle Boos\Harvard\Individual Rooms\3 - Firefighters\36 - 38 - Kitchen - Day & Study

ROOM #



**MITCHELL
ASSOCIATES
ARCHITECTS**

PHYSICAL TRAINING

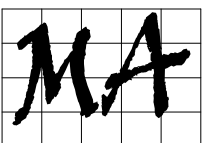
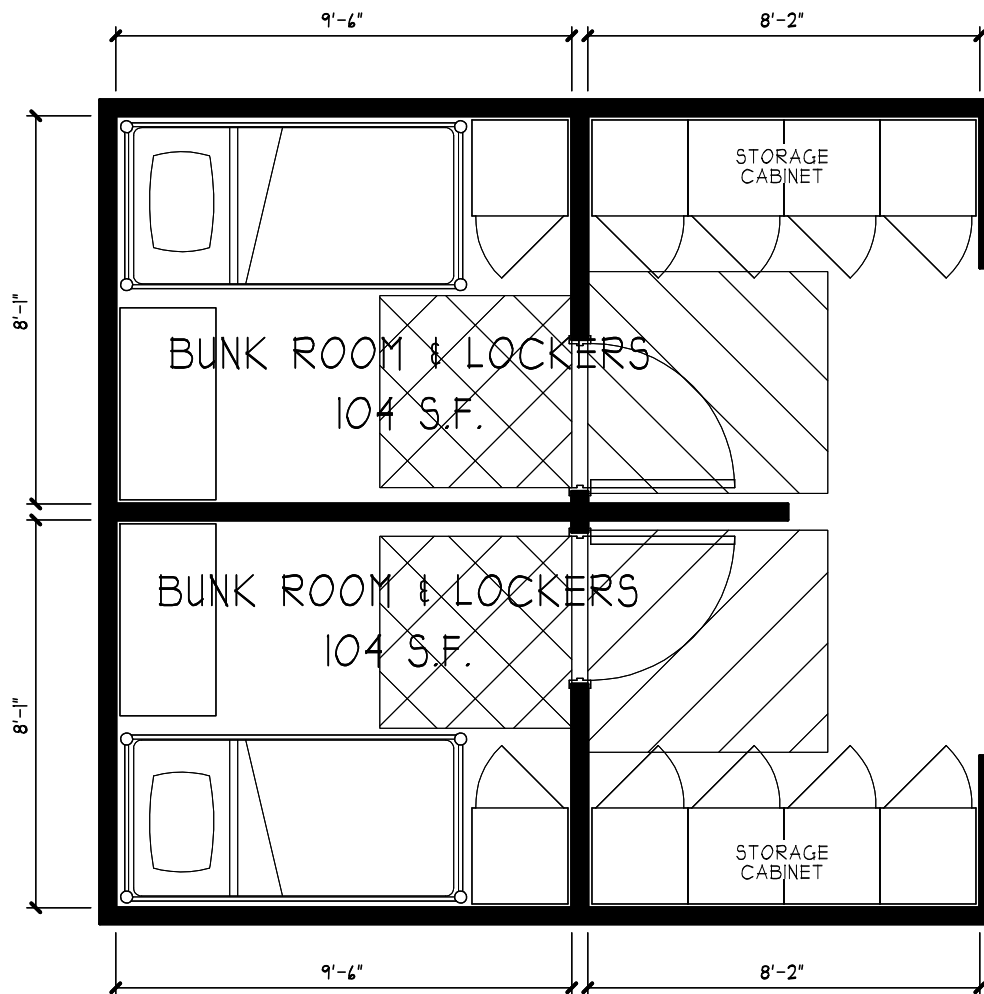
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DATE: 8/22/2019

39 - 41

S:\W Drive\Kaestle Boos\Harverd\Individual Rooms\3 - Firefighters\39 to 41 - Physical Training

ROOM #



**MITCHELL
ASSOCIATES
ARCHITECTS**

BUNK ROOMS W/ LOCKERS

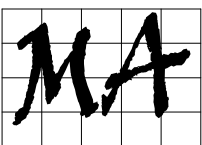
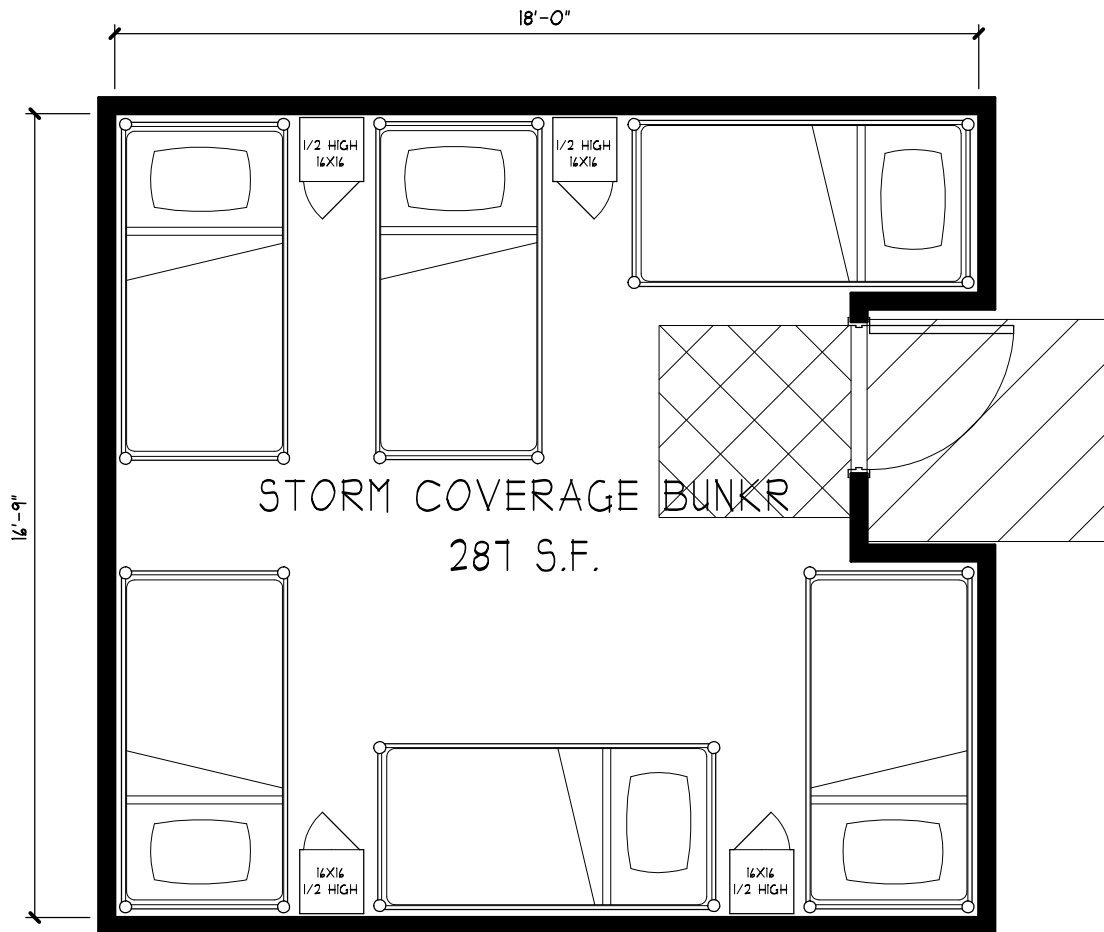
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DATE: 8/29/2019

S:\J Drive\Kaestle Boos\Harvard\Individual Rooms\3 - Firefighters\42 - Bunkrooms

42

ROOM #



**MITCHELL
ASSOCIATES
ARCHITECTS**

STORM COVERAGE BUNKROOM

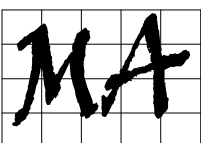
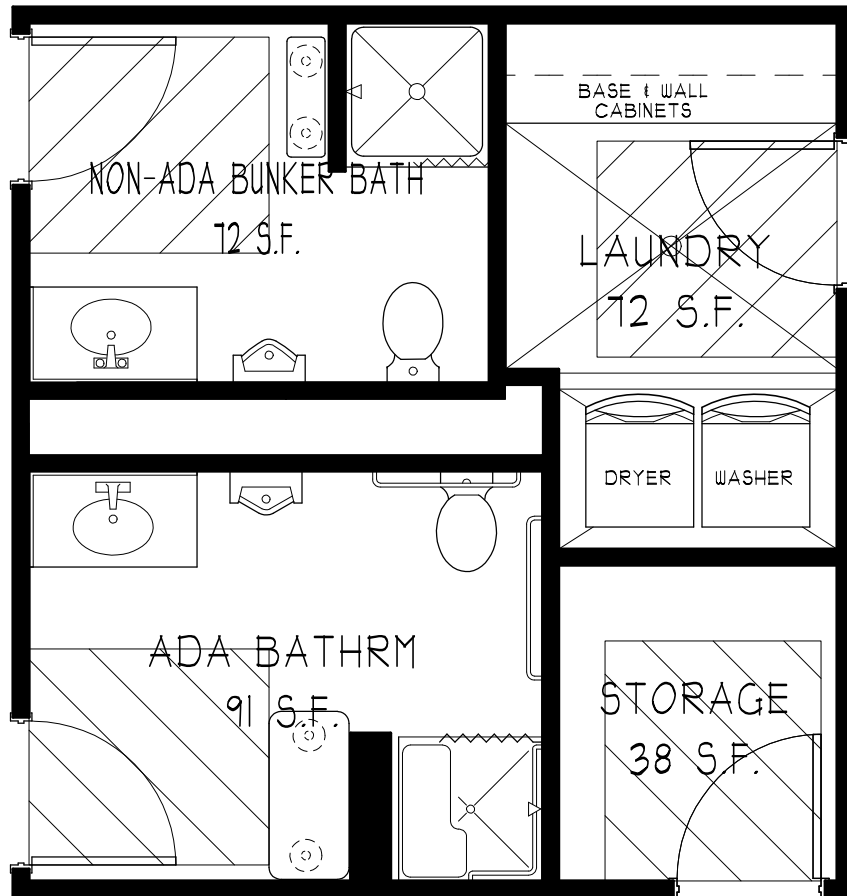
SCALE: 1/4" = 1'-0"

DATE: 8/29/2019

S:\J Drive\Kaestle Boos\Harvard\Individual Rooms\3 - Firefighters\43 - Storm Coverage Bunkroom

43

ROOM #



MITCHELL
ASSOCIATES
ARCHITECTS

BUNKERS BATHROOMS & LAUNDRY

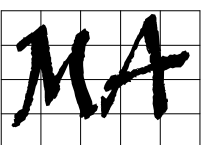
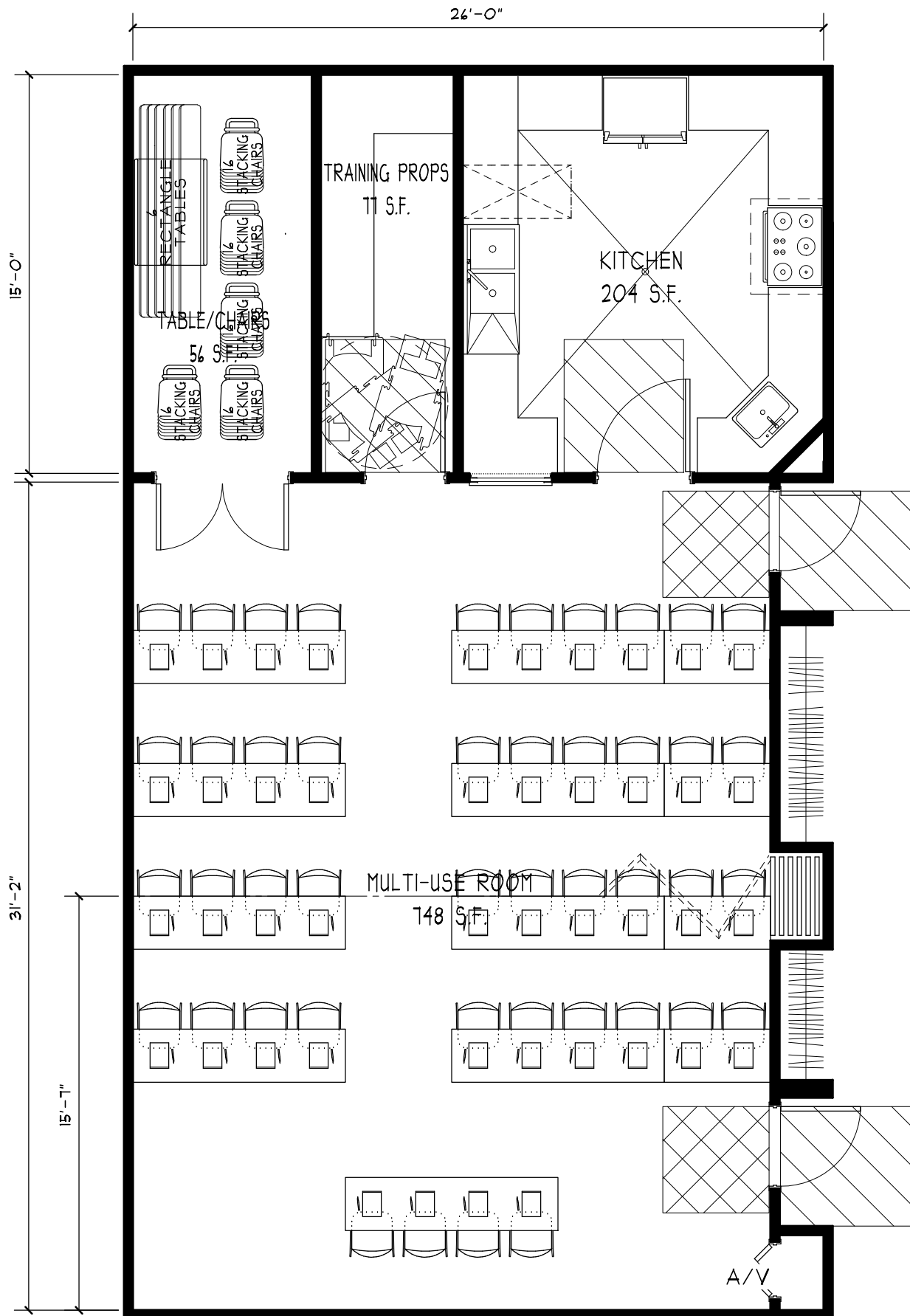
SCALE: 1/4" = 1'-0"

DATE: 8/19/2019

44 & 45

ROOM #

S:\J Drive\Kaestle Boos\Harvard\Individual Rooms\3 - Firefighters\44 & 45 - Bunker's Bathrooms & Laundry



**MITCHELL
ASSOCIATES
ARCHITECTS**

MULTI USE ROOM & SUPPORT

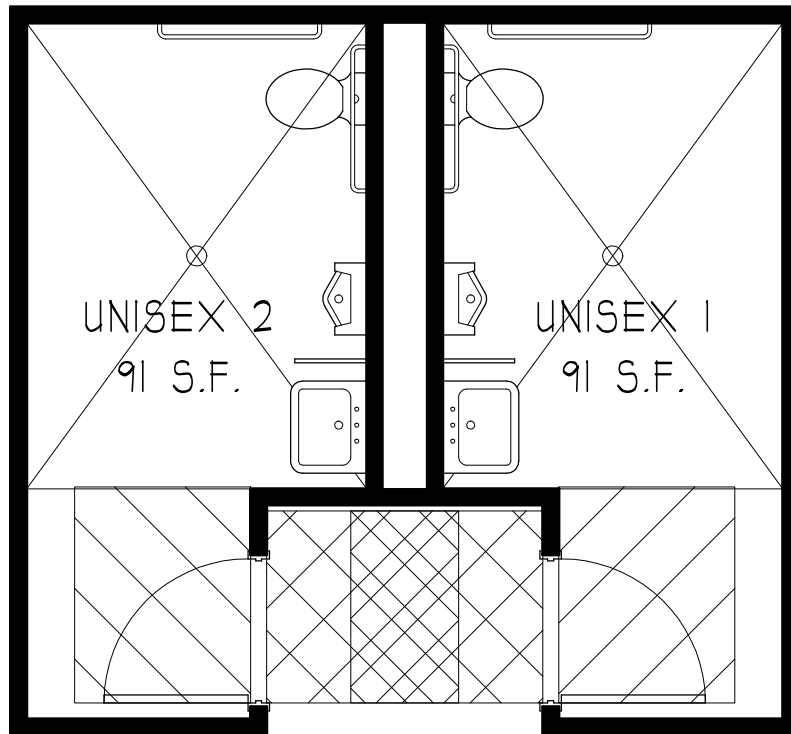
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DATE: 8/30/2019

S:\J Drive\Kaestle Boos\Harvard\Individual Rooms\4 - Public & Training\41 - 52 - Multi-Use

41 - 52

ROOM #



MITCHELL
ASSOCIATES
ARCHITECTS

UNISEX PUBLIC BATHROOMS

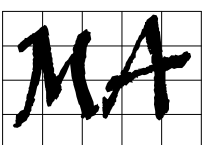
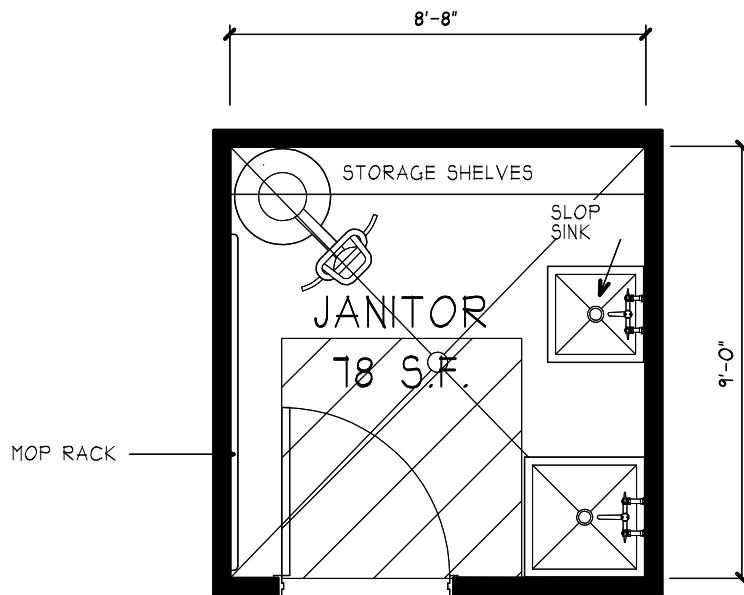
SCALE: 1/4" = 1'-0"

DATE: 8/19/2019

S:\J Drive\Kaestle Boos\Harvard\Individual Rooms\4 - Public & Training\53 - Public Bathrooms

53

ROOM #



MITCHELL
ASSOCIATES
ARCHITECTS

OFFICE SIDE JANITOR'S CLOSET

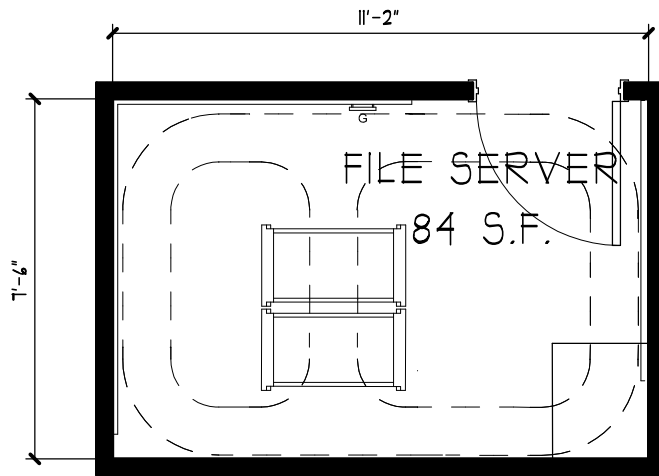
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DATE: 8/22/2019

56

S:\J Drive\Kaestle Boos\Harvard\Individual Rooms\5 - Miscellaneous\56 - Office Side Janitor

ROOM #



**MITCHELL
ASSOCIATES
ARCHITECTS**

FILE SERVER

SCALE: 1/4" = 1'-0"

DATE: 8/19/2019

S:\J Drive\Kaestle Boos\Harvard\Individual Rooms\5 - Miscellaneous\51 - File Server

51

ROOM #



HARVARD FIRE STATION *FEASIBILITY STUDY*



SITE SELECTION ANALYSIS



HARVARD FIRE STATION

FEASIBILITY STUDY



SITE OVERVIEW

The existing Harvard Fire Station is an existing non-conforming lot near the top of a hill behind Town Hall that is 70,131.6 sf. (1.61 acres) located at 11 Elm Street. Optimal recommended parcel size based on the program for this study is 2.5 – 3 acres. The parcel to the east of the site slope away at approximately 8% grade down to the Town Hall and the First Congregational Church and then on to Ayer Road. The parcel to south of the site slopes away from the Fire Station at approximately 10% grade down to the Rectory/Parsonage of the First Congregational Church. The parcel the west of the site is forested, riddled with exposed ledge and slopes away at an approximate 25% grade. The parcel north of the site continues to slope up to the Hildreth House at an approximate grade of 4%. Approximately half of the site is paved and occupied by the fire station. The other half of the site is divided between a gravel area with a temporary tent garage and a heavily ledged wooded area. The temporary tent garage houses the Brush Truck and a flat-bottomed rescue boat and trailer. The south edge of the property is demarcated with a typical 'New England' style stone wall. Vehicle circulation to the south of the building is attained via an easement onto 7 Elm Street.

The Fire Station falls within a Wireless Communication Overlay District and is Zoned Agricultural Residential. The Fire Station also falls within the newly implemented Hildreth Housing Overlay District. A portion of the eastern edge of the parcel lies within the Historic Overlay District where the historic Powder House and Town Pound are located. Around the time of the Revolutionary War gun powder would have been stored in the Powder House to be protected and readily available to the town's militia in case of war. The Town's Pound served as a detention area for stray livestock and owners were required to pay restitution for their animals. The land – structure relations are determined by the Lot Size Standards set forth in chapter 125 – 29 and 30 of the Protective Bylaw. Since the parcel is within 2,500 feet from the Town center (intersection of Routes 110 and 111) and the structure is considered institutional the floor area ratio limit shall be 20% of the Land area of the lot. The existing structure has a FAR of approximately 8% the proposed program would have a FAR of 22%. The height of a building shall be less than three (3) stories and less than 35 feet. The existing structure complies with the height restriction but, the proposed program on the existing site may not. The zoning setbacks for a building on this site should be 20% of the maximum lot width making the setback 35 feet. On the existing site the building is fifteen (15) feet off the north lot line and five (5) feet off the south lot line.

The site is serviced by Town sewer and Town water. The site is also serviced by underground gas utility lines coming into the south side of the building. Overhead utility lines come from the end of Elm Street along the south edge of the property and attach to the south east corner of the building. There is one flagpole located just off the north east corner of the building. At the rear of the building there is a communication tower, pole with emergency sirens, apparatus bay, and a trash barrel. The concrete apron in the front of the building is cracked. The concrete apron at the rear apparatus bay is cracked and heaved. Neither dumpsters, transformers, nor generators were observed on site. There were no first responder memorials located on site. The asphalt in front of the apparatus bays at the front of the building is mostly cracked with pieces breaking off along the south edge. The asphalt in the easement is extensively cracked with a portion of the wearing course missing leaving the binder course. The asphalt at the rear of the building is cracking overall. The newest looking pavement is over the sewer line with an obvious seam between new and old pavement. There is one sidewalk that runs at the rear of the building south and then turns east sandwiched between the south edge of the building and stone wall. This walk is about three (3) feet wide and leads from the rear of the building to an exterior door halfway down the structure. At this door there is a break in the stone wall with three uneven steps down into the easement area. There is



HARVARD FIRE STATION *FEASIBILITY STUDY*



neither curbing nor any storm water grates on site. There is no observable storm drainage system on site and any storm water simply sheet flows downhill.

The site can be accessed from Ayer Road via an unnamed one-way drive just north of Town Hall or from Elm Street, which is also one-way and come in from the south. Fire response vehicles must navigate a 360-foot course to Ayer Road consisting of a ten (10) percent grade change, a slalom like zigzag between the Town Hall and First Congregationalist Unitarian Church and parking lots with potential vehicular or pedestrian conflicts along the way. Site lines at Ayer Road are approximately 250 feet to the north and 300 + feet to the south toward the intersection of Fairbank Street and Ayer Road



Apparatus access drive down from Station



Station front and apron area



Tent structure with Antique Fire Truck



Special Operations Trailer.





HARVARD FIRE STATION *FEASIBILITY STUDY*



Emergency Management Trailer



Rear of Station, trash cans.

Woods Road and Ledge.



Fire apparatus parked outside.



Easement area south edge of property.



Binder course visible.



Historic Powder House.



Historic Town Pound.



HARVARD FIRE STATION *FEASIBILITY STUDY*



View south down Elm Street



Auxiliary Fire Apparatus building and Town Hall.



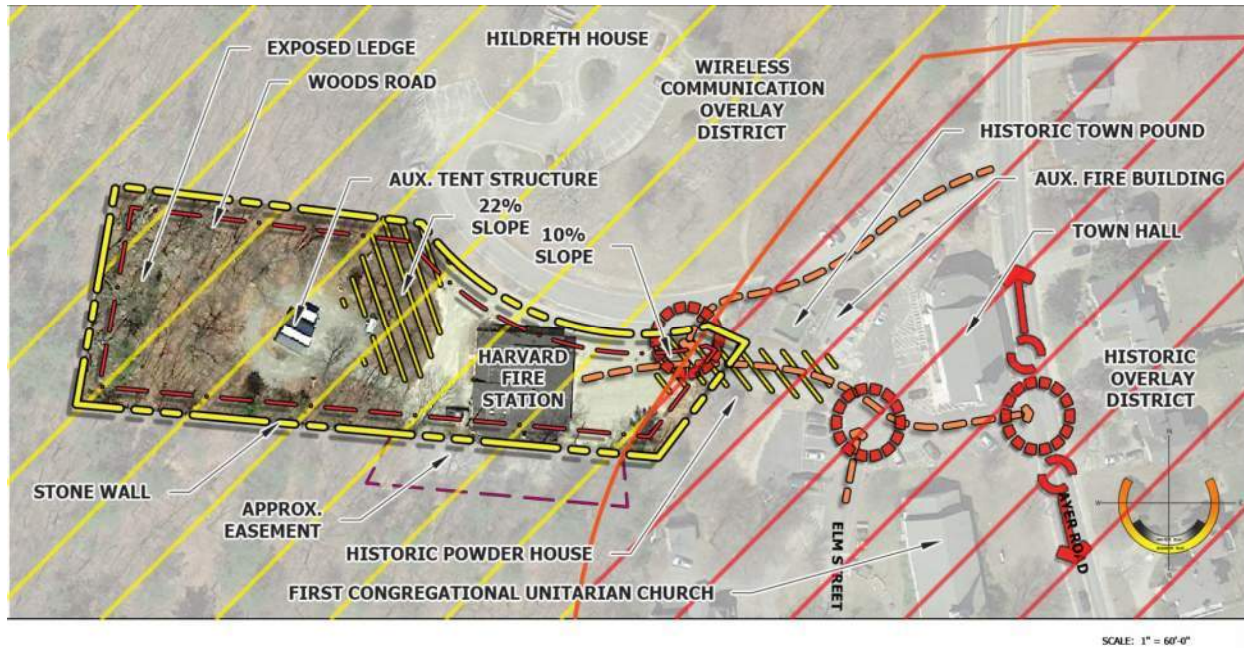
View south down Ayer Road



View north up Ayer Road



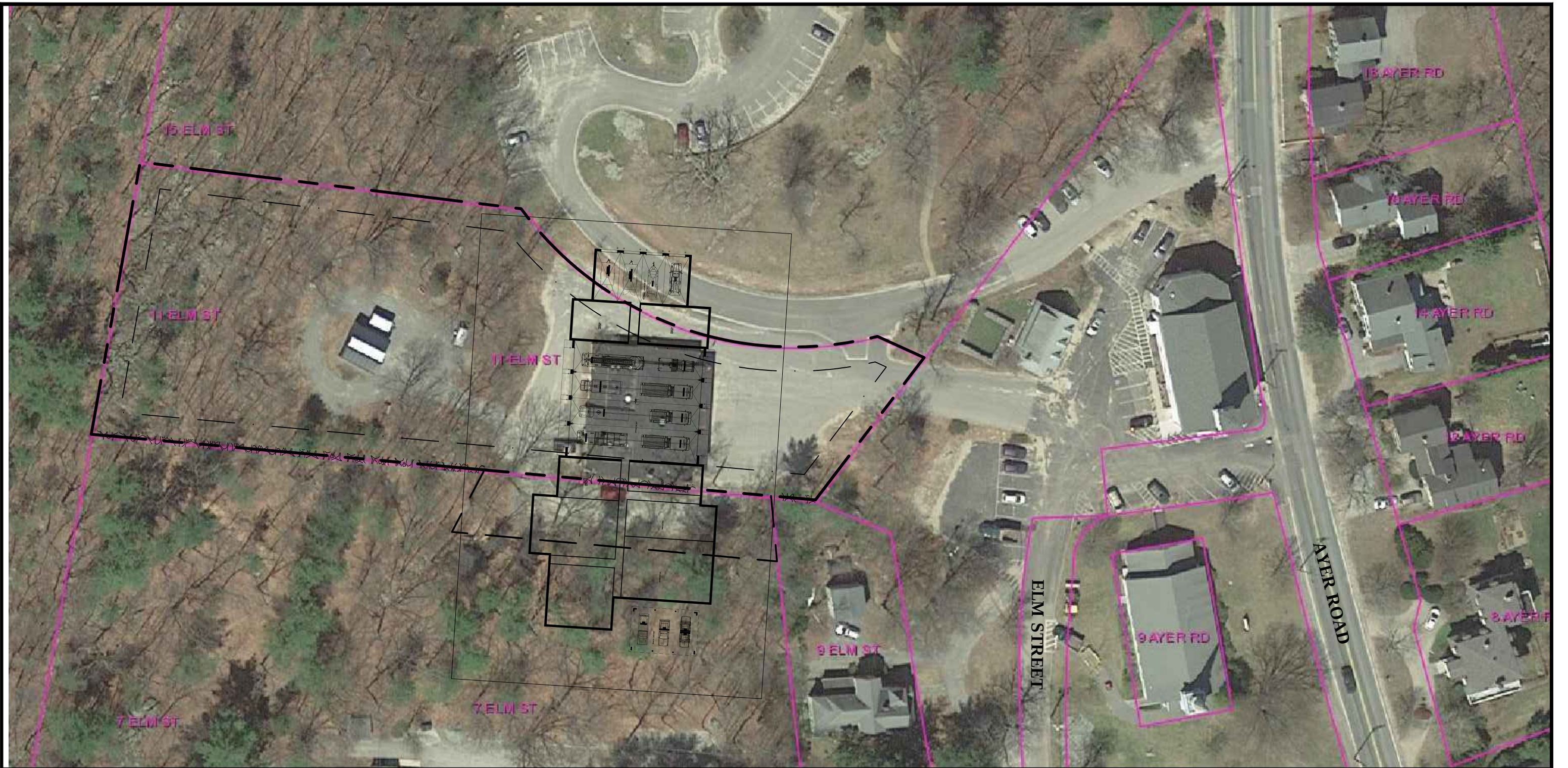
HARVARD FIRE STATION *FEASIBILITY STUDY*



Existing Conditions Site plan.

Harvard Fire Study
Harvard, Massachusetts

Site Number	1	2	3
Site Name	Existing Fire Station	Optional Site 1	Optional Site 2
Address	11 Elm Street	35 Ayer Road	39 Massachusetts Ave
Parcel ID	125017C003500000	125017A000400000	125022B004300000
Lot Size	1.61 Acres	4.3 Acres	1.9 Acres
Current Uses	Fire Station	Two Family	Education
No. of Buildings on Site	1	3	1
Ownership Public or Private	Town of Harvard Public	William Hazel Trust 2010 Private	Town of Harvard Public
Numbers of Owners	1	2	1
Assessed Value	\$516,900.00	\$532,400	\$516,400
Site Natural Features			
Topography	Steep sloping site	More gradual than steep. Sloping down toward street	Gradual sloping down toward street
Soils	Chaffield-Hollis Rock Outcrop Complex with a slope of 3 to 15%	Paxton Fine Sandy Loam with an overall slope between 3 to 15%	Mostly Paxton Fine Sandy Loam with 8 to 15% slopes, Partial Canton Fine Sandy Loam with 8 to 15% slopes, Partial Woodbridge Fine Sandy Loam with 3 to 8% slopes.
Areas of Critical Environmental Concern (ACEC)	N/A	N/A	N/A
National Heritage & Endangered Species Program (NHESP)	N/A	N/A	N/A
Vegetation	New England Upland Deciduous Forest in undeveloped areas rear of station. Sparse landscaping around building.	Grass Field with New England Upland Deciduous Forest areas. Farm like.	Landscaped and manicured lawn along frontage typical New England Upland Deciduous Forest in rear.
Flood Plain	N/A	N/A	N/A
Vernal pools	N/A	N/A	N/A
Wetlands	N/A	N/A	N/A
Habitat	Typical for vegetation type	Typical for vegetation type	Typical for vegetation type
Well head protection area, Surface Water Protection District	No	No	Yes, Interim Wellhead Protection Area
Ground Water Protection District	N/A	N/A	N/A
Aquifer Zone (medium & High yield)	N/A	N/A	N/A
Riverfront & Wetland Buffer Zone	N/A	N/A	N/A
Existing Zoning	Agricultural Residential	Residential 1	Agricultural Residential
Zoning (maximum impervious surface)	25%	25%	25%
Minimum setbacks	Front: 75' from road centerline, Side and Rear: 20% of required lot width or max. lot width, whichever is lesser.	Front: 75' from road centerline, Side and Rear: 20% of required lot width or max. lot width, whichever is lesser.	Front: 75' from road centerline, Side and Rear: 20% of required lot width or max. lot width, whichever is lesser.
Max building height	35 Feet	35 Feet	35 Feet
Abutting Land Uses			
North Side	Hildreth House Senior Center	Private Residential	Commercial, Public School
East Side	Town Hall	Commercial, Auto Repair Shop	Private Residential
South Side	First Congregationalist Fellowship Building	Building 1: Private Residential Building 2: Commercial, Day Care	Private Residential
West Side	Private Residence	Private Residential	Private Residential
Vehicular Accessibility	Yes	Yes	Yes
Utility Services Available			
Municipal Water or well	Municipal Water	Municipal Water	Municipal Water
Municipal Sanitary Sewer	Municipal Sewer	Private Sewer	Unknown
Electric	Yes	Yes	Yes
Gas	Yes	Available	Available
Community Impacts	Known/existing impacts	Impacts to residential	Impacts to residential
Environmental Concerns (21-E), AUL	N/A	N/A	N/A
Other Site Features/Comments	Tight narrow site, not easily	Adjacent to Police Station	Next to school
Significant Site Specific Construction Costs	Possible Shallow Bedrock. Visable rock.	Possible Shallow Bedrock, Aquisition of property	Demo existing building
Earthwork	Abundent Outcrop and Shallow Bedrock	Abundant Outcrop and Shallow Bedrock	Typical
Roadways	No Street Frontage	Access to Depot road and Route 110	Access to Route 111
Utilities			
Permits			
Mass Highway	N/A	MassDOT State Route 110 Partial Frontage	MassDOT State Route 111 Entire Frontage
Conservation Commission	N/A	N/A	N/A
MEPA			
EIR or ENF	N/A	N/A	N/A

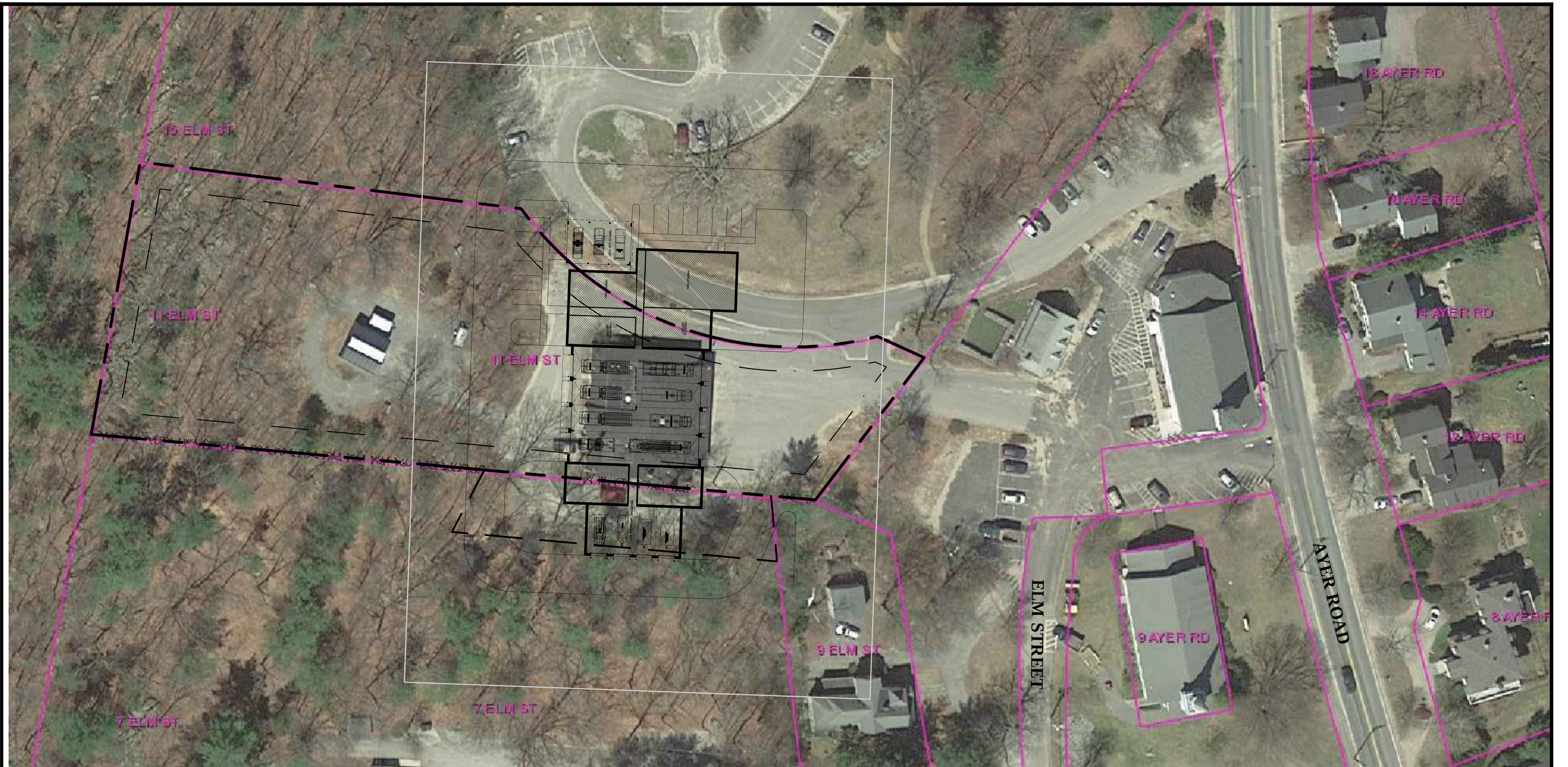


SCALE: 1" = 60'-0"

EXISTING CONDITIONS HARVARD FIRE STATION

HARVARD, MA
September 27, 2019

KAESTLE BOOS
associates, inc



SCALE: 1" = 60'-0"

EXISTING CONDITIONS HARVARD FIRE STATION: 2 STORY OPTION

HARVARD, MA
September 27, 2019

KAESTLE BOOS
associates, inc



SCALE: 1" = 80'-0"

EXISTING CONDITIONS: 35 AYER ROAD HARVARD FIRE STATION

HARVARD, MA
September 27, 2019

KAESTLE BOOS
associates, inc

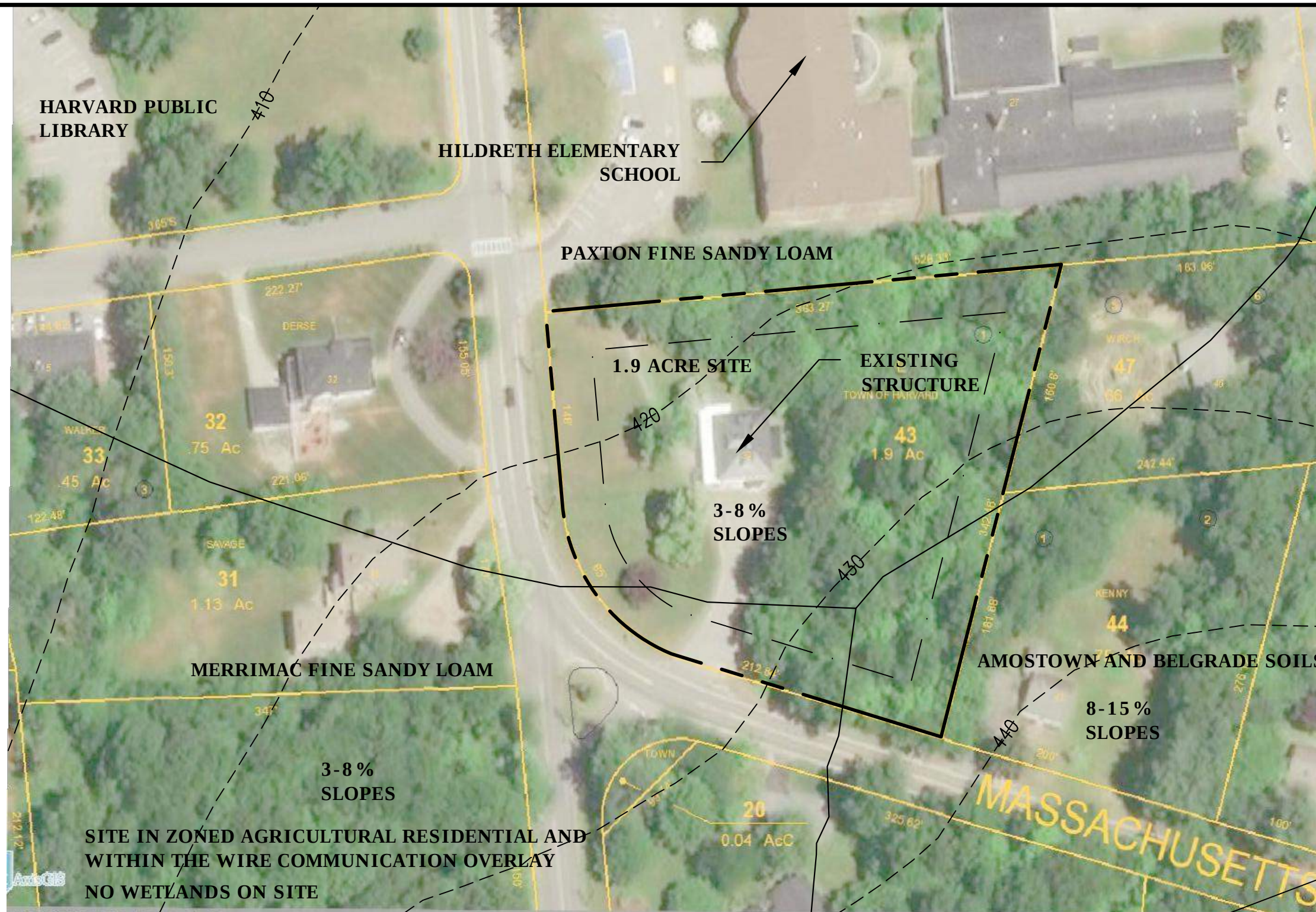


SCALE: 1" = 80'-0"

EXISTING CONDITIONS: 35 AYER ROAD HARVARD FIRE STATION: 2 STORY OPTION

HARVARD, MA
September 27, 2019

KAESTLE BOOS
associates, inc



SCALE: 1" = 80'-0"

EXISTING CONDITIONS: 39 MASS AVE HARVARD FIRE STATION

HARVARD, MA
September 20, 2019

KAESTLE BOOS
associates, inc

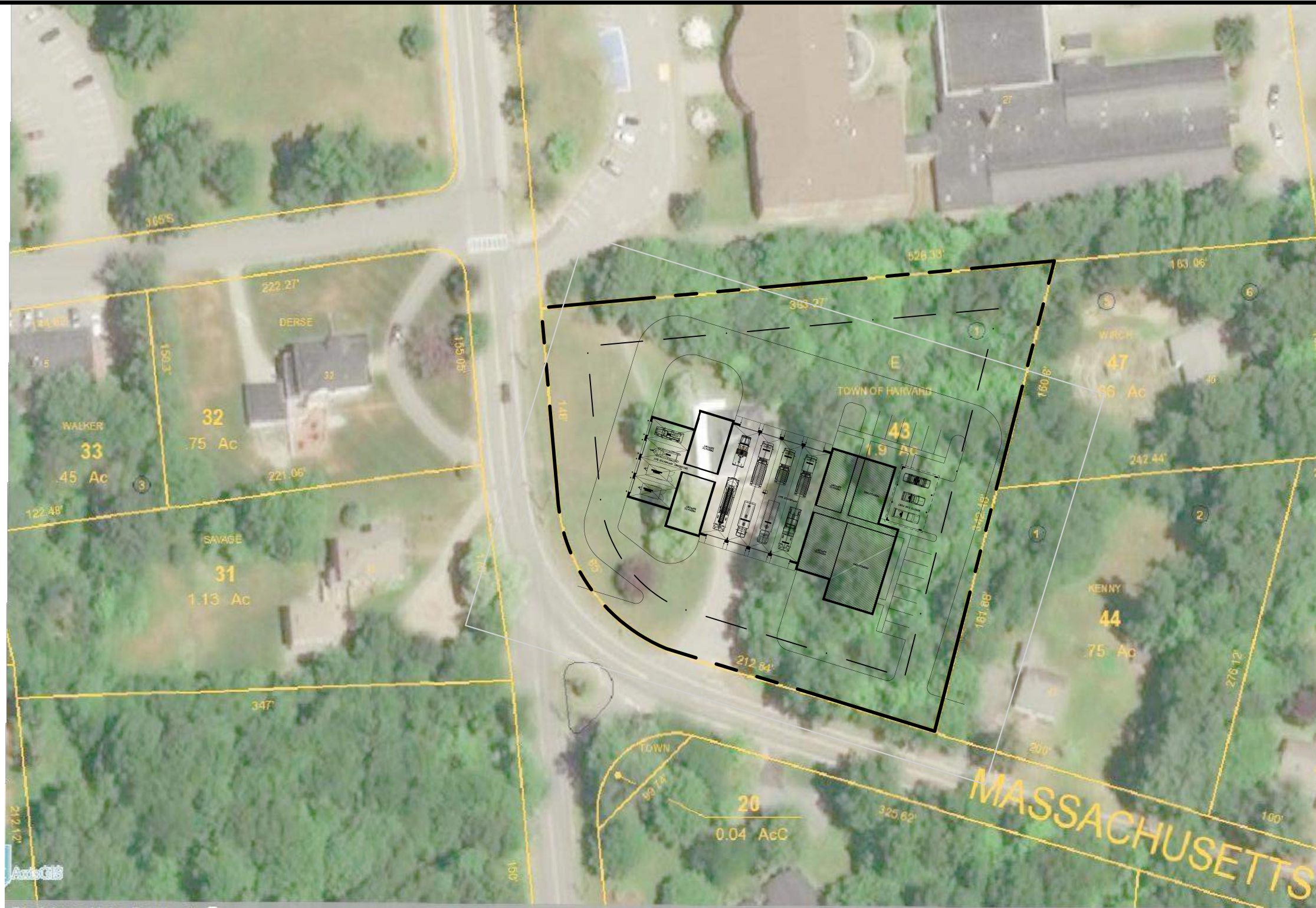


SCALE: 1" = 80'-0"

EXISTING CONDITIONS: 39 MASS AVE HARVARD FIRE STATION

HARVARD, MA
September 27, 2019

KAESTLE BOOS
associates, inc



SCALE: 1" = 80'-0"

EXISTING CONDITIONS: 39 MASS AVE HARVARD FIRE STATION: 2 STORY OPTION

HARVARD, MA
September 27, 2019

KAESTLE BOOS
associates, inc



HARVARD FIRE STATION *FEASIBILITY STUDY*



OPINION OF PROBABLE COST



Harvard Fire Department

Jan. 2020

Preliminary OPC - Single Story

KAEISTLE BOOS
associates, inc

Cost Detail		Subtotals	Totals	Comments
Direct Construction Costs:				
Probable scope				
Central Station	23,500 sf	\$8,225,000		
Car Port	1,035	\$155,000		
Site Development		\$1,000,000		
			\$9,380,000	Assume 2.5 Acres
Design & Estimating Contingency	15.00%	\$1,407,000		
Direct Construction Cost SubTotal:			\$10,787,000	
GC Mark-ups:				
General Conditions & Requirements	8.50%	\$917,000		
Bond	1.00%	\$117,000		
Insurance	1.40%	\$164,000		
Building Permit	1.50%	Waived by Town		
GC Fee	3.00%	\$324,000		
SubTotal:			\$1,522,000	
Escalation (to Midpoint of Construction - 2021):	12.50%		\$1,539,000	
Probable Total Construction Cost:			\$13,848,000	Projected Bid
Equipment Costs				
Station Alerting System		\$105,000		Preliminary Estimate
Furnishings, Furniture		\$235,000		Allowance
Computer Equipment & UPS		\$50,000		Allowance
Telephone System		\$50,000		Allowance
Security / Access Control		\$75,000		Allowance
Firematic Equipment		\$250,000		Prelim. Allow.
Total Probable Cost of Equipping:			\$765,000	
Owner's Indirect Cost				
Land Survey		\$15,000		Allowance
Geotech		\$20,000		Allowance
Environmental Study		N/A		Assumed Not Required
Basic A/E Fee	9.5%	\$1,316,000		
Equipment Design & Procurement		\$77,000		
Project Management Fee	4.25%	\$589,000		Verify w/OPM
Reimbursables/Add Services	Allow.	\$66,000		
Structural Peer Review		\$5,000		If Required (Building Off.)
Utility Backcharges	Allow.	\$50,000		Verify w/Electric Utility
Moving	Allow.	\$15,000		Verify w/Chief
Reproduction / Miscellaneous	Allow.	\$7,000		Assume Electronic Distribution
Legal / Advertising	Allow.	\$10,000		
Material Testing	Allow.	\$75,000		
Probable Owner's Indirect Costs:			\$2,245,000	
Owner's Contingencies				
Construction Contingency	5.00%	\$692,000		
Equipment Contingency	7.50%	\$57,000		
Owner's Indirect Costs Contingency	7.50%	\$168,000		
Owner's Total Project Contingencies:			\$917,000	
Total Project Cost:			\$17,775,000	

Notes: All Costs rounded to nearest thousand



HARVARD FIRE STATION *FEASIBILITY STUDY*



APPENDIX 7.1 EXISTING BUILDING PLANS

HARVARD FIRE STATION

H A R V A R D . M A S S A C H U S E T T S

F I R E S T A T I O N B U I L D I N G C O M M I T T E E

A R T H U R R . N I C H O L S O N J R . C H A I R M A N

J O H N O . B U R D I C K

S U S A N H . W A S S E R M A N

W I L L I A M J . C U R L E Y

G . D A V I D H O B S O N

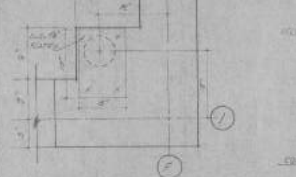
A L F R E D W . P O I T R A S

J O H N O . B U R D I C K F I R E C H I E F

P E R L E Y F . G I L B E R T A S S O C I A T E S I N C .
A R C H I T E C T S A N D E N G I N E E R S
L O W E L L . M A S S A C H U S E T T S

PLAN DETAIL (A) 1/2" = 1'-0"

PLAN DETAIL (B) 1/2" = 1'-0"



FOOTING / FOUNDATION, PLAN 4'-10"

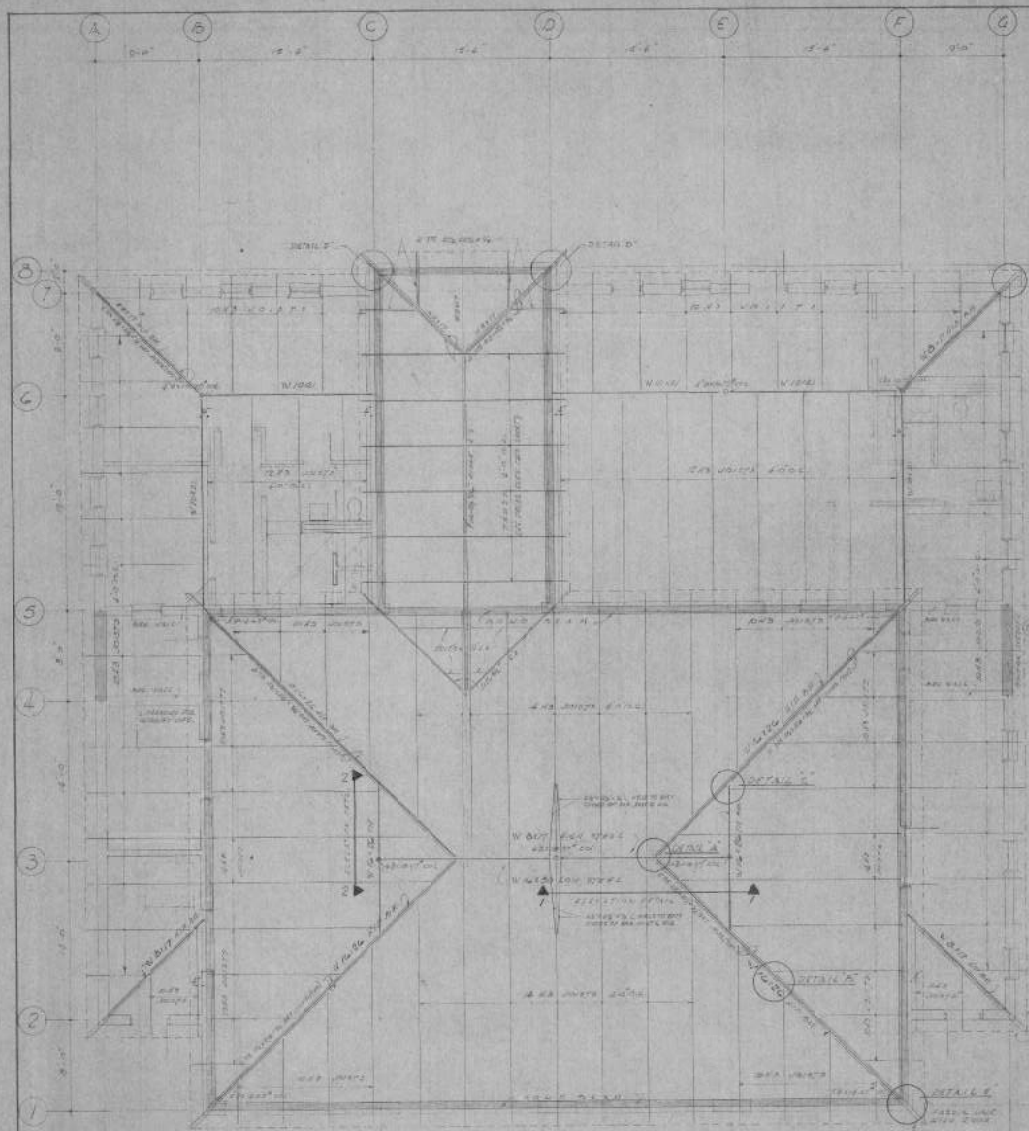
PRODUCT
HARVARD FIRE STATION
HARVARD, MASSACHUSETTS



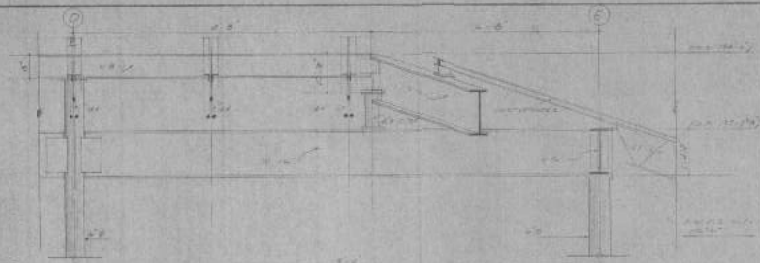
PERLEY F. GILBERT ASSOC. INC.
ARCHITECTS ENGINEERS
LOWELL MASSACHUSETTS

REVISIONS	CONTENTS	DATE
REV DESCRIPTION	FOUNDATION PLAN FOUNDATION DETAILS	S-1

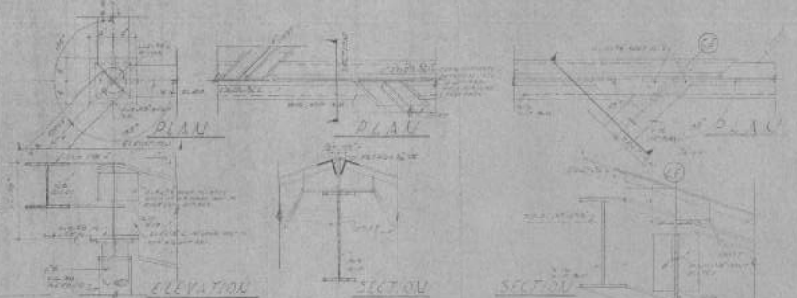
5-1



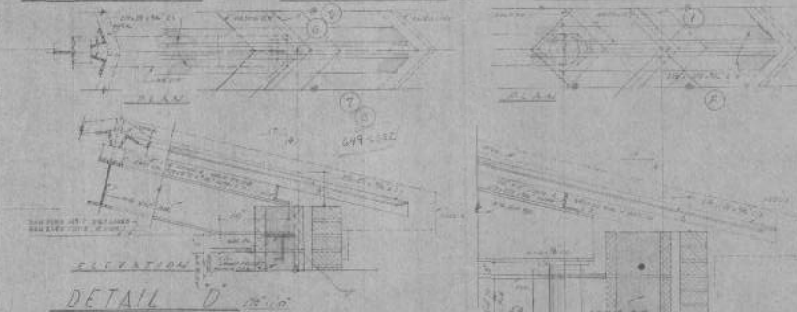
ROOF FRAMING PLAN 4'-10"



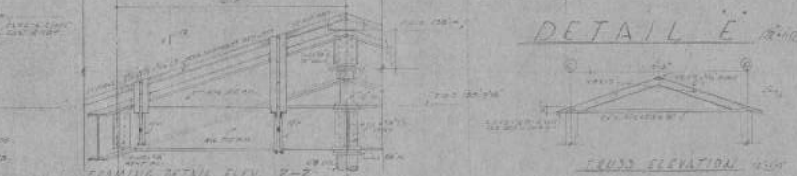
FRAMING DETAIL ELEVATION 4'-10"



DETAIL A 4'-10" DETAIL B 4'-10" DETAIL C 4'-10"



DETAIL D 4'-10" DETAIL E 4'-10"



FRAMING DETAIL ELEV. 4'-10"

PROJ. NO. 1
HARVARD FIRE STATION
HARVARD, MASSACHUSETTS



RAYLEY GILBERT ASSOC. INC.
ARCHITECTS - ENG. OFFS.
LOWELL, MASSACHUSETTS

REVISIONS	DATE	BY	APP.
1	10-1-55	W. G. M.	
2	10-1-55	W. G. M.	
3	10-1-55	W. G. M.	
4	10-1-55	W. G. M.	
5	10-1-55	W. G. M.	
6	10-1-55	W. G. M.	
7	10-1-55	W. G. M.	
8	10-1-55	W. G. M.	
9	10-1-55	W. G. M.	
10	10-1-55	W. G. M.	

W.P. DOBNEY E. 4/12/66

NOTE:
SEE SET OF PLE DETAILS
OF GRADE, UTILITY, LIGHTS, TREES
& LANDING FIELD.

LEGEND
— EXISTING GRADES
— NEW FINISH GRADES
— EXISTING UTILITY LOCATIONS
— EXISTING STORM DRAIN

NORTH

SITE GRADING PLAN

W.P. DOBNEY E. 4/12/66

NORTH

SITE DEVELOPMENT PLAN

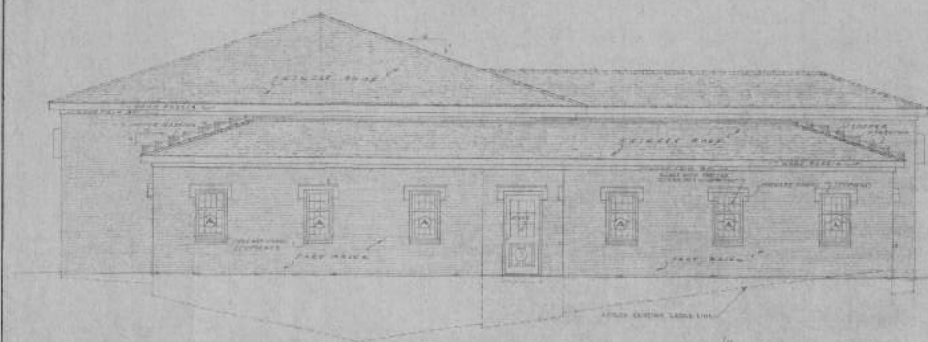
PROJECT
HARVARD FIRE STATION
HARVARD, MASSACHUSETTS



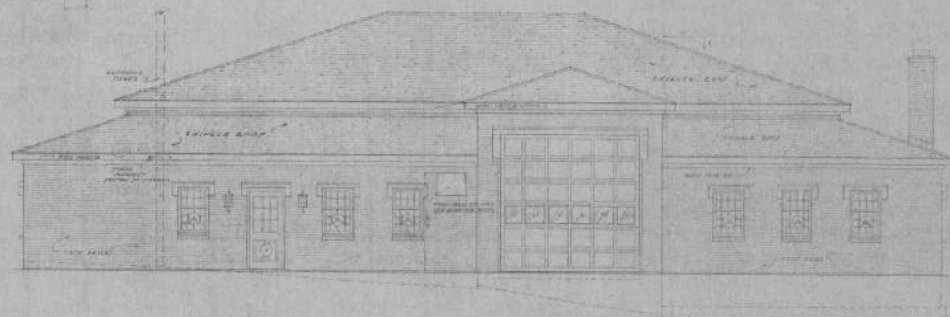
PERLEY F. GILBERT ASSOC., INC.
ARCHITECTS & ENGINEERS
LOWELL, MASSACHUSETTS

REVISIONS	CONTENTS
1. PRELIMINARY	SITE DEVELOPMENT
2. GRADING	GRADING PLANS
3. ELECTRICAL	ELECTRICAL SERVICE

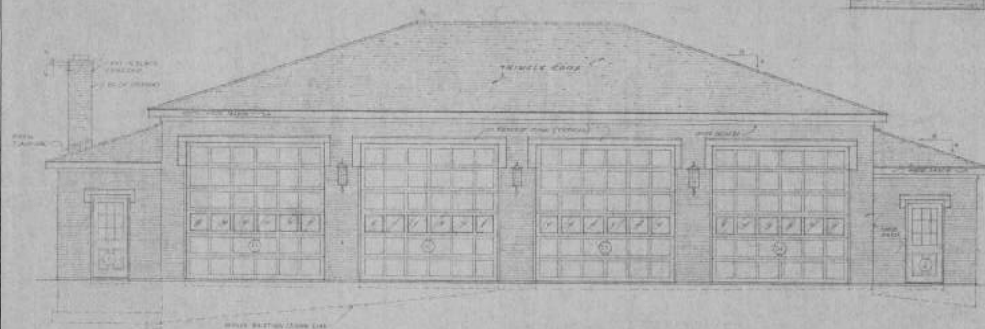
DATE 4/12/66
SHEET NO. 1
A-1



NORTH ELEVATION



WEST ELEVATION



EAST ELEVATION

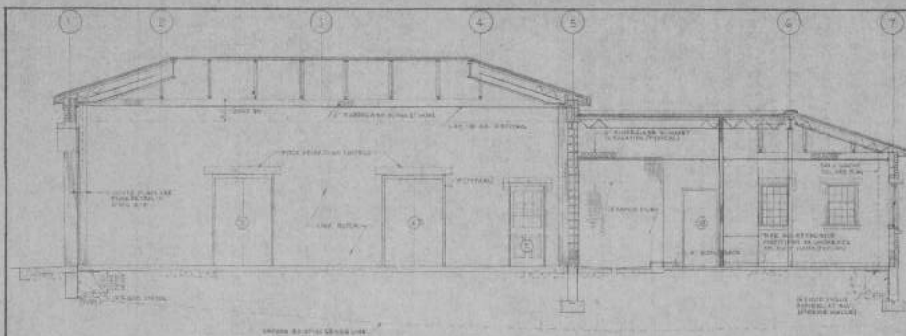
PROJECT
HARVARD FIRE STATION
HARVARD, MASSACHUSETTS



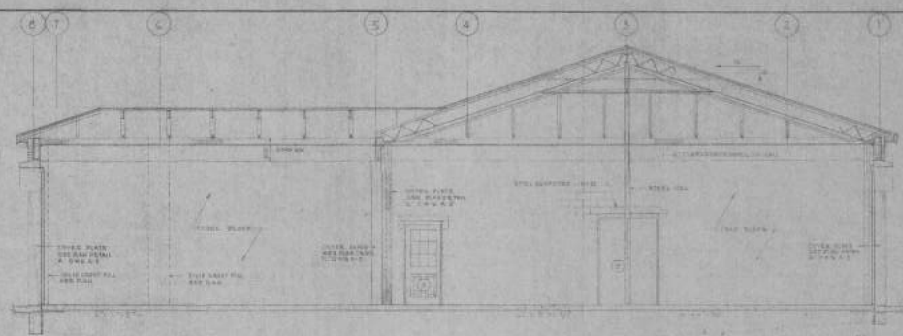
PERCY F. GILBERT ASSOC. INC.
ARCHITECTS & ENGINEERS
LOWELL, MASSACHUSETTS

REVISION	CONTENTS
DATE	EXTERIOR ELEVATIONS
DESCRIPTION	

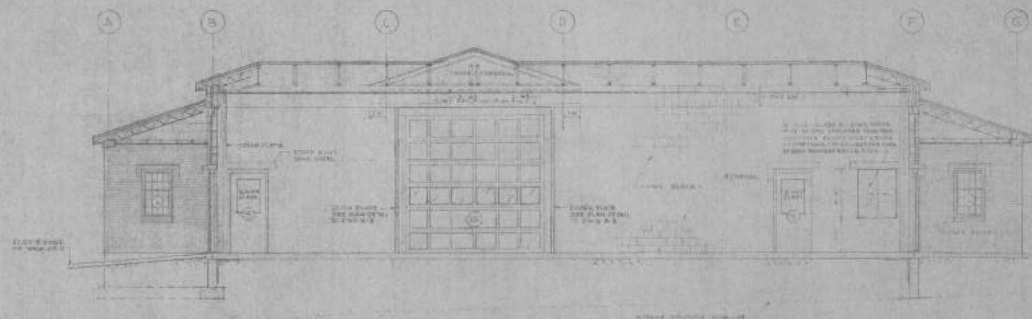
DATE
DRAWN
CHECKED
DEPT. NO.
A-3



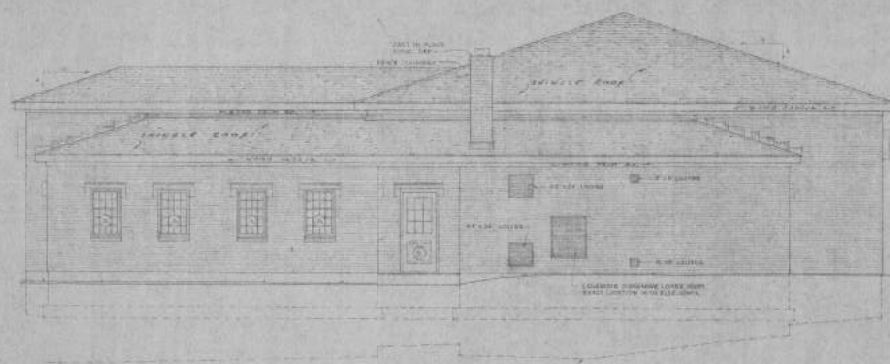
BUILDING SECTION A-A
SCALE 1/8" = 1'-0"



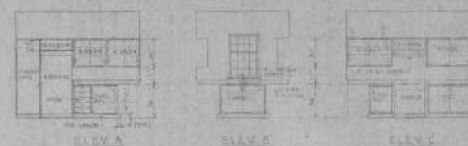
BUILDING SECTION B-B
SCALE 1/8" = 1'-0"



BUILDING SECTION C-C
SCALE 1/8" = 1'-0"



SOUTH ELEVATION
SCALE 1/8" = 1'-0"



KITCHEN CABINET ELEVATIONS
SCALE 1/8" = 1'-0"



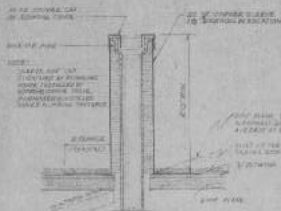
TOILET ELEVATIONS
SCALE 1/8" = 1'-0"

PROJECT
HARVARD FIRE STATION
HARVARD, MASSACHUSETTS

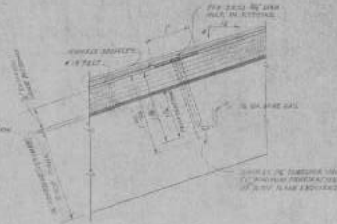


PERCY F. GILBERT ASSOC. INC.
ARCHITECTS
LOWELL, MASSACHUSETTS

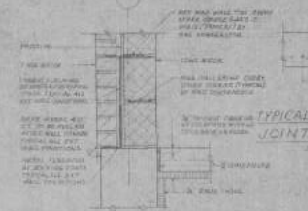
REVISIONS	CONTENTS	DATE
1. REVISIONS	EXTERIOR ELEVATIONS	1/1/54
2. REVISIONS	INTERIOR ELEVATIONS	1/1/54
3. REVISIONS	BUILDING SECTIONS	1/1/54



TYPICAL PLUMBING VENT
SCALE 1/2" = 1'-0"



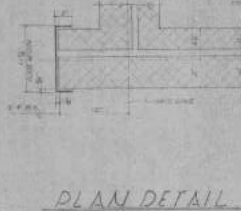
ROOF DECK PLYSCORD
OVERLAY DETAIL
SCALE 1/2" = 1'-0"



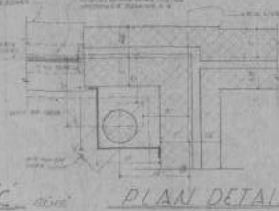
TYPICAL EXTERIOR MASONRY WALL FLASHING
SCALE 1/2" = 1'-0"



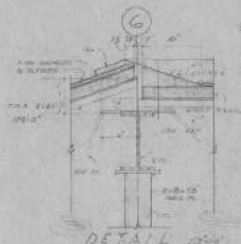
TYPICAL EXPANSION
JOINT DETAIL
SCALE 1/2" = 1'-0"



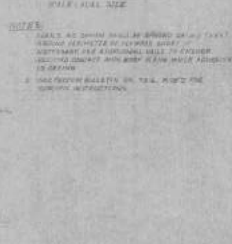
PLAN DETAIL C



PLAN DETAIL B



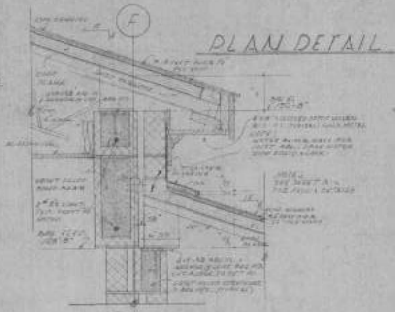
DETAIL 6



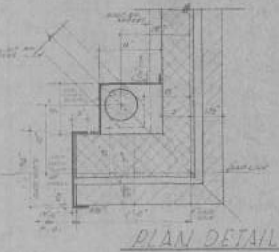
DETAIL 7



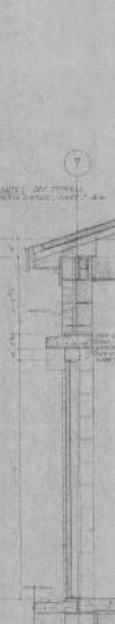
DETAIL 8



DETAIL 9



PLAN DETAIL A



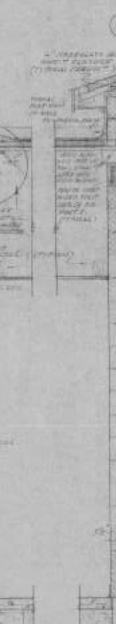
SECTION 1



SECTION 2



SECTION 3



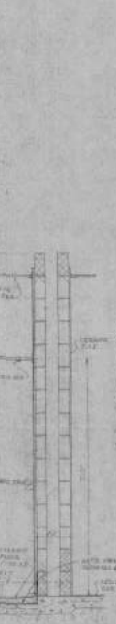
SECTION 4



SECTION 5



SECTION 6



SECTION 7



SECTION 8



SECTION 9



SECTION 10



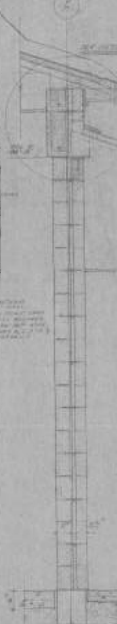
SECTION 11



SECTION 12



SECTION 13



SECTION 14



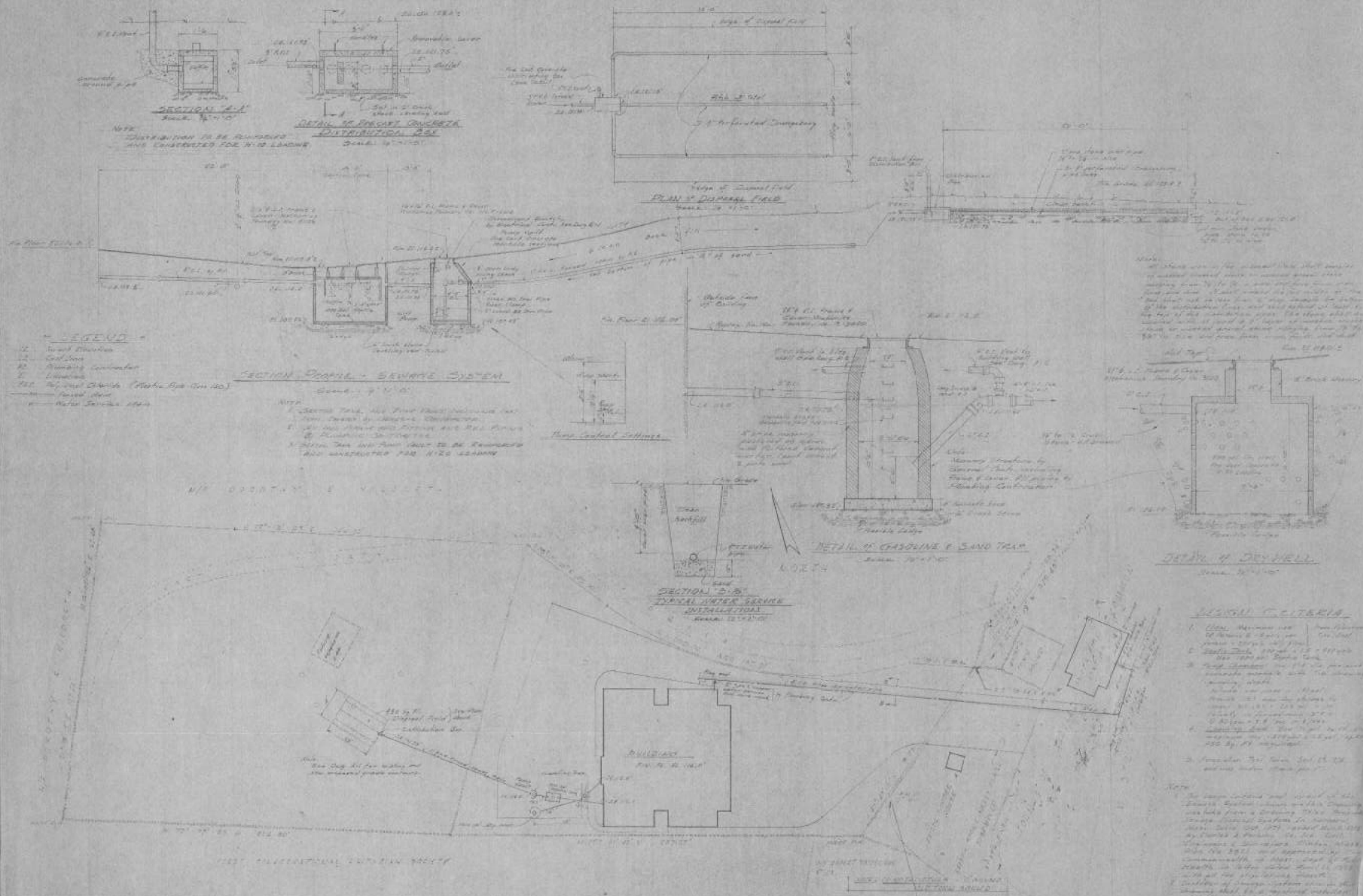
SECTION 15

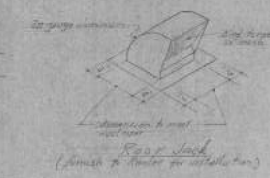
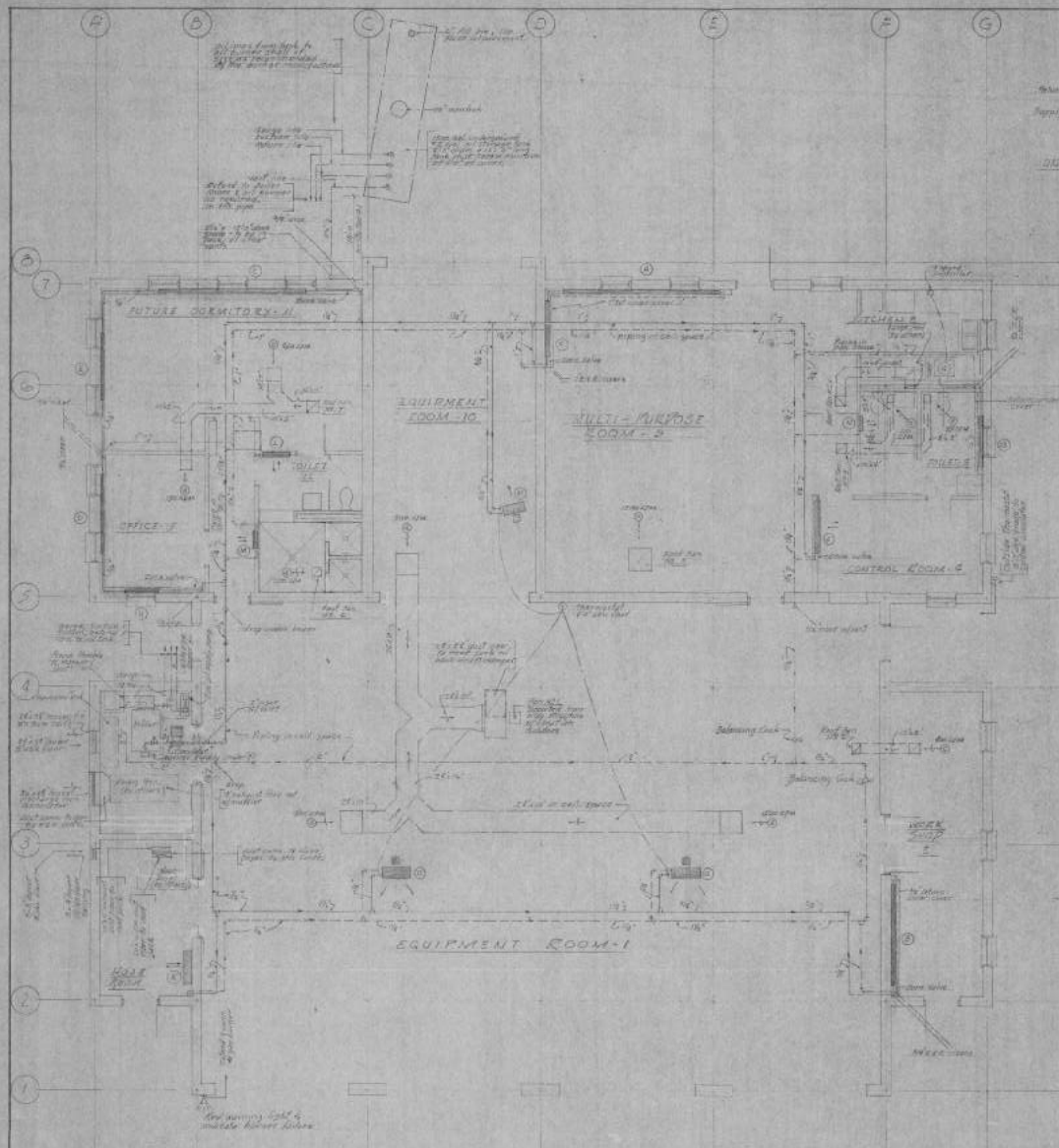
HARVARD FIRE STATION
HARVARD, MASSACHUSETTS



PERLEY ROBERT ASSOCIATES
ARCHITECTS & ENGINEERS
CONVEY, MASSACHUSETTS

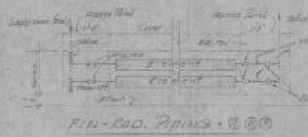
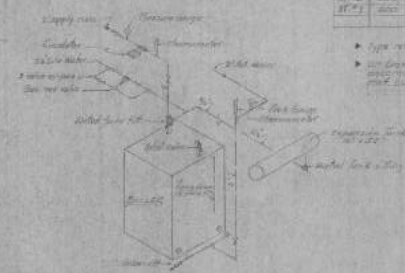
REVISIONS	CONTENTS	DATE
1. WALL SECTIONS & DETAILS		





NOTES:

- 1. All piping should be in accordance with the National Board of Fire Underwriters.
- 2. All piping should be in accordance with the National Board of Fire Underwriters.



NO.	QTY	DESCRIPTION	UNIT	PRICE	TOTAL
1	1	1/2" x 1/2" x 1/2" x 1/2" x 1/2" x 1/2"	1	1.00	1.00
2	1	1/2" x 1/2" x 1/2" x 1/2" x 1/2" x 1/2"	1	1.00	1.00
3	1	1/2" x 1/2" x 1/2" x 1/2" x 1/2" x 1/2"	1	1.00	1.00
4	1	1/2" x 1/2" x 1/2" x 1/2" x 1/2" x 1/2"	1	1.00	1.00
5	1	1/2" x 1/2" x 1/2" x 1/2" x 1/2" x 1/2"	1	1.00	1.00
6	1	1/2" x 1/2" x 1/2" x 1/2" x 1/2" x 1/2"	1	1.00	1.00
7	1	1/2" x 1/2" x 1/2" x 1/2" x 1/2" x 1/2"	1	1.00	1.00
8	1	1/2" x 1/2" x 1/2" x 1/2" x 1/2" x 1/2"	1	1.00	1.00
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10	1	1/2" x 1/2" x 1/2" x 1/2" x 1/2" x 1/2"	1	1.00	1.00

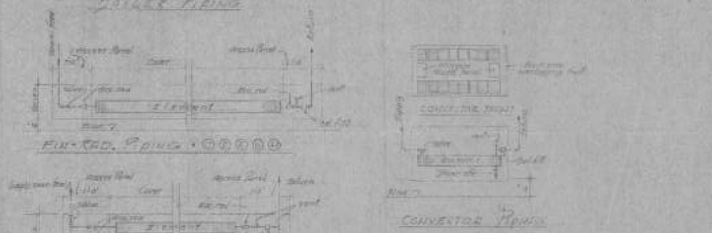
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9	1	1/2" x 1/2" x 1/2" x 1/2" x 1/2" x 1/2"	1	1.00	1.00
10	1	1/2" x 1/2" x 1/2" x 1/2" x 1/2" x 1/2"	1	1.00	1.00

See notes to this specification.



HEATING & VENTILATING

