

ABINGTON FIRE STATION FACILITY STUDY

Abington, Massachusetts

Existing Conditions Structural Report - Station No. 1

December 22, 2019 - DRAFT

INTRODUCTION

Foley Buhl Roberts & Associates, Inc. (FBRA) is collaborating with *Kaestle Boos Associates, Inc. (KBA)* in the review and evaluation of Fire Station No. 1 in Abington, MA. The purpose of this *Existing Conditions Structural Report* is to identify and describe the structural systems of the building and to comment on structural issues/conditions observed.

Fire Station No. 1 is located at 1040 Bedford Street in Abington, MA. Constructed in 1964, it is the older of the two fire stations in the Town, and serves as the headquarters for the department. The two-story building is rectangular in plan, with (high and low) flat roofs. Three (3), single-depth apparatus bays are located on the First Floor of the facility, accessed by overhead doors on the east (front) side. The main entrance to the building is located on the east side as well. A partition separates the apparatus bays from the administration area at the back of the station. Support spaces at the First Floor (rec room, utility/storage room, offices, etc.) are located along the north side of the building, below the (partial) Second Floor. This area is separated from the apparatus bays by a 12" thick concrete block (east-west) bearing wall. The Second Floor is served by single, wood framed stairway; bunk rooms and a bathroom are located at this level. Station No. 1 has no Basement. There have been no significant renovations or additions to the building since the original construction.



The building is not sprinklered. The Second Floor has no secondary means of egress (only a ladder located at a rear window) and is not handicapped accessible.

The age of the high and low roofs is unknown. Perimeter walls are concrete masonry unit (CMU) construction with a brick veneer. A masonry chimney is located on the north side of the building.

A communications antenna was originally mounted on the low roof over the apparatus bays; it was subsequently removed and replaced with a new, free standing, ground supported antenna at the back of the building.

Structural conditions at Station No. 1 were briefly reviewed at the site (exposed areas only) by FBRA on November 26, 2019. The low roof over the apparatus bays was exposed to view; however, Second Floor and high roof construction was mostly obscured by finishes.

Original construction documents were not available. No exploratory building demolition or structural materials testing was conducted in conjunction with this review. No subsurface soils information or geotechnical studies/reports were available. Accordingly, comments in this report are based on our visual observations only.

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I. STRUCTURAL SYSTEMS DESCRIPTION

Station No. 1 is a two-story building with high and low flat roofs. The high roof over the Second Floor appears to be wood framed, and is internally drained (two drains). There are no parapets. Low roof construction over the apparatus bays is steel framed, with a single internal drain. There are no parapets at this roof.

Second Floor construction appears to be wood framed. First Floor construction appears to be a concrete slab on grade.

Foundations are unknown, but are assumed to be conventional concrete spread footings.

Structural Materials: No original Structural Drawings were available; however, structural materials commonly used at the time of construction would be as follows:

Concrete:	3,000+/- psi compressive strength
Steel Reinforcing:	40,000+/- psi yield strength
Structural Steel:	36,000+/- psi yield strength
Wood:	1,000+/- psi allowable bending stress

Design Live Loads: No original Structural Drawings were available; accordingly, the roof and Second Floor design live loads are unknown. The construction of this building preceded the release of the Massachusetts State Building code (1st Edition promulgated in 1975); accordingly, while the building may have been designed for nominal wind loads, it was not designed for seismic loads. The building does not meet current code requirements.

Expansion Joints: There are no internal expansion joints in the building.

Roof Construction: High roof construction appears to be wood framed, with wood sheathing over wood joists, supported by perimeter masonry bearing walls and the continuation of the aforementioned interior masonry bearing wall, along the southern edge.

Low roof construction over the apparatus bays is steel framed, with a 1½" deep steel roof deck spanning 9+/- feet to W8 steel beams. Steel beams span approximately 18 feet in the east-west direction and are supported by 24" deep steel girders (three (3) girders equally spaced) which clear span the apparatus bays in the north-south direction. Steel beams and girders are supported by interior (12" CMU) and perimeter (8" CMU + 4" brick veneer) masonry bearing walls.

Second Floor Construction: Second Floor construction appears to be a wood subfloor on wood joists. Wood joists are supported by (unreinforced) masonry bearing walls at the building perimeter and by the aforementioned interior masonry bearing wall along the south side of this level.

First Floor Construction is assumed to be a soil-supported concrete slab on grade. The thickness of the slab and the reinforcing (if any) are unknown. There are no floor drains present.

Exterior Wall Construction is typically concrete block (CMU) and brick veneer construction (8" CMU and a 4" brick veneer). The walls serve as load bearing elements and provide lateral force resistance for wind (and seismic) loads. The presence of reinforcing in these walls could not be determined; however it is expected that they are unreinforced.

Interior Partitions at the First Floor are non-load bearing masonry construction (typically 6"). The interior CMU bearing wall which separates the apparatus bays from the support space along the north side of the building is 12" thick. Second Floor partitions are wood stud construction.

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Subsurface Soils/Foundations: No subsurface soils information was available. Foundations for masonry bearing walls are assumed to be conventional concrete frost wall and concrete spread footing construction.

Fire Resistance: The wood framed Second Floor and high roof construction has little or no fire resistance rating (the ceiling construction may provide a level of protection). The unprotected low roof steel framing over the apparatus bays has no fire resistance rating. As previously noted, the building is not sprinklered.

Lateral Load Resistance: Interior and perimeter masonry walls (likely unreinforced) provide lateral force resistance for wind (and seismic) loads; however, the construction details of these walls do not meet current Code requirements.

II. STRUCTURAL CONDITION/COMMENTS

Structural Conditions at Station No. 1 were reviewed at the site (exposed areas only) by FBRA on November 26, 2019. Generally speaking, floor and roof construction (where visible) appears to be in satisfactory condition; there is no evidence of structural distress that would indicate significantly overstressed, deteriorated or failed structural members.

Foundations appear to be performing adequately; there are no signs of significant, total or differential settlements.

Structural/structurally related conditions observed during our site visit are noted below:

1. Second Floor construction is performing adequately; however, it appears to be relatively light and flexible. Further review is recommended, in conjunction with a potential, future renovation. In the interim, we recommend that heavier loads (file cabinets, etc.) be dispersed throughout the space, to the extent practical.
2. Reportedly, Second Floor showers have leaked in the past. The condition of the (assumed) wood floor construction in this area should be reviewed to determine if any moisture-related damage has occurred over time.
3. Normal shrinkage cracking was observed in the slab on grade at the apparatus bays; these cracks do not present a structural concern.
4. There are no floor drains in the apparatus bays. Reportedly, when the floor is wet, water seeps into the administration space at the back of this area. Further review is recommended.
5. There is only one roof drain at the low roof, which can become blocked at times. Although there are no parapets that would allow water to pond significantly, the drain should be maintained and kept clear at all times.
6. The original design snow load is unknown. A snow drift condition exists where the low roofs of the apparatus wing abuts the higher, two-story wing. FBRA recommends that snow drift loading be evaluated in conjunction with a potential future renovation of the building.
7. Masonry piers between the overhead doors of the apparatus bays are 24 inches wide and are composed of 8" CMU block with a 4" brick veneer (12" total thickness). The southern pier was damaged by a fire truck in the past, and was rebuilt.

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8. The exterior brick veneer generally appears to be in satisfactory condition. Caulking at the control joints on the north and south sides of the building has failed and should be replaced. Limited repointing of mortar joints is required. Mortar joints at the top section of the chimney are appear to be in poor condition; repair/repointing is required.
9. Steel loose lintels, supporting the brick veneer over windows on the north side of the building, exhibit a moderate level of corrosion. There are no immediate structural concerns; however, all lintels should be cleaned and coated in conjunction with a potential future renovation of the building,
10. The steel railing for the concrete stair at the back of the building has corroded at the base and has spalled the corner of the concrete step. Repair/replacement is required.
11. Cracking/spalling of the cementitious parging on concrete foundation walls was observed in some locations. These conditions are not structural and can be repaired for cosmetic purposes.
12. Concrete masonry (CMU) bearing walls (interior and perimeter walls) generally appear to be in satisfactory condition. Vertical shrinkage cracks were observed at the bottom corner of some beam pockets along the southern wall of the building. These conditions do not represent an immediate structural concern; however, they should be addressed in conjunction with a potential future renovation of the building.
13. Building exterior walls appear to be relatively plumb.
14. The low (membrane) roof, observed from the Second Floor, appears to be in satisfactory condition. Further review of the high and low roofs is recommended, in conjunction with a potential future renovation of the building.

End of Existing Conditions Structural Report