

## **Appendix G**

### **Existing Site and Facilities Analysis**

Existing Conditions Evaluations:  
Department of Public Works Facility  
470 Dedham Ave

**A. General**

The first floor of the DPW building is approximately 23,000 sf and was built in 1960 and designed by Alonzo B. Reed, Inc. Engineers and Architects. In 1965 a second floor addition was added also designed by Alonzo B. Reed, Inc. of approximately 8,880 sf. The total building gross area is approximately 31,920 sf.

The first floor of the DPW building is divided into vehicle maintenance, vehicle storage, shops, and a small administration area. The second floor is the former public works administration, inspectors department, superintendent offices, and engineering department. Town offices and support areas have been moved to 500 Dedham Avenue. A site visit was conducted on Thursday May 5th, 2016 with representatives from the Department of Public Works staff to observe the current building conditions. The following observations are based on the site visit and subsequent review of the original construction documents. The purpose of this study was to evaluate current conditions and make general recommendations for the buildings reuse.



Primary Building Elevation  
470 Dedham Ave Needham, MA

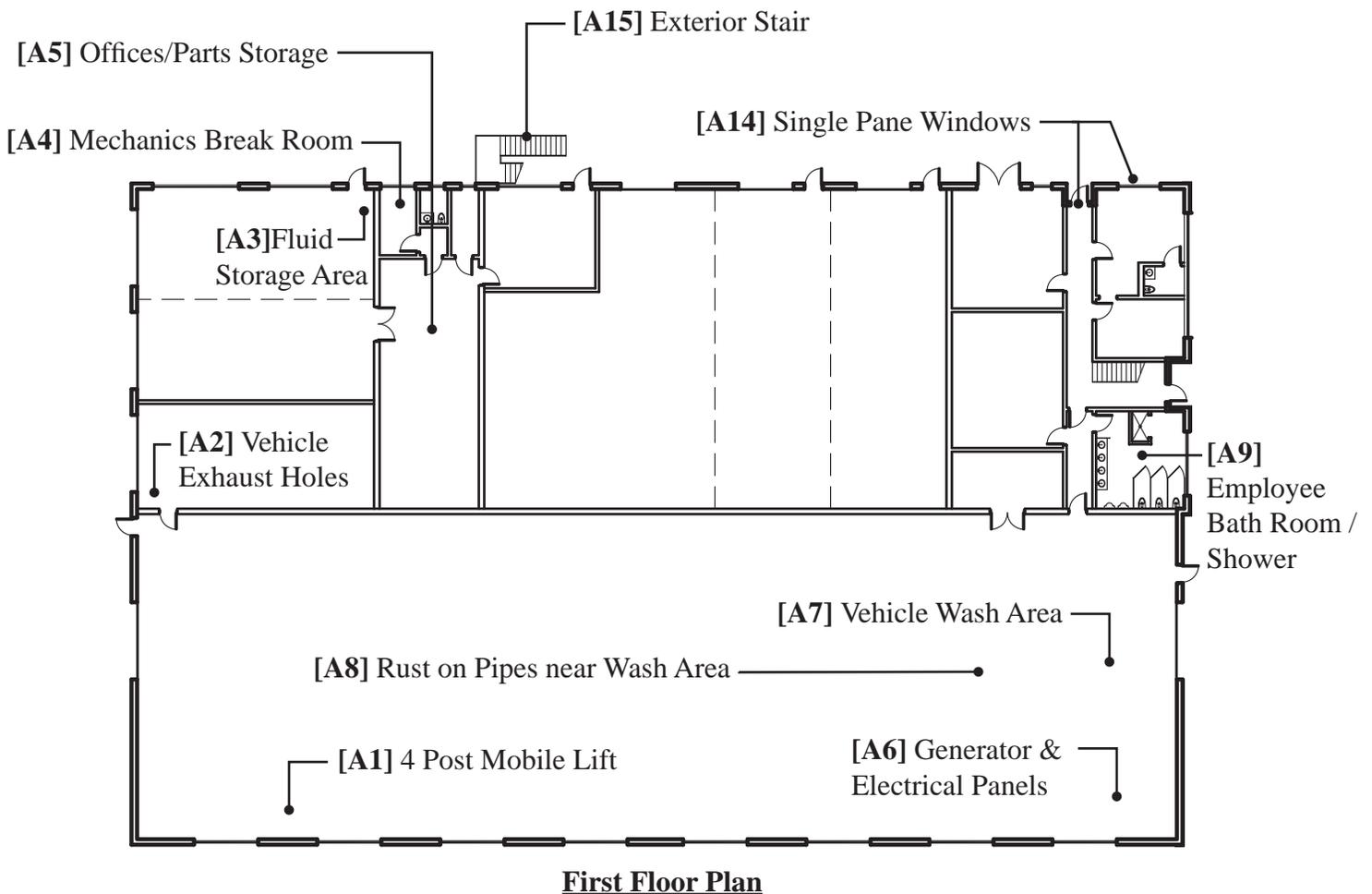
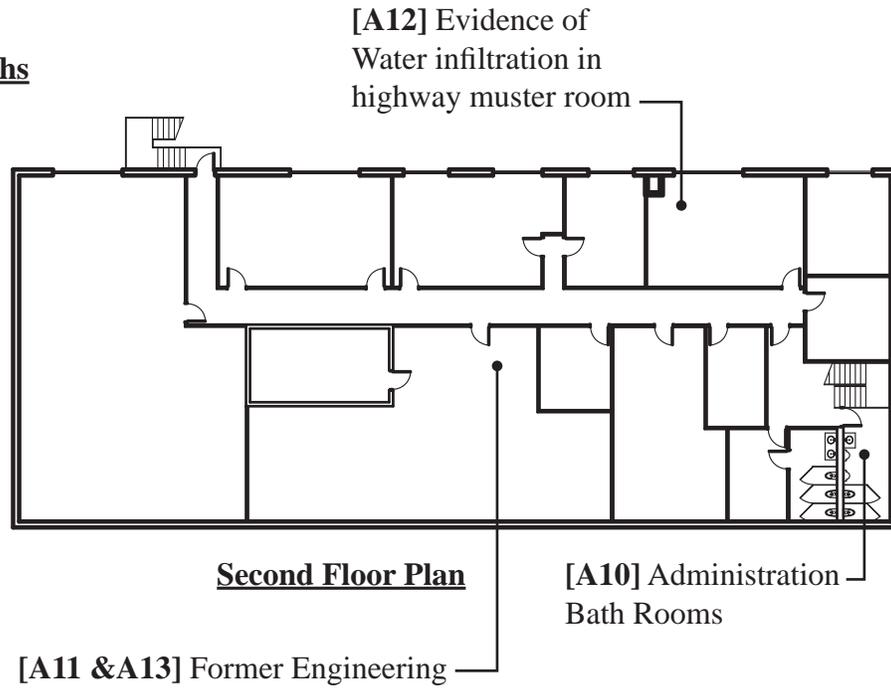


Shops / Maintenance  
Side Building Elevation  
470 Dedham Ave Needham, MA

**B. Aerial Image of Needham Public Works**



**C. Key Plans for Photographs**



**D. Observations**



**A1 & A2** - There are currently (2) vehicle maintenance bays, and (1) welding bay. The space is undersized for (5) mechanics based on industry standards that recommend 1.5 maintenance bays per mechanic. There is inadequate lifting height indoors for the Mohawk four post mobile lift currently stored in the vehicle storage area. There is an outdated direct vehicle exhaust system, which include holes located in the slab that vent through the roof.



**A3** - Fluids are not stored in a properly rated room with spill protection per CMR 527 9.0.



**A4** - The mechanics toilet and kitchen facilities are not code compliant by today's standards, and not sized adequately for (5) mechanics, a refrigerator, TV, and microwave that have been added to space. There is no counter space in the mechanics break room.



**A5** - The corridors and parts storage areas have been converted into office space and storage for reference manuals. The remaining parts storage area is inadequate resulting in parts being stored on the maintenance floor and in corridors causing "stacking" of tires and parts in an inefficient manner that is a trip hazard.



**A6** - The vehicle storage area has poor lighting and ventilation conditions and houses the buildings diesel stand-by generators', and back flow prevention. There is an additional closed storage shed and outdoor canopy for vehicle and equipment storage required for day to day operations. The O. H. doors on the closed storage shed are 8 feet wide and not sized appropriately for today's DPW vehicles and equipment. Vehicles and equipment are stored outdoors without protection from the elements resulting in reduced service life and functionality. The location of vehicle wash area is a safety hazard in close proximity to the generator and main electrical panels without any barrier.

**A7** - There is no wash bay or knockdown pad on site, an area near the exit door to vehicle storage has been converted for washing vehicles. The floor drains and catch basins in this area are not designed for handling the additional water runoff from vehicle washing and often overflow salt and chemicals into the nearby stream.

**A8** - The pipes and structural steel above the area used for washing vehicles show signs of significant rust. Some of the pipes appear to be covered in asbestos insulation, additional testing is necessary to confirm.



**A9 & A10** - Although the bathroom, shower and kitchen facilities likely met the requirements of the codes when they were constructed, they do not conform to current State Building Code, Plumbing Code, and ADA Guidelines.



**A11** -The second floor administration area is currently being used as the highway division muster room, bunk area for storm events, and as a file storage area for town documents. The floors in many rooms appear to be vinyl asbestos tile, additional testing is necessary to confirm. Asbestos tile would need to be properly disposed of if disturbed.



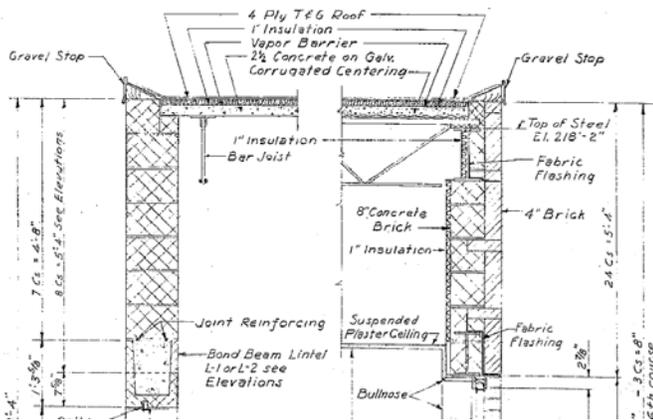
**A12 & A13** -There is evidence of water infiltration near the chimney in the Highway Division muster room. Window air conditioning units have been added to many rooms suggesting that the roof top units no longer work. After removing ceiling tiles in the former engineering department we found batt insulation on wood furring between the roof joists.



**A14** -The windows throughout the building are energy inefficient single pane windows with steel frames. Many of the window frames show significant signs of rust and deterioration. The hollow metal and aluminum entrance doors are loose fitting and without perimeter weather-stripping making them energy inefficient.



**A15** -The two stairways do not meet current State Building Code standards for design and are not enclosed in a properly rated means of egress system. There is no elevator in the building, consequently it does not conform to CMR 521.



**Roof** -The ballasted roof is past its useful life span, as evidenced by signs of water infiltration in multiple areas of the building. There is water pooling around the roof drains, and moss growing in some areas. The gutters and downspouts are clogged with leaves. The design drawings show minimal or no insulation at roof and exterior walls that would provide only minimal heat loss benefit by current energy code standards.





**Culvert** -A drainage culvert that runs along one side of the building is used to channel roof water run off. In addition to the roof gutters and downspouts there are two drainage pipes that empty into the culvert.

### **E. General Recommendations for Reuse:**

Based on field observations and review of the construction drawings, the DPW building looks to be thoughtfully designed for public works operations and management in the 1960's. The current building is between 51 and 56 years old and showing systemic problems to the existing building due to deterioration and changes in day to day DPW operations. The current building is in need of significant renovations to provide a safe work environment for DPW operations. The following is a list of corrective minimum recommendations:

- Replacement of roof, exterior windows, doors, and stairs. Renovating the exterior stair may include simple enclosure rather than replacement
- Addition of an elevator
- Added insulation to the exterior walls and roof to meet current energy standards.
- Reconfiguration of the interior space to meet the day to day operational needs.
- Mechanical systems, lighting, electrical, fire alarm, and sprinkler systems are outdated or broken. Based on our experience, it is likely that these systems will need to be replaced in their entirety.

## **E. Structural Evaluation of Existing Conditions:**

### Existing Conditions:

The original 23,000 square foot one-story building was constructed in 1960. Original structural drawings by Alonzo B. Reed Inc. were available for review. The 1960 structure had three areas: a high bay area for vehicle maintenance on the northwest portion of the building; a low roof area for general storage and shop bays, and an administration office along the north portion of the building; and an open area for vehicle storage for the entire length of the south portion of the building. There is a concrete drainage channel running the full length of the building along the south wall.

The roof structure at the north portion of the building over the general storage bays and administration areas consists of 2-1/2 inches of concrete on metal form deck. The deck is supported by 16S5 steel bar joists spaced at approximately 2 feet 6 inches spanning 21 feet to steel wide flange beam framing and steel columns. The framing and roof was designed to accept a future second floor addition. The maintenance bay roof consists of metal roof deck supported by steel wide flange beam framing and steel columns. The exterior walls for the northern portions of the building are non-loadbearing 12 inch concrete masonry. The floor slabs at the general storage bays and administration areas are 4-inch concrete reinforced with welded wire reinforcing. The slab at the vehicle maintenance is 6-inch concrete reinforced with welded wire reinforcing. The building foundations consist of reinforced concrete foundation walls and piers on reinforced concrete continuous and isolated shallow spread footings.

The vehicle storage area consists of metal roof deck supported by 32L13 long span steel joists spaced at 7 feet 10 inches and spanning 60 feet. The joists are supported on 12 inch concrete masonry walls. The slab at the vehicle storage area is 7-inch concrete reinforced with welded wire reinforcing. The building foundations consist of reinforced concrete foundation walls on reinforced concrete continuous shallow spread footings.

In 1965, an 8,880 square foot second floor addition was constructed over the north portion of the building for town administration offices. The existing concrete roof deck became the second floor. The second floor roof consists of metal roof deck supported by 14H3 steel bar joists spaced at approximately 4 feet 10 inches spanning 21 feet to steel wide flange sections and steel columns. Second floor steel columns are aligned with the original steel columns.

Overall, the building is in fair to good condition. The minor cracking and deterioration found at the existing concrete masonry is expected considering the age of the structure. Existing masonry walls have joint reinforcing every other course and horizontal bond beams. Per the existing drawings, there is no vertical reinforcing. Cracking is likely due to movement from temperature changes. The slabs-on-grade are in fair condition with cracking and minor spalling. There are no signs of settlement. Moderate surface rust was found on the 32L13 joists over the southeast area of vehicle storage that is used as a wash bay. There is some concrete spalling and surface erosion in the drainage channel on the south side of the building.

Summary and Recommendations:

The purpose of the evaluation was to determine the feasibility of reusing the existing structure for the new DPW facility. The assumed scope includes a complete interior renovation. Any additions would be structurally separate. Per the International Existing Building Code, the anticipated renovation is assumed to be a Level 3 Alteration. There is no anticipated Change in Use. A level three alteration requires that any new or modified structural elements must comply with the current building code. Existing elements may remain if they met the code requirements at the time of construction, and the loading is not increased. Please consider the following:

- The existing 12 inch concrete masonry walls do not have vertical reinforcing. The walls meet the empirical code requirements likely in effect at the time of construction; however, are overstressed when subjected to current wind loading perpendicular to the face of the wall. Reinforcing the walls by cutting in and grouting vertical bars, or adding steel wind posts and girts is recommended, especially around large window and door openings.
- The existing 32L13 steel joists over the vehicle storage area do not have capacity for the current flat roof and drifting snow load requirements. Removing the existing roof deck and adding two additional joists between each existing joist is recommended. A new metal roof deck would be installed over the vehicle maintenance area.
- We recommend reinforcing the metal roof deck and framing over the vehicle maintenance bay adjacent to the second floor addition to account for current snow drift loading requirements.
- We recommend cleaning and painting steel joists in the vehicle maintenance area.
- We recommend providing vertical structural steel X-bracing to supplement existing concrete masonry walls resisting lateral loading from seismic and wind.

General repairs including, but not limited to, structural crack and spall repairs at existing masonry walls, slab-on-grade repairs, and reinforcing existing roof openings at existing equipment is also recommended. More substantial structural alterations such as removing exterior and loadbearing walls, or adding heavy roof-top equipment may trigger more structural requirements.



**S1** - Channel with Deteriorated Concrete and Surface Erosion.



**S2** - Corroded Steel Joists at Wash Bay



**S3** - Minor Cracking at Exterior Wall



**S4 - Modified Door Opening**



**S5 - New Openings at Interior Wall**



**S6 - Unsupported Roof Opening at Vehicle Maintenance**