

When it's essential...it's Weston&Sampson.®  
westonandsampson.com

**Weston&Sampson**  
environmental/infrastructure consultants

Five Centennial Drive, Peabody, MA 01960-7985  
tel: 978-532-1900 fax: 978-977-0100

report

# Ashburnham Department of Public Works Facility

## PRELIMINARY ARCHITECTURAL FEASIBILITY REPORT

July, 2016  
Updated August 10, 2016

## **Table of Contents**

List of Appendices .....	2
List of Figures.....	3
Introduction .....	4
A. Need for the Facility .....	4
B. Existing Facilities.....	5
C. Proposed Facility.....	8
D. Building Sites .....	11
E. Cost Estimate.....	13
F. Annual Operating Budget.....	14
G. Maps, Drawings, and Sketches.....	14
H. Construction Problems.....	15
I. Conclusions and Recommendations.....	16

**List of Appendices**

Appendix A.....Existing Facility Deficiencies  
Appendix B..... Space Needs  
Appendix C ..... Design Criteria  
Appendix D .....Sensitive Receptors and Site Information  
Appendix E.....Geotechnical Letter Report  
Appendix F..... Cost Summary  
Appendix G ..... Annual Operating & Maintenance Budget  
Appendix H ..... Maps, Drawings, and Sketches

**List of Figures**

Figure 1 ..... Existing DPW Facility Aerial  
Figure 2 ..... Existing DPW Facility Lot Lines  
Figure 3 ..... FEMA Flood Map

## **Introduction**

The Town of Ashburnham retained the services of Weston & Sampson to prepare a feasibility study for a new facility to house the Department of Public Works (DPW). The object of the study was to develop a DPW building program and site features which are capable of cost effectively and efficiently supporting the services offered by the DPW to the community. The study included inspecting the existing facilities, identifying deficiencies, interviewing staff, identifying current and future needs, developing conceptual alternatives, evaluating the preferred conceptual alternative with the DPW Committee (Committee), and preparing budget cost estimates for the preferred alternative. The following Preliminary Architectural Feasibility Report (PAFR) has been prepared in accordance with the United States Department of Agriculture (USDA) Community Facilities Application Package RD Instruction 1942-A. This report supplements the Ashburnham Department of Public Works Facility Feasibility Study Report dated April 2016 which has been included under separate cover.

### **A. Need for the Facility**

The Town of Ashburnham has identified a need to replace the existing Department of Public Works (DPW) facility located at 17 Central Street. The original facility was built in 1960 and has exceeded its useful life. Furthermore, the existing structures do not meet today's building codes. The DPW operations have changed significantly since 1960 and the current facilities do not meet the operational demands of today's Department of Public Works. The undersized and non-code compliant facilities contribute to inefficient and unsafe working conditions for DPW employees. In addition, the facilities do not provide adequate protection of the Town's multi-million dollar fleet contributing to a reduction in vehicle /equipment life

expectancy and an increase in vehicle maintenance costs.

## **B. Existing Facilities**

The DPW is composed of Administration, Highway (including vehicle maintenance), and Water & Sewer. These divisions are responsible for the maintenance, repair, and construction of the town's infrastructure including the Town's roadways and water and sewer distribution systems. The existing operations are supported out of the existing facility located at 17 Central Street. The facility includes several small support buildings, salt/sand storage area, and miscellaneous storage containers.

The attached Figure 1 consists of an aerial view of the existing DPW site with the summary of the existing building/storage area sizes. The following is a summary of the existing structures currently used by the DPW:

**Building 1:** The building consists of a single story +/- 3,600 SF space which was constructed on or about 1960. The building supports the DPW administrative offices, employee support spaces, and vehicle/equipment storage. The building is constructed of uninsulated load bearing concrete masonry unit (CMU) walls with a single sloped pitched roof over the vehicle storage area and a flat roof over the office/employee facilities area. The building includes four (4) overhead doors which are used to access the vehicle/equipment storage area.

**Building 2:** The building consists of a two-bay single story +/- 1,800 SF pre-engineered metal building which was constructed on or about 1988. The Town received \$80,000 for the building that collapsed. The DPW initially received \$40,000 with the promise that \$40,000 would be

Town of Ashburnham  
Department of Public Works  
**PRELIMINARY ARCHITECTURAL  
FEASIBILITY REPORT**

provided one (1) year later. However, the DPW never received the remaining \$40,000. The building supports the vehicle maintenance operations. The building is constructed of cold rolled steel columns, steel wall girts, steel roof purlins, corrugated insulated metal wall panels with bagged insulation, and a metal roof system with bagged insulation. Due to the lack of space, the metal building is connected to two storage containers (Container Area 1) adjacent to Building 2 which serves as vehicle maintenance parts storage and workshop area.

- Building 3:** The building consists of a +/- 950 SF timber framed salt storage structure. The building is open on one end and enclosed on three (3) sides with uninsulated corrugated metal siding supplemented by a +/- 6' timber push wall. The roof consists of an uninsulated single sloped metal roof constructed over the timber framing.
- Building 4:** The building consists of a five-bay single story +/- 2,700 SF pre-engineered metal building which was constructed on or about 1998. The building supports vehicle/equipment storage and shop operations. The building is constructed of cold rolled steel columns, steel wall girts, steel roof purlins, and corrugated insulated metal wall panels with bagged insulation. The roof consists of a gable roof system with a metal roof and bagged insulation.
- Building 5:** The building consists of +/- 1,500 SF cast-in-place concrete storage shed. The roof consists of a timber framed roof system which is deteriorated resulting in the space being primarily open to the atmosphere. The overhead doors accessing the space are all

damaged and stuck in the open position or have been removed completely. Due to the failing nature of the structure, the space is primarily unused.

Weston & Sampson prepared an operational analysis based on inspections of the existing facilities. Based on this analysis, numerous functional inadequacies and space limitations associated with the existing building and site were identified as follows.

The facilities have undergone minimal upgrades to support the growing DPW operations. As a result, there are several operational inefficiencies which impact the level of service the DPW is able to provide to the community. The following is a summary of some of the deficiencies/inefficiencies associated with the existing facility:

- Facilities are undersized and unable to efficiently support current operations which results in a portion of the multi-million dollar fleet to be stored outdoors. This impacts DPW response times during cold and inclement weather conditions. In addition, this contributes to the rapid deterioration of high value Town owned equipment and increases vehicle maintenance costs.
- Undersized facilities lack adequate office space.
- Maintenance and storage areas are undersized requiring equipment to be stacked in the bays contributing to inefficient operations associated with moving equipment each day to perform daily activities. Furthermore, the vehicles are forced to park in very tight quarters resulting in unsafe circulation within the building and exposing the equipment to damage by parking in these cramped quarters.

- Inadequate working conditions including:
  - Poor ventilation
  - Inadequate lighting
  - Confined workshop areas
  - Inadequate training facilities for state mandated employee training
  - Inadequate employee facilities

These deficiencies directly impact operations and the efficiency of service that the DPW is able to provide to the Town. A photograph analysis of some of the deficiencies observed in the existing facility has been included in Appendix A of this report.

## **C. Proposed Facility**

The Project Team prepared a space needs assessment to identify the current and future needs of the Department of Public Work. The assessment included analyzing current deficiencies in the facility which need to be corrected with the construction of a new facility. The assessment also included interviewing key staff to learn first-hand the operational issues with the existing facility. The staff interviews were supplemented with support by the project team's knowledge of industry practices and familiarity with solutions which have been implemented on recently constructed public works facilities.

The staff interviews conducted by the project team focused on identifying all DPW functions, identifying current deficiencies, and identifying current and future space requirements. The information obtained during these interviews included detailed accounts of space deficiencies in the existing facilities which affect day-to-day operations. A summary of the departmental organization is as follows:

### DPW Staffing Summary

Position	Staff
Office/Administration	3
Foremen	2
Mechanic	1
Workforce	7
<b>Total Staff</b>	<b>13</b>

#### Space Needs / Room Part Plans

The data obtained from the operations analysis and interviews were compiled and analyzed by Weston & Sampson. The analysis consisted of individually identifying the space needs for the operations of each function by developing sketches of individual rooms. Sketches were prepared for each major space including office and office support areas, employee facilities, shop spaces, vehicle maintenance, wash area, and vehicle/equipment storage areas. These space requirements were then assembled into a comprehensive space allocation matrix. The space needs assessment identified an initial requirement of approximately 29,608 square feet. The results of the initial space needs were then reviewed in detail by the Project Team, DPW staff and the Committee to determine if the spaces could be reduced without negatively impacting operations. Based on valuable input from the DPW and the Committee, the team was able to reduce, and in some cases combine, spaces in an effort to control the size and cost of the building program. These reductions resulted in a modified space needs projection of 25,285 square feet. This reflected an overall reduction in the space needs of 4,323 square feet, or approximately 15%. Refer to Appendix B for a summary of the staff interview notes, space needs matrix, and DPW vehicle/equipment inventory.

Town of Ashburnham  
Department of Public Works  
**PRELIMINARY ARCHITECTURAL  
FEASIBILITY REPORT**

The proposed facility can be generally described as a new consolidated pre-engineered metal building constructed on standard shallow foundations and slab-on-grade. The building envelope will consist of factory foam insulated wall panels with a 4" masonry veneer base and a standing seam metal roof. The interior functions will be separated by full height walls consisting of CMU and metal stud / gypsum wall board systems. The ancillary support functions include a "lean-to" open canopy storage structure to provide covered storage of equipment, a tension membrane (fabric) salt storage structure, and pre-cast concrete block material storage bins. The building and ancillary structures will be access via a new paved (hot mix asphalt) parking and yard area. The stormwater from the site will be collected in a closed drainage system consisting of deep sump hooded catchbasins, underground infiltration system, and surface detention systems. The stormwater system will be designed to meet the DEP stormwater quality standards.

The project includes an ancillary tension membrane (fabric) salt storage structure. The proposed structure is a typical structure type for covered storage of salt product in the public works industry and is provided with a 20 year membrane warranty. The life expectancy of the structure is 50+ years with proper maintenance including membrane replacement following full term use of the product. The structure is supported on precast concrete bin walls which elevate the structure to prevent damage from impact of vehicles or salt product. The interior of the push walls are covered with a plywood barrier wall to allow the proper management and containment of the salt product.

The associated design criteria for the new DPW facility have been included as Appendix C of this report. The criteria has been developed in the form of a Design Narrative which identify anticipated building type and systems which are standard for

a facility of this type.

## **D. Building Sites**

### Amount of Land Required

The estimated total land area required to meet the operational needs of a 25,285 SF facility including the ancillary support structures, material storage bins, parking, vehicle circulation, and stormwater management systems is 4 acres.

### Location - Alternate Locations

The only alternate site currently available to the Town for the construction of a new DPW facility is the existing site located at 17 Central Street. Although this site meets the minimum acreage identified above, the lot configuration is not suitable for the construction of a safe and efficient consolidated DPW facility due to uneven lot lines which restrict the ability to construct a single consolidated facility which negatively impacts circulation, abutters, operations management, and construction costs. Furthermore, a portion of the north-east corner of the site has a +/- 10' grade separation making it difficult to achieve a level yard area for DPW operations. A copy of the existing site lot lines and contours (10' intervals) is included in the attached Figure 2.

### Site Plan

Based on the results of the final space needs assessment, the Project Team prepared a conceptual alternative for the development of the DPW facility at a Town owned parcel located at the corner of Williams Road / Platts Road (3 Platts Road).

Prior to developing an alternative for the site, Weston & Sampson prepared sensitive receptor maps to confirm that the site was suitable for use as a DPW facility. The sensitive receptor maps identified a stream and wetlands in the area of the site.

However, the upland portion proposed for the DPW facility would not directly impact either of these elements. The facility would be within the wetland buffer zone as well as a small portion of the 200' river front area and will require permitting through the local Conservation Commission. A copy of the receptor maps is included in Appendix D.

In addition, Weston & Sampson evaluated the location of the flood plain in relation to the proposed development area for the DPW facility. The proposed development area is located on an upper plateau which is approximately 10' higher than the adjacent stream. A review of the FEMA Flood Maps indicates that the proposed site development area is outside of the Zone A 100-year flood zone. A copy of the FEMA map with the proposed development area shown on the map is included in Figure 3.

#### Site Suitability

Weston & Sampson conducted a preliminary geotechnical subsurface investigation to confirm the suitability of the site to support a new Public Works Facility. In summary, the Geotechnical Report concluded that based on the subsurface conditions encountered in our explorations, structures can be supported on conventional shallow spread foundations bearing in undisturbed, medium dense (or denser) native sand. Some undocumented fill was identified in the explorations. This undocumented fill should be removed from within the zone-of-influence beneath proposed foundations, slabs, and other site improvements that could be damaged by differential settlement. The existing fill may provide adequate support of flexible site improvements such as flexible asphalt pavements provided subgrades are adequately prepared and evaluated during construction. A copy of the Geotechnical Letter Report is included in Appendix E.

Based on the relatively flat topography in the proposed development area, the results of the preliminary geotechnical evaluation, confirmation that the site does not directly impact wetlands, and confirmation that the proposed development area is not located within the 100-year flood plain, it appears that the site is suitable for construction of a new DPW facility.

## **E. Cost Estimate**

A conceptual cost estimate was prepared for the preferred alternative, using square foot costs based on historical data for similar DPW facilities as well as a detailed site development estimate. In general, the cost estimate assumes cost effective building systems, finishes, and equipment as identified in the estimate spreadsheet and as described as follows:

- Construction of a new pre-engineered metal building with partial masonry wall finish and concrete protection wall for the vehicle storage area, maintenance area, wash bay, and shop areas
- Factory foam insulated architectural metal panel with improved exterior finish system.
- Primary industrial support equipment for vehicle maintenance operations
- Site improvements, including storm water management and paving upgrades
- Contingency allowance for unanticipated design and construction costs, pending final design.

Our estimated costs for new building construction and site improvements are based on costs of similar construction for which bid prices are available, supplemented by cost data obtained from published sources. It is assumed that the project will be publicly bid under Chapter 149 requirements, and prices are based on 2016 costs. Our cost projection does account for one (1) year of cost escalation. Additional

escalation factors should be included once the project time line has been established by the Town. A copy of the backup associated with this estimate is included in Appendix F.

The estimate includes site work to be performed by Town forces. In accordance with RD Instruction 1942-A, 1942.18 (h), the specific site work that will be performed by Town forces is work which the Department of Public Works possesses the necessary skills, abilities, and resources to perform. This site work is similar in nature to the type of work that the DPW performs throughout the Town in repairing, maintaining, and upgrading the infrastructure of the community.

## **F. Annual Operating Budget**

An anticipated average annual operating budget has been developed for the Ashburnham DPW based on yearly operating costs for similarly design, constructed, and operated facilities. A copy of the estimated annual operating costs is included in Appendix G of this report. In addition, estimated maintenance costs are also provided based on assumed maintenance operations for the facility. The estimated annual maintenance costs are also included in Appendix G of this report.

## **G. Maps, Drawings, and Sketches**

The alternative for a new DPW Facility was prepared with the following operational considerations in mind:

- Arrange interior space to provide efficient circulation patterns
- Attempt to segregate small/public vehicle traffic from heavy truck traffic
- Providing adequate parking for public and employees
- Provide full access and safe vehicle movement around the perimeter of the

facility

- Provide bulk material storage area with adequate yard area for large vehicle maneuvering
- Maintain safe and functional access to/from the salt/sand operations area

The conceptual alternative was prepared by developing “Block Building Plans”. These Block Building Plans were developed for each of the major space categories for the new facility as follows:

- Administration & Employee Facilities
- Shops
- Vehicle Maintenance
- Vehicle / Equipment Storage
- Open Canopy Storage
- Wash Bay

The configuration and size of the planning “block” for each building was developed by assembling the individual room sketches identified during the space needs assessment. The Project Team reviewed the alternative with the Committee to confirm that the concept meets the operational needs of the DPW. Copies of the site location map, property boundaries, property ownership, existing site grades, proposed conceptual floor plan, proposed site plan, and a proposed building rendering have been included in Appendix H.

## H. Construction Problems

The main area of concern which could impact construction or the cost of construction is unforeseen subsurface conditions. Unforeseen subsurface obstructions and/or variable

subsurface conditions could impact the foundation design as well as the construction schedule. In order to mitigate the potential for unforeseen subsurface conditions, a comprehensive subsurface investigation will be completed prior to finalizing the design of the new Public Works Facility. This investigation will include advancing additional geotechnical borings as well as installing test pits within the footprint of the proposed buildings and any major site features (e.g. detention basins, etc.). This investigation will allow the designer the opportunity to better define the subsurface conditions for a contractor prior to bidding the project. It should be noted that a preliminary subsurface investigation was undertaken at the direction of the Town to determine the general subsurface conditions for the purpose of the initial planning and the cost estimate effort (see Appendix E).

## **I. Conclusions and Recommendations**

Based on the data contained in the Preliminary Architectural Feasibility Study report, it has been concluded that the existing facility does not meet the current needs of the DPW and is in need of replacement. In addition, it has been determined that the current site, located at 17 Central Street, is not suitably configured to support the current and future needs of the DPW. As a result, it is recommended that the Town build a new DPW facility at the Town owned site located at 3 Platts Road. Based on the data in this report, the proposed site is suitably sized to support the proposed DPW facility and will not have a direct impact on the adjacent wetlands and 100-year flood plain.

Possible alternatives to the proposal listed above would be for the Town to solicit private land owners to identify a minimum 4 acre parcel within the Town with suitable site geometry to support a new Public Works Facility. It is likely that this approach would add significant costs to the project associated with the procurement of a new parcel which would likely render the project impracticable from a cost perspective.

## **Appendix A**

### **Existing Facility Deficiencies**

Town of Ashburnham  
New Department of Public Works Facility

# Summary of Existing Facility Deficiencies

# Town of Ashburnham New Department of Public Works Facility

Why does the Town need a new facility?

- The existing facility was built in 1960
- DPW responsibilities have increased significantly over the years along with the number of vehicles and pieces of equipment, but the facilities have not kept pace



Existing DPW Facility

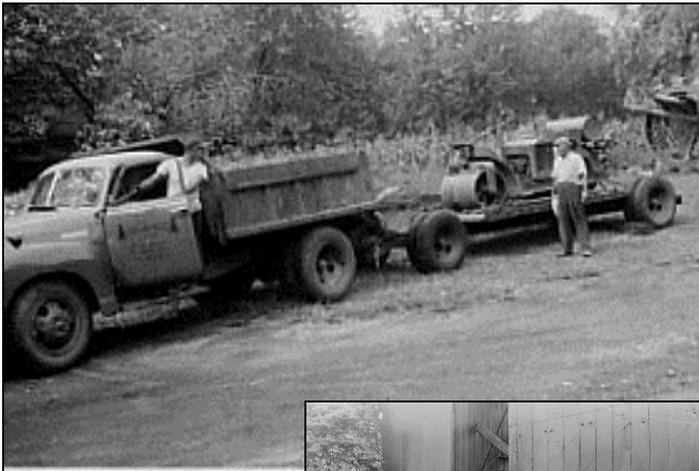


Existing DPW Facility

# Town of Ashburnham New Department of Public Works Facility

Why does the Town need a new facility?

- Vehicle and equipment types and sizes have changed significantly since the facility was constructed



Smaller 1950's era vehicles



Today's larger multipurpose DPW vehicles

Town of Ashburnham  
New Department of Public Works Facility

Why does the Town need a new facility.....



Maintenance bays are undersized to safely and efficiently maintain DPW equipment

Town of Ashburnham  
New Department of Public Works Facility

Why does the Town need a new facility.....



Maintenance bays are undersized to safely and efficiently maintain DPW equipment

# Town of Ashburnham New Department of Public Works Facility

Why does the Town need a new facility.....



Maintenance bays are undersized to safely and efficiently maintain DPW equipment

# Town of Ashburnham New Department of Public Works Facility

Why does the Town need a new facility.....



Material storage facilities are undersized and dilapidated resulting in inefficient and unsafe storage of materials

# Town of Ashburnham New Department of Public Works Facility

Why does the Town need a new facility.....



Employee Support Facilities are Undersized and  
Inefficient for Today's Operations

Town of Ashburnham  
New Department of Public Works Facility

Why does the Town need a new facility.....



Interior vehicle/equipment storage is inefficient due to limited storage space

Town of Ashburnham  
New Department of Public Works Facility

Why does the Town need a new facility.....



Interior vehicle/equipment storage is inefficient due to limited storage space

# Town of Ashburnham New Department of Public Works Facility

Why does the Town need a new facility.....



Interior vehicle/equipment storage is inefficient due to limited storage space

# Town of Ashburnham New Department of Public Works Facility

Why does the Town need a new facility.....



Portions of the multi-million dollar fleet are stored outdoors due to limited space

# Town of Ashburnham New Department of Public Works Facility

## Summary of Deficiencies |

- Existing buildings do not comply with today's Building Code
- Toilet facilities do not meet current Plumbing Code
  - Number of fixtures
  - Male/female toilet facilities
- Building does not meet current Mechanical Code
  - Building envelope insulation
  - Ventilation
  - Maintenance air exchanges
- Inadequate vehicle washing facilities
- Operational inefficiencies
  - Inadequate storage areas
  - Inadequate employee facilities
  - Undersized material storage areas
  - Undersized maintenance work



**Appendix B**  
**Space Needs**

## M E M O R A N D U M

**TO:** Ashburnham Abbreviated DPW Study File  
**FROM:** Joseph Fitzpatrick  
**DATE:** 03 April 2013  
**SUBJECT:** Staff Interviews - Meeting Minutes

**Meeting Attendees:** Don Gallucci, Jeff Alberti, Joseph Fitzpatrick, Steve (DPW), Doug (Town Administrator)

### **General Discussion:**

- The area being considered for a new DPW facility is approximately 40 acres of land with a creek running through it. The creek separates a 5 – 7 acres piece of land from the remainder of the site.
- This area is located on the corner of Williams Road and Platts Road. The creek could be used to separate the garage from the bulk material storage area, with the bulk materials going on the back end of the site.
- The site should be large enough to support a new facility outside of any critical areas. Conservation will be involved in the permitting process for this site.

### **Divisions:**

- The divisions to be housed in a new facility would include Highway and Water & Sewer. They should be separated where possible.
- The staff includes the DPW Superintendent, 2 admin assistants (one part-time), 1 water foreman, 1 highway foreman, 3 water workers, and 5 highway workers (including one mechanic).
- They have approximately 22 pieces of equipment.
- Vehicle maintenance does not need permanent, in-ground lifts. Portable lifts should be sufficient.
- There was an original design done prior to this meeting by another firm. It is a conceptual layout that should be reviewed but not necessarily used in our programming study.
- We discussed a facility of about 29,000 SF at a total project cost of \$8.3 M. The Public Safety Building was \$6.5 M in 2007.
- A salt shed needs to be included on the new site but fueling does not.

Town of Ashburnham, Massachusetts  
 Department of Public Works  
**Space Needs Summary**  
 Date: April 2016

**Building Requirements**

Area	Description	2013 Size (SF)	2016 Size (SF)	Ref #	Sheet No.	Room / Area Dimensions		
						length	width	size
Office & Office Support Areas	Vestibule/Waiting/Reception	160		A7.04	1	10	16	160
	Administration Area (2 Admin Staff)	160		A8.06	1	10	16	160
	Superintendent of Public Works	180		A1.05	2	12	15	180
	Copy/File/Mail Area	225		A9.02	2	15	15	225
	Active File Storage	120		C7.03	3	10	12	120
	Archive File Storage	120		C7.03	3	10	12	120
	Safe Closet	16		New	3	4	4	16
	Conference Room	192		A10.04	3	12	16	192
	Administration Lunch Room	120		B2.09	4	10	12	120
	Supply Closet	100		A11.01	4	10	10	100
	Telephone / Data Room	80		-	4	8	10	80
	General Closet	40		A11.01	4	4	10	40
	Janitor Closet	36		A11.01	4	6	6	36
	Admin Toilet Facilities	96		B3.03	4	6	16	96
	Subtotal:	1,645						
	Area Grossing Factor (15%):	247						
	Circulation (20%):	378						
<b>TOTAL:</b>	<b>2,270</b>	<b>2,025</b>						
Employee Facilities	Male Locker/Shower/Toilet	234		B1.11	5	9	26	234
	Female Locker/Shower/Toilet	150		B1.13	5	10	15	150
	Workforce Lunch Room	440		B2.07	6	20	22	440
	Shared Foreman Office	192		A2.03	6	12	16	192
	Main Electric Room	150		B5.01	7	10	15	150
	Plumbing/Fire Protection Room	160		B5.02	7	10	16	160
	Subtotal:	1,326						
	Area Grossing Factor (15%):	199						
Circulation (20%):	305							
<b>TOTAL:</b>	<b>1,830</b>	<b>1,800</b>						
Work Shops & Material Storage	Highway Material Storage	380		C9.05	8	19	20	380
	Water Meter Testing/Repair/Storage Workshop	320		C9.14	8	16	20	320
	Shared General Workshop	1,035		-	9	23	45	1,035
	Subtotal:	1,735						
	Area Grossing Factor (10%):	174						
	Circulation (10%):	191						
<b>TOTAL:</b>	<b>2,099</b>	<b>1,980</b>						

Town of Ashburnham, Massachusetts  
 Department of Public Works  
**Space Needs Summary**  
 Date: April 2016

**Building Requirements**

Area	Description	2013 Size (SF)	2016 Size (SF)	Ref #	Sheet No.	Room / Area Dimensions		
						length	width	size
Vehicle Maintenance	Fluid Storage Room	192		D5.09	10	12	16	192
	Maintenance Bay	1,265		-	11	23	55	1,265
	Maintenance Bay	1,100		-	11	20	55	1,100
	Hydraulic Hose Workshop	180		C3.21	12	15	12	180
	Mechanics Office / Reference Room	120		C8.02	12	10	12	120
	Maintenance Workshop	144		C3.24	13	8	18	144
	Large Tool Storage Area	180		-	13	12	15	180
	Tire Storage	144		C9.07	14	12	12	144
	Parts Storage Room	280		C5.11	14	14	20	280
	Subtotal:	3,605						
	Area Grossing Factor (10%):	361						
	Circulation (10%):	397						
	<b>TOTAL:</b>	<b>4,362</b>	<b>4,125</b>					
Wash Area	Wash Bay / Combo Storage Bay	1,375		D 4.03	15	25	55	1,375
	Wash Equipment Room	360		D 4.03	15	18	20	360
	Subtotal:	1,735						
	Area Grossing Factor (5%):	87						
	Circulation:	n/a						
	<b>TOTAL:</b>	<b>1,822</b>	<b>1,495</b>					
Vehicle and Equipment Storage	Vehicle and Equipment Storage	13,015				95	137	13,015
	Subtotal:	13,015						
	Area Grossing Factor (5%):	651						
	Circulation:	n/a						
	<b>TOTAL:</b>	<b>13,666</b>	<b>10,560</b>					
Canopy	Unheated Canopy (3-sided)	-	3,300					
	<b>TOTAL:</b>	<b>-</b>	<b>3,300</b>					
<b>TOTAL:</b>		<b>26,050</b>	<b>25,285</b>					

<b>Staffing</b>	Current	Future
Highway Workforce	5	-
Highway Administration	1	-
Water & Sewer Workforce	3	-
Water & Sewer Administration	1	-
DPW Administration	3	-
<b>Total:</b>	<b>13</b>	<b>-</b>

# Equipment Listing Report

## Highway / Light Department

### > Heavy Equipment (1)

(Location Total: 1)

Equipment	Year, Make, Model	Odometer	Vehicle #	VIN #	Type	Color	Driver
98 - 2005 John Deere BRUCH CUTTER	2005 John Deere BRUSH CU	0	98	L06420H440437	Brush Cutter	Green	

## Highway Department

### > Heavy Equipment (7)

(Location Total: 17)

Equipment	Year, Make, Model	Odometer	Vehicle #	VIN #	Type	Color	Driver
100 - 2012 VOLVO LOADER	2012 VOLVO LOADER	2,531	100	VCEOL70FC00026588	Loader	Yellow	
101 - 1996 John Deere GRADER	1996 John Deere GRADER	0	101	DW672BX558980	Grader	Yellow	
103 - 2006 John Deere BACKHOE	2006 John Deere BACKHOE	0	103	T0410GX959497	BACKHOE	Yellow	
104 - 2014 John Deere BACKHOE	2014 John Deere BACKHOE	254.6	104	1T0410KXCCEE265398	BACKHOE	Yellow	
2003 VOLVO LOADER	2003 VOLVO LOADER	0	99	V60041	Loader	Yellow	
76 - 1993 TRACKLESS SNOW PLOW	1993 TRACKLESS SNOW PL	0	76	MT5577	Trackless	Yellow	
95 - 2007 Bobcat Skid Steer	2007 Bobcat Skid Steer	510	95	530319727	Loader	Yellow	

### > Trailers (1)

Equipment	Year, Make, Model	Odometer	Vehicle #	VIN #	Type	Color	Driver
93 - 2005 Stow Mixer	2005 Stow CONCRETE MIXE	0	93	SBA751024	Trailer	Yellow	

### > Trucks (9)

Equipment	Year, Make, Model	Odometer	Vehicle #	VIN #	Type	Color	Driver
1995 International DUMP TRUCK	1995 International DUMP TRU	58,096	96	1HTSDAAR0SH688928	Truck	Green	
1996 Elgin Pelican Sweeper	1996 Elgin Pelican Sweeper	0	94	S8361D	Pelican Sweep	Yellow	
80 - 2008 Chevy Silverado 3/4 4X4	2008 Chevy Silverado 3/4 4X4	74,574	80	1GCEK14X18Z122208	Truck	Green	
81 - 2011 Ford F-550	2011 Ford F-550	0	81	1FDUF5HT6BEA76318	Truck	Green	
86 - 2011 Ford F-550	2011 Ford F-550	0	86	1FDUF5HT0BEA79957	Truck	Green	
90 - 2008 International DUMP TRUCK	2008 International DUMP TRU	26,008	90	1HTWDAAR78J661857	Truck	Green	
91 - 2006 International 700	2006 International 700	0	91	1HTWDAARX6J295308	Truck	Green	
92 - 2012 International DUMP TRUCK	2012 International DUMP TRU	17,759	92	1HTWDAAR5CJ659551	Truck	Green	
97 - 2015 Mack GU432 Dump Truck	2015 Mack GU432 Dump Truc	650	97	1M2AX34CXFM010201	Truck	Green	

**Municipal Grounds**

(Location Total: 5)

> Tractors & Mowers (1)

Equipment	Year, Make, Model	Odometer	Vehicle #	VIN #	Type	Color	Driver
108 - 2003 Big Tex UTILITY TRAILER	2003 Big Tex UTILITY TRAILER	0	108	4K8AX101431A03090	Trailer	Black	

> Trailers (2)

Equipment	Year, Make, Model	Odometer	Vehicle #	VIN #	Type	Color	Driver
107 - 2006 PACE UTILITY TRAILER	2006 PACE UTILITY TRAILER	0	107	40LUB12126P130461	Trailer	Black	
109 - 1999 UTILITY TRAILER	1999 GAC UTILITY TRAILER	0	109	1G91A1823XS203031	Trailer	Black	

> Trucks (2)

Equipment	Year, Make, Model	Odometer	Vehicle #	VIN #	Type	Color	Driver
2006 Ford F-550	2006 Ford F-550	0	82	1FDAF57P86EB81651	Truck	Green	
2012 Ford F-550	2012 Ford F-550	13,645	85	1FDUF5HT2CEC32257	Truck	Green	

**Water/Sewer Department**

(Location Total: 5)

> Trailers (1)

Equipment	Year, Make, Model	Odometer	Vehicle #	VIN #	Type	Color	Driver
110 - 1997 Aquatech Trailer	1997 Aquatech Trailer	0	110	97201019	Trailer	Blue	

> Trucks (3)

Equipment	Year, Make, Model	Odometer	Vehicle #	VIN #	Type	Color	Driver
2007 Ford F-350	2007 Ford F-350	71,000	83	1FTWF31567EA47003	Truck	Green	
78 - 2012 Ford UTILITY TRUCK	2012 Ford F550 UTILITY TRU	0	78	1FDUF5HT7CEA44088	Truck	Green	CAROLIS, ROBERT
79 - 2013 Ford F-150 Pick-Up	2013 Ford F-150 Pick-Up	0	79	1FTEX1EM9DKF27323	Truck	Green	

> Vans (1)

Equipment	Year, Make, Model	Odometer	Vehicle #	VIN #	Type	Color	Driver
77 - 1987 GMC 3500 STEP VAN	1987 GMC 3500 STEP VAN	0	77	1GDHP32M2H3502529	Van	Red	

**Total equipment listed = 28**

**Appendix C**  
**Design Criteria**

**Town of Ashburnham  
New Public Works Facility  
Design Narrative**

The following is a summary of the key building elements required to support a new Public Works Facility for the Ashburnham Department of Public Works.

**Space Needs Requirements**

Based on the feasibility study for the new Public Works Facility, the following is a summary of the minimum requirements needed to meet the current and future needs of the department:

Office/Office Support Areas:	2,025 SF
Employee Facilities:	1,800 SF
Trade Shops:	1,980 SF
Vehicle Maintenance:	4,125 SF
Vehicle and Equipment Storage:	10,560 SF
Unheated Open Canopy:	3,300 SF
Vehicle Wash:	<u>1,495 SF</u>
Total:	25,285 SF

**Office / Office Support / Employee Facility Areas**

- Space shall support typical office operation and employee support spaces and shall include private offices, open work areas, locker/shower/toilet facilities, file storage areas, closets, break room and a separate public reception area. Public reception area shall be secured from the remainder of the space and shall include a public reception counter area with a sliding or fixed transaction window.
- Spaces shall include communication support infrastructure including back boxes and raceways (conduit) throughout the space to facilitate installation of voice/data wiring. Locations and quantities shall be as determined by the Town. Raceway shall extend from the back boxes through the wall cavity up to the ceiling space above. The raceway shall be turned toward the center of the room and shall be terminated with an insulating bushing. All wiring will be run in cable trays or J-hooks from a dedicated telephone / data room to each drop. Provisions for a wireless system shall be incorporated into the building accordingly.
- In general, lighting in business areas of the facility shall consist of cable mounted direct/indirect fluorescent lighting fixtures containing two T8 lamps and electronic ballasts. Fixtures shall be placed parallel to the exterior wall. The row of fixtures closest

to the window shall be provided with ambient light sensors and dimming ballasts allowing that row of fixtures to dim or brighten based upon the amount of day light entering the space. Occupancy sensors shall control the on-off function of the lights. Switching shall be provided to override the 'on' function of the fixtures allowing manual off setting of the lights and to allow for multiple light levels or in the event of a desire to have the fixtures off. Spaces shall be provided with fixtures wired to the emergency distribution system to provide emergency illumination in the event of power failure. Quantity of fixtures wired to emergency distribution system shall maintain 1 foot-candle (FC) average during emergency operation. Corridors shall be provided with wall mounted linear indirect fixtures. Required fixtures to provide emergency illumination shall be connected to the emergency distribution system. The corridor fixtures shall be controlled by area occupancy sensors with override control via the Building Management System (BMS). Toilet rooms shall be provided with 2'x4' recessed fluorescent troffers. At least one fixture in toilet rooms shall be wired to the emergency distribution system. Toilet room lights shall be controlled by area occupancy sensors.

- Typical office type finishes shall be provided. Walls shall consist of metal stud and painted gypsum wall board systems.
- Ceilings shall consist of acoustical ceiling tile.
- Floor finishes shall consist of carpet, resilient flooring, and ceramic tile. Carpet shall be provided in general office areas. Resilient flooring shall be provided in high traffic areas and utility spaces (such as lunch/break rooms) as identified by the Town. Locker, shower, toilet facilities shall include ceramic tile floors and ceramic tile walls to 6'-0" above finish floor.
- Heating ventilation and cooling shall be provided for the Office, Office Support Areas, Workforce Support Space and Employee Facilities by packaged roof top HVAC units equipped with gas-fired furnace sections and direct expansion (DX) refrigeration sections. Air distribution systems shall consist of sheet metal ductwork distribution, fabricated and installed in accordance with SMACNA and ASHRAE standards. Space zoning shall be accomplished by variable air volume (VAV) boxes with downstream ductwork terminating at ceiling diffusers and return registers. Mechanical ventilation air for all spaces shall be provided and exhaust shall be provided for storage rooms, toilet spaces and shower/locker rooms. Ventilation air shall be provided in accordance with the requirements of the International Mechanical and Massachusetts State Building Codes. Ductwork systems in high humidity areas, such as shower rooms shall be aluminum. Mechanical exhaust shall be provided by roof-mounted centrifugal-type exhaust fans. Cooling shall be provided for the telephone/data room by a ductless-split DX system.
- Office / employee facilities area shall be fully sprinklered in accordance with NFPA 13 and shall be a wet system.

## **Trade Shops**

- Shop areas shall be accessible via overhead sectional doors (minimum 12' x 12' doors) and personnel doors. Doors shall be electrically operated doors and shall include the following components:

- Operation-Cycle Requirements: Operator capable of operating for not less than 100,000 cycles.
- Insulation: as required to meet IECC prescriptive requirements.
- 3 inch track.
- Weatherseals: Replaceable, adjustable, continuous, compressible weatherseal and sensor edge and continuous flexible seals at door jamb and head condition for a weathertight installation.
- Hardware: Shall all be galvanized (hinges, rollers, push/pull handles)
- Counterbalance Mechanism: Steel
- Manual override capabilities: Disconnect Device consisting of hand-operated disconnect device or mechanism for automatically engaging chain-and-sprocket operator and releasing brake for emergency operation while disconnecting motor without affecting timing of limit switch.
- Remote-Control Station: Momentary-contact three button control station with push button controls labeled “Open”, “Close”, and “Stop.
- Obstruction Detection Device: Photoelectric sensor and automatic safety sensor edge.
- Limit Switches: Adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
- Shop space shall be equipped with floor drains. Floors shall be locally pitched to promote positive drainage to the floor drains.
- Shop areas shall be provided with high output fluorescent light fixtures with protective wire guards. Fixtures shall be equipped with bi-level switching ballast multiple light levels. Light fixtures shall be controlled by occupancy sensors with manual off switching override. Fixtures shall be connected to the emergency generator.
- Utility and mechanical spaces shall be provided with chain mounted industrial fluorescent light fixtures. Fixtures shall be provided with 15% upright reflectors, T8 lamps and electronic ballasts. Light fixtures shall be controlled by occupancy sensors with manual off switching override.
- Heating and ventilation shall be provided for the Work Shops and Material Storage spaces by single zone gas-fired roof top units. Air distribution systems shall consist of sheet metal ductwork distribution, fabricated and installed in accordance with SMACNA and ASHRAE standards. Ductwork shall be run exposed in the occupied spaces and terminate at supply diffusers and return/exhaust registers. Ventilation air shall be provided in accordance with the requirements of the International Mechanical and Massachusetts State Building Codes. Mechanical exhaust shall be provided by roof-mounted centrifugal-type exhaust fans. High bay spaces shall be equipped with industrial destratification propeller fans controlled by rise in temperature thermostats.
- Shops shall include a carbon monoxide (CO) and Nitrogen Dioxide (NO<sub>2</sub>) detection system to monitor the space and provide exhaust system override/activation and alarm locally and to the DDC system operator work station(s) if space CO and /or NO<sub>2</sub> levels exceed OSHA and ASHRAE Standard 62.1-2004 acceptable levels.
- Shop area shall be fully sprinklered in accordance with NFPA 13 and shall be a wet system.

## Vehicle Maintenance

- Maintenance area shall include minimum operating areas for each bay of 18' wide x 55' deep x 20' high clearance. Space shall include support spaces including mechanics' office, parts room, 2 hour rated fluid storage room, secured tool storage area, and hydraulic hose workshop. Space shall also contain an open floor area for storage of large maintenance support equipment/tools.
- Maintenance area shall be accessible via overhead sectional doors (minimum 14' x 14' doors) and personnel doors. Overhead doors shall be electrically operated doors and shall include the following components:
  - Operation-Cycle Requirements: Operator capable of operating for not less than 100,000 cycles.
  - Insulation: as required to meet IECC prescriptive requirements.
  - 3 inch track.
  - Weatherseals: Replaceable, adjustable, continuous, compressible weatherseal and sensor edge and continuous flexible seals at door jamb and head condition for a weathertight installation.
  - Hardware: Shall all be galvanized (hinges, rollers, push/pull handles)
  - Counterbalance Mechanism: Steel
  - Manual override capabilities: Disconnect Device consisting of hand-operated disconnect device or mechanism for automatically engaging chain-and-sprocket operator and releasing brake for emergency operation while disconnecting motor without affecting timing of limit switch.
  - Remote-Control Station: Momentary-contact three button control station with push button controls labeled "Open", "Close", and "Stop.
  - Obstruction Detection Device: Photoelectric sensor and automatic safety sensor edge.
  - Limit Switches: Adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed position
- Maintenance areas shall be provided with high output fluorescent light fixtures with protective wire guards. Fixtures shall be equipped with bi-level switching ballast multiple light levels. Light fixtures shall be controlled by occupancy sensors with manual off switching override. Fixtures shall be connected to the emergency generator.
- Vehicle maintenance space shall be equipped with trench drains located at each overhead door. Floors shall be locally pitched to promote positive drainage to the floor drains.
- Heating and ventilation shall be provided for the Vehicle Maintenance spaces by a combination of gas-fired infrared radiant tube heaters and roof mounted gas-fired make-up air units. The radiant tube heaters shall provide for primary space heating. The gas-fired make-up air units shall provide ventilation air to offset mechanical exhaust. Air distribution systems shall consist of sheet metal ductwork distribution, fabricated and installed in accordance with SMACNA and ASHRAE standards. Ductwork shall be run exposed in the occupied spaces and terminate at supply diffusers and return/exhaust registers. Ventilation air shall be provided in accordance with the requirements of the International Mechanical and Massachusetts State Building Codes. Mechanical exhaust shall be provided by roof-mounted centrifugal-type exhaust fans. Provisions for a future

vehicle tail pipe exhaust system shall be provided for the vehicle service bays. The overhead doors shall be equipped with a hose port to allow for manual venting on vehicle exhaust. High bay spaces shall be equipped with industrial destratification propeller fans controlled by rise in temperature thermostats.

- Vehicle maintenance area shall include a carbon monoxide (CO) and Nitrogen Dioxide (NO<sub>2</sub>) detection system to monitor the space and provide exhaust system override/activation and alarm locally and to the DDC system operator work station(s) if space CO and /or NO<sub>2</sub> levels exceed OSHA and ASHRAE Standard 62.1-2004 acceptable levels.
- Vehicle maintenance area shall be fully sprinklered in accordance with NFPA 13 and shall be a wet system.
- Vehicle maintenance equipment shall include:
  - Heavy Duty Vehicle Lift (80,000 lb capacity minimum)
  - Provisions for a future Light Duty Vehicle Lift (16,000 lb capacity minimum)
  - Provisions for a future Bridge Crane (5 ton capacity)
  - Overhead Lubrication Distribution System (including storage tanks and pneumatic pumps)
  - Storage Shelving / Benches / Racks
  - Exhaust Removal System

### **Vehicle Storage Area**

- Vehicle storage area shall provide storage large vehicles (dump trucks, front end loaders, backhoes, etc.) and small vehicles (pickup trucks, 1 tons, etc.). The minimum clearance to the underside of the structure and any mechanical/electrical/plumbing/fire protection systems shall be 16'-0".
- Vehicle Storage Area shall be accessible via overhead sectional doors (minimum 18' x 14' doors) and personnel doors. Overhead doors shall be electrically operated doors and shall include the following components:
  - Operation-Cycle Requirements: Operator capable of operating for not less than 100,000 cycles.
  - Insulation: as required to meet IECC prescriptive requirements.
  - 3 inch track.
  - Weatherseals: Replaceable, adjustable, continuous, compressible weatherseal and sensor edge and continuous flexible seals at door jamb and head condition for a weathertight installation.
  - Hardware: Shall all be galvanized (hinges, rollers, push/pull handles)
  - Counterbalance Mechanism: Steel
  - Manual override capabilities: Disconnect Device consisting of hand-operated disconnect device or mechanism for automatically engaging chain-and-sprocket operator and releasing brake for emergency operation while disconnecting motor without affecting timing of limit switch.
  - Remote-Control Station: Momentary-contact three button control station with push button controls labeled "Open", "Close", and "Stop."

- Obstruction Detection Device: Photoelectric sensor and automatic safety sensor edge.
  - Limit Switches: Adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed position.
- Vehicle storage area shall be constructed with a sloped floor to sumps. Sumps shall be a minimum of 4' x 4' with a 5' deep sump to collect solids. Sumps shall be constructed of reinforced concrete and shall contain waterstops at all joints.
- Heating and ventilation shall be provided for the Vehicle and Equipment Storage spaces by gas-fired infrared radiant tube heaters. Ventilation air shall be provided in accordance with the requirements of the International Mechanical and Massachusetts State Building Codes. Mechanical exhaust shall be provided by sidewall-mounted propeller-type exhaust fans interlocked with motorized outdoor intake dampers at the opposite end of the space. These fans shall be thermostatically controlled. High bay spaces shall be equipped with industrial destratification propeller fans controlled by rise in temperature thermostats. A passive natural air ventilation system consisting of roof mounted passive turbine vents shall be provided. System shall be interlocked to an exterior thermostat to open wall dampers to promote the introduction of natural ventilation during seasonal periods.
- Garage areas shall be provided with high output fluorescent light fixtures with protective wire guards. Fixtures shall be equipped with bi-level switching ballast multiple light levels. Light fixtures shall be controlled by occupancy sensors with manual off switching override. Fixtures shall be connected to the emergency generator.
- Vehicle storage area shall include a carbon monoxide (CO) and Nitrogen Dioxide (NO<sub>2</sub>) detection system to monitor the space and provide exhaust system override/activation and alarm locally and to the DDC system operator work station(s) if space CO and /or NO<sub>2</sub> levels exceed OSHA and ASHRAE Standard 62.1-2004 acceptable levels.
- Vehicle storage area shall be fully sprinklered in accordance with NFPA 13 and shall be a dry system with galvanized piping.
- Additional untempered vehicle storage shall be provided under a canopy. Canopy shall extend off the sidewall of the vehicle storage area and shall be enclosed on three sides. Canopy shall be provided with dedicated electrical outlets to provide power to engine block heaters. Steel within the canopy shall be galvanized. Canopy shall include high bay lighting suitable for an outdoor environment and shall be fully sprinklered in accordance with NFPA 13 and shall be a dry system with galvanized piping. Minimum clearance within the canopy shall be 16'-0".

### **Wash Bay Design Elements**

- Wash bay shall have a minimum interior clearance to structural steel and mechanical/electrical/plumbing/fire protection systems of 20'-0".
- All structural steel shall be galvanized and any exposed steel shall be painted. Paint system shall consist of a moisture-cured zinc-rich primer 3-4 mils dry film thickness (DFT), two coats of epoxy (4-6 mils DFT each coat). Total thickness shall be between 11-16 mils DFT.
- Bay shall be a drive through bay with 2 – 16' x 14' high sectional overhead doors. Overhead doors shall be rated for a wet environment (car wash models) including door,

hardware, and motor. Doors shall be electrically operated doors and shall include the following components:

- Operation-Cycle Requirements: Operator capable of operating for not less than 100,000 cycles.
- Insulation: as required to meet IECC prescriptive requirements.
- 3 inch track.
- Weatherseals: Replaceable, adjustable, continuous, compressible weatherseal and sensor edge and continuous flexible seals at door jamb and head condition for a weathertight installation.
- Hardware: Shall all be stainless steel (hinges, rollers, push/pull handles)
- Counterbalance Mechanism: Stainless Steel
- Manual override capabilities: Disconnect Device consisting of hand-operated disconnect device or mechanism for automatically engaging chain-and-sprocket operator and releasing brake for emergency operation while disconnecting motor without affecting timing of limit switch.
- Remote-Control Station: Momentary-contact three button control station with push button controls labeled “Open”, “Close”, and “Stop”. Door controls shall include relay to interface with automatic wash equipment program. Push button control station to be waterproof type rated for car wash application.
- Obstruction Detection Device: Photoelectric sensor and automatic safety sensor edge.
- Limit Switches: Adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
- Heating and ventilation shall be provided for the Vehicle Wash Area spaces by a roof mounted gas-fired make-up air unit. Air distribution systems shall consist of aluminum ductwork distribution, fabricated and installed in accordance with SMACNA and ASHRAE standards. Ductwork will be run exposed in the occupied spaces and terminate at supply diffusers and return/exhaust registers. Ventilation air will be provided in accordance with the requirements of the International Mechanical and Massachusetts State Building Codes. Mechanical exhaust shall be provided by roof-mounted centrifugal-type exhaust fans. All exhaust system components in high humidity areas shall be designed for moisture and salt corrosion resistance. General exhaust shall be provided during non-washing operation and increased during vehicle washing periods. The additional exhaust fans will be interlocked to the vehicle wash systems to activate the system when the wash equipment is in use and shall run for 15 minutes following use of the wash equipment.
- Wash Bay shall include a carbon monoxide (CO) and Nitrogen Dioxide (NO<sub>2</sub>) detection system to monitor the space and provide exhaust system override/activation and alarm locally and to the DDC system operator work station(s) if space CO and /or NO<sub>2</sub> levels exceed OSHA and ASHRAE Standard 62.1-2004 acceptable levels.
- Wash equipment shall include provisions for a future pressure wash system with a self-contained or separate heating plant to allow for hot water pressure washing. Wash equipment provisions shall be located in a separate room and shall be interlocked to an exterior louver to provide combustion air to the equipment and interlocked to the wash bay exhaust system to activate the system during washing operations. System shall be

capable of delivering 3 – 5 gallons/minute. The system shall include the installation of a new wash system hose festoon. System shall consist of a Lock 'n Roll Festoon Trolley FRT-06 with stainless steel components. The cable shall be pvc/nylon coated or equal to prevent corrosion. Festoon shall be installed to avoid interference with the catwalks. Hose / festoon system shall come with a stainless steel wand holder mounted to the wall. The hose length of the final length of hose between the cable and the wand shall be of suitable length to allow the user to wash the mid-point of the opposite side of the largest town vehicle from each end. Wash equipment shall include a backflow preventer device.

- The base wash system shall include provisions for ¾" hose washing with water hose reels.
- Wash Bay shall include the installation of a space humidity sensor to measure humidity within the wash bay. Sensor shall be mounted in a location which will not receive direct exposure to wash water. Sensor shall be connected to wash bay exhaust fan and heating and ventilation unit. When a predetermined high level humidity reading is reached (adjustable), the sensor shall turn on the exhaust fan and the ventilation unit. Units shall run until a predetermined low level humidity reading is reached (adjustable) and the units shall shut down. All sequence of operations associated with the humidity sensor shall be overridden when the wash equipment is activated, when the gas detection system is activated, or when the space temperature thermostat calls for heat
- Vehicle wash bay area lighting shall consist of enclosed, sealed, watertight, fiberglass fluorescent light fixtures with bi-level switching ballasts providing multiple light levels. Light fixtures shall be controlled by occupancy sensors with manual off switching override. Fixtures shall be connected to the emergency generator.
- Bay shall be equipped with a 1 ½" high volume connection with a backflow preventer to allow for high volume / low pressure knockdown of the equipment.
- Bay shall be constructed with a sloped floor to a center trench drain (minimum 12" wide) with removable steel grates (HS-20 rating) which shall drain to a large sump in the center of the trench drain. Sump shall be a minimum of 4' x 4' with a 5' sump to collect solids. Trench and sump shall be constructed of reinforced concrete and shall contain waterstops at all joints.
- Walls shall be constructed of 8" thick concrete masonry units to a minimum of 8'-0". Wall system above 8' shall consist of galvanized metal studs (6") with an exterior grade sheathing and a membrane or liquid applied air barrier membrane. The wall systems shall be covered on the interior by a PVC panel system. This panel system shall consist of fluted polypropylene panels as manufactured by Kemply or approved equal. Panels shall be 16 inches wide x 20 feet long x 0.40" thick, tongue and groove with interlocking edges, fastened to the sheathing/air barrier membrane substrate with a mechanical fastening system.
- Wash bay shall be fully sprinklered in accordance with NFPA 13 and shall be a dry system with galvanized piping.
- Personnel doors shall consist of new stainless steel doors and frames as manufactured by Ceco Door, Model Stainless-Tech or equal.

## General

- The facility shall be provided with a diesel fired emergency generator providing power to the facility during utility outages. This generator shall provide power to the heating plant, lighting, ventilation system, lighting, and industrial equipment. The generator shall be provided with a skid mounted sub-base fuel tank. The generator will be provided will be an exterior pad mounted generator with a full sound attenuation enclosure.
- All spaces shall have voice and data capabilities.
- All spaces shall be sprinklered.
- All spaces shall have fire alarm provisions.
- All spaces shall be American with Disabilities Act - Accessibility Guidelines (ADA-AG, 2010 Edition) compliant and the Massachusetts Architectural Access Board Rules & Regulations compliant in accordance with 521 CMR.
- The building shall contain exit signage as necessary to direct occupants to the available egress locations of the facility. Exit signs shall be cast aluminum type with LED lamps and self-contained batteries and charger.
- All spaces shall be equipped with the appropriate power to support the operations. Receptacles shall be located in work space and office spaces to serve the equipment located in those spaces. Locations shall be based upon the intended furniture/equipment arrangement. Corridors shall be provided with receptacles at intermediate locations to support floor-cleaning equipment. Toilet rooms shall be provided with a GFI type receptacle adjacent to the vanities. All spaces other than small closets shall be provided with at least one duplex receptacle. Maintenance bays shall be equipped with a minimum of 6 receptacles per bay in addition to specialty power required to support the industrial equipment. Trade shop areas shall be equipped with a minimum of 4 outlets per bay in addition to specialty power required to support trade shop equipment. Kitchenette areas shall be provided with necessary power to support the equipment installed.
- Facility shall be equipped with a compressed air distribution system from the air compressor to a loop system with ¾" valve and capped connections, 20 feet on center. Distribution piping to all owner required outlets and to the fluid distribution pneumatic pumps shall be provided. Size of air compressor to be determined upon final system demand calculations. Compressed air drops shall be provided with regulator, lubricator, and quick disconnect in the maintenance area, trade shops, vehicle storage area, and wash equipment room. A minimum of two drops per maintenance bay and trade shop shall be provided. In addition, the vehicle storage area shall be equipped with 3 drops spaced evenly throughout the bay and one drop shall be provided in the wash equipment room.
- Facility shall be equipped with mezzanine space to allow for the storage of material and supplies on an upper level. Mezzanine shall be rated for heavy loading (250 psf) and shall be accessed by a stair (minimum 6' wide) and shall have gate access at the railing to allow for forklift access. Mezzanine shall not exceed 1/3 the floor area that they open up to in order to meet the definition of a mezzanine space in accordance with the most recent building code.
- The domestic hot water for the facility shall be generated by commercial gas fired water heaters sized to meet the building demands. A hot water system will be provided with 120 degree water through a thermostatic mixing valve for general use throughout the

building. A hot water recirculation system will be provided for fixtures over 50 feet from the hot water source.

## Site

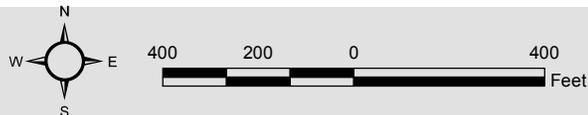
- Exterior illumination shall be provided utilizing pole mounted LED lighting fixtures with full cut-off. Additional wall mounted lights shall be provided at all exterior doors. Exterior light shall be wired from the emergency power source to provide the required emergency illumination from the building to the public way. Exterior fixtures shall be controlled from the BMS. Fixtures shall be provided with bi-level switching allowing a reduction in light level at a pre-determined late hour.
- All floor drains shall run through a state approved sand/gas separator.
- Facility shall include a new salt storage structure (3,600 SF) and shall be sized to allow delivery of product at the end entrance of the structure. Structure shall consist of tension membrane (fabric) salt storage structure with a minimum 20 year membrane warranty. The structure shall be supported on precast concrete bin walls (minimum 6' high) which elevate the structure to prevent damage from impact of vehicles or salt product. The interior of the push walls shall be covered with a plywood barrier wall to allow the proper management and containment of the salt product.
- Site shall include an area for precast concrete material storage bin system. Blocks shall consist of 2' x 2' x 6' blocks stacked and interlocked.
- All circulation areas shall be paved with a minimum of 4" of bituminous concrete paving installed in two layers (base course and top course) on a 12" bed of pavement subbase consisting of 8" gravel borrow and 4" crushed stone.
- Stormwater management system shall be provided to capture and treat the stormwater discharge in accordance with DEP standards. Anticipated stormwater management systems include deep sump hood catch basins, HDPE piping, oil/grit separators, detention basins and/or subsurface retention/infiltration systems, and outlet control structures.

## **Appendix D**

### **Sensitive Receptors and Site Information**



Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

**Legend**

**ACECs**

- ACECs

**NHESP Habitats**

- NHESP Estimated Habitats of Rare Wildlife
- NHESP Priority Habitats of Rare Species
- NHESP Certified Vernal Pools

**DEP Wetlands**

- Marsh/Bog
- Wooded marsh
- Cranberry Bog
- Salt Marsh
- Open Water
- Reservoir (with PWSID)
- Tidal Flats
- Beach/Dune
- Perennial Stream
- Intermittent Stream
- Channel in Water

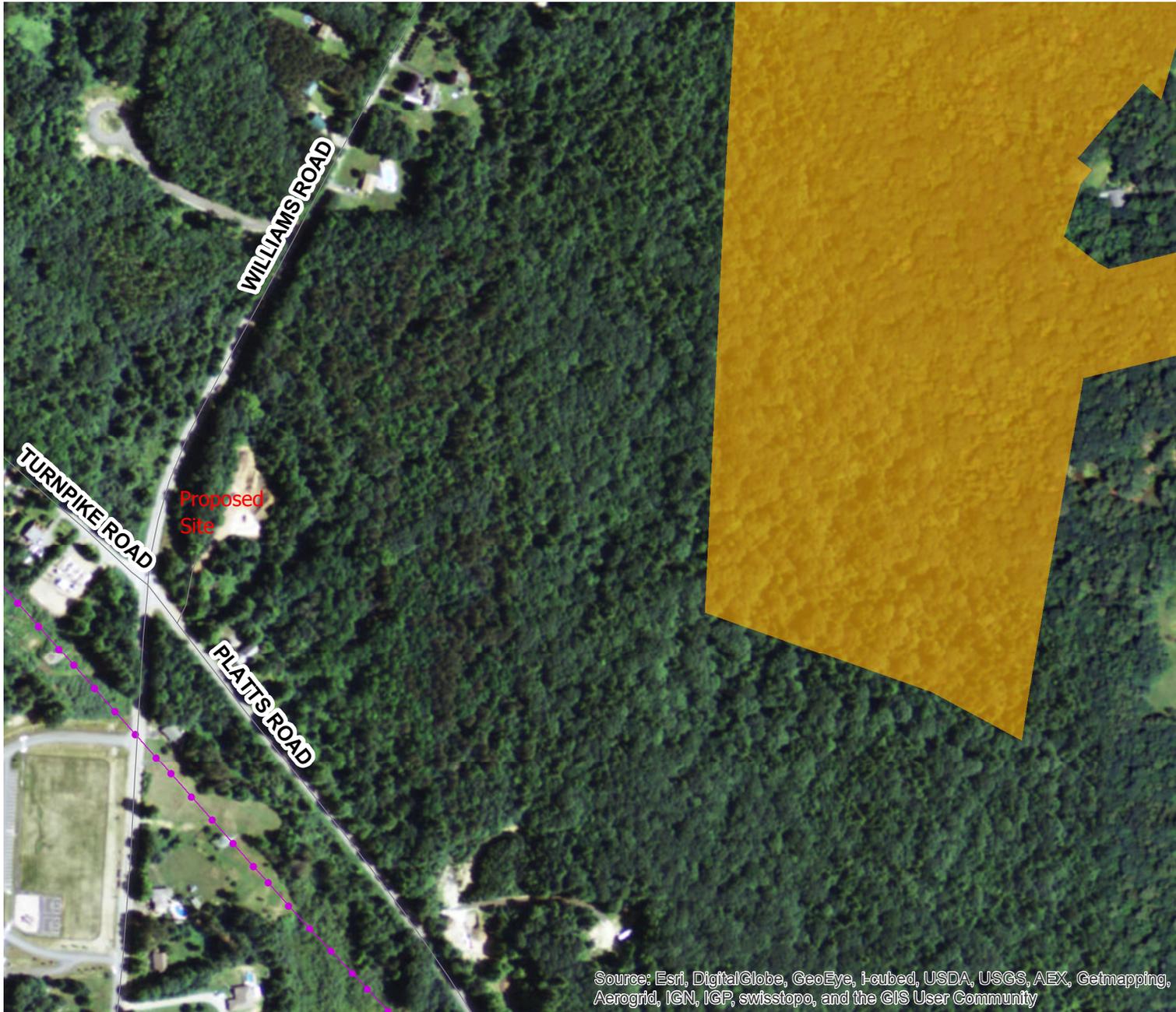
**FEMA National Flood Hazard Layer**

**Flood Zone Designations**

- A: 1% Annual Chance of Flooding, no BFE
- AE: 1% Annual Chance of Flooding, with BFE
- AE: Regulatory Floodway
- AH: 1% Annual Chance of 1-3ft Ponding, with BFE
- AO: 1% Annual Chance of 1-3ft Sheet Flow Flooding, with Depth
- VE: High Risk Coastal Area
- D: Possible But Undetermined Hazard
- X: 0.2% Annual Chance of Flooding
- X: Reduced Flood Risk due to Levee
- Area Not Included
- Area with no DFIRM - Paper FIRMs in Effect

**FIGURE 1**  
Williams and Platts Road  
Ashburnham MA

Area Receptors Map

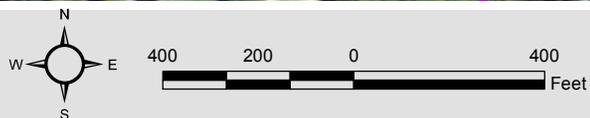


**Legend**

- Transmission Lines by Type**
  - Pipeline
  - Pipeline Arbitrary Extension
  - Powerline
  - Powerline Arbitrary Extension
  - Ski Lift/Tramway
  - Substation
  - Landing Strip/Airport
- BWP Land Disposal Sites**
  - ▣ Landfills
  - ▣ Dumping Grounds
- DEP BWP Major Facilities**
  - ◇ EPA/RCRA-regulated Hazard. Waste
  - MA-regulated Hazard. Waste
  - MA and EPA/RCRA-regulated Hazard. Waste
- AUL Sites**
  - ⊘ AUL Sites
- Tier Classified Sites**
  - ◆ Tier 1A
  - ◆ Tier 1B
  - ◆ Tier 1C
  - ◆ Tier 1D
  - ◆ Tier II
- Zone A**
  - ▨ Zone A
- PUBLIC WATER SUPPLIES**
  - ▲ Ground Water
  - ▲ Surface Water
  - ▲ Non-Community
  - ▨ IWPA's
  - ▨ DEP Approved Zone IIs
- OpenSpace: Lands**
  - Federal
  - DCR-State Parks & Recreation
  - DCRS/DFG
  - Department of Fish & Game
  - DCR-Urban Parks & Recreation
  - DCR-Water Supply Protection
  - Department of Agricultural Resources
  - Commonwealth of Massachusetts
  - County
  - Municipal
  - Public Non-Profit
  - Land Trust
  - Conservation Organization
  - Non-Profit
  - Private
  - Other
  - Unknown

**FIGURE 2**  
Williams and Platts Road  
Ashburnham MA

Human Receptors Map



Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

**Appendix E**  
**Geotechnical Letter Report**

**Town of Ashburnham, Massachusetts  
Weston & Sampson Project No. 2160097**

March 2, 2016

Steve Nims  
Department of Public Works Director  
8 Williams Road  
Ashburnham, MA 01430

**RE: Geotechnical Feasibility Study  
Proposed Department of Public Works Facility  
Ashburnham, Massachusetts**

**INTRODUCTION**

Weston & Sampson Engineers, Inc. (Weston & Sampson) is pleased to present this letter report summarizing our geotechnical feasibility study for the proposed new Department of Public Works (DPW) facility at 3 Platts Road in Ashburnham, Massachusetts. The purpose of our feasibility study was to complete preliminary subsurface investigations and geotechnical analyses and provide a discussion of geotechnical considerations for the proposed site development.

The 5.5-acre site is located immediately northeast of the intersection of Platts Road and Williams Road. Portions of the site are currently used to stockpile materials by the Ashburnham DPW. A preliminary site layout developed by Weston & Sampson includes an approximately 26,260 square foot pre-engineered steel main building and timber framed salt shed at the approximate locations shown in the attached **Figure 1 – Site Plan**. The main building will house administration offices, employee facilities, maintenance shops, vehicle storage areas, and a vehicle wash. Proposed site features also include paved driveway, parking, and yard areas and new underground utilities.

We assume the lowest building floor will be a slab-on-grade and no basements and/or below grade areas are planned except for possible below grade vaults in isolated areas. Structural information was not available at the time of this study but based on our experience with similar structures, we anticipate that loads will be less than 250 kips for columns, less than 5 kips per lineal foot for walls, and up to 250 pounds per square foot (psf) for floor slabs.

Preliminary site grading and proposed first floor building elevations had not been developed at the time of this study but based on existing site topography we anticipate that mass grading will require cuts and fills up to approximately 5 feet relative to existing grades. We also assume that new utilities and any below grade vaults will be less than 10 feet below existing grades.

## **SITE OBSERVATIONS AND CONDITIONS**

### **Surface Conditions**

The site is generally forested and bounded to the west by Williams Road, to the south by Platts Road, and to the north and east by a stream and associated low lying wet areas as shown in Figure 1. Material stockpiles are present in an open area in the central portion of the site. A residential property on Platts Road is present immediately south of the site.

Existing site features include a section of abandoned roadway bordered on both sides by field stone walls on the west side of the site parallel to Williams Road and two abandoned and partially filled stone foundations near the south end of the site. A layer of asphalt concrete (AC) pavement is present in the abandoned roadway under two to three inches of forest litter. According to Steve Nims, the Town of Ashburnham DPW Director, the abandoned foundation closest to Platts Road supported a garage and the structure to the east was a residential house. Remnants of the house include a residential well and stone retaining wall. The approximate locations of these features are shown in **Figure 1**.

The ground surface in the vicinity of the proposed building and salt shed, as well as areas to the south and west, are relatively flat and level. Areas to the north and east of the proposed structures generally slope downward at mild to moderate inclinations of 4H:1V or flatter (horizontal:vertical) towards the stream and associated low lying wet areas. Steeper slopes up to approximately 2.5H:1V may be present in isolated areas.

### **Geologic Setting**

Based on information available from the Massachusetts Office of Geographic Information (MassGIS), surficial geology conditions at the site are mapped as coarse grained stratified glacial deposits of sand and gravel overlying till and bedrock at depths less than 50 feet. Bedrock geology in the vicinity of the site is mapped as sulfidic mica-schist of the Paxton Formation. Areas of outcrops and shallow bedrock are mapped approximately 400 feet northwest and 1000 feet southeast of the site.

### **Subsurface Explorations**

Subsurface conditions were explored by advancing four borings (B-1 through B-4) to depths up to 19.8 ft. below the existing ground surface (bgs) on February 5 and 11, 2016. The borings were completed by New England Boring Contractors, Inc. of Brockton, MA using a track-mounted ATV drill rig at the approximate locations shown in Figure 1. Borings were completed using hollow-stem auger and cased drive-and-wash drilling methods as noted in the attached **Boring Logs**.

Standard penetration tests (SPT) were conducted at 2 ft. to 5 ft. intervals by driving a 24 in. long by 1-3/8 in. inside diameter (2 in. outside diameter) split spoon sampler with blows from a 140 lb. safety hammer (rope and cathead) falling 30 in. per blow. The blow counts for the middle 12 inches of sampler penetration are combined and designated as the SPT blow count, which is correlated to soil consistencies and engineering soil properties. Sampling refusal is defined as more than 100 blows for less than 6 inches of sampler penetration. Drilling refusal is defined as no discernable advancement of the augers over a period of approximately 5 minutes.

A Weston & Sampson geotechnical engineer monitored drilling activities in the field and prepared logs for each boring. Subsurface conditions encountered in the borings are described in the following section and the attached **Boring Logs**.

### **Subsurface Conditions**

**General** – Subsurface conditions encountered in the borings generally consisted of variable thicknesses of topsoil, fill, debris, and pavement materials underlain by native SAND and GRAVELLY SAND to the depths explored. Borings B-1 and B-2 encountered 2 ft. of medium dense, silty fine to medium SAND FILL with trace gravel and organics underlain by very dense native SAND with up to some gravel and trace to little silt to auger refusal at 14.5 ft. in B-1 and to boring termination at 19.8 ft. in B-2.

Boring B-3 was completed in the vicinity of the abandoned house foundation and encountered approximately 7 inches of topsoil at the ground surface underlain by up to 5 ft. of very dense, gravelly SAND FILL with some silt and construction debris (bricks) and trace organics. Three attempts were required to penetrate the fill at B-3; auger refusal was encountered at 2.8 ft. and 4.5 ft. during the first two attempts. Boring B-4 was completed in the section of abandoned roadway and encountered approximately 3 inches of forest litter underlain by roadway materials including approximately 4 inches of AC pavement overlying 6 inches of gravel base. The fill and roadway materials encountered in borings B-3 and B-4 were underlain by very dense gravelly SAND with trace to little silt to auger refusal on bedrock or boulders at 10.5 ft. in B-3 and 11.7 ft. in B-4.

**Groundwater** – Groundwater was encountered in B-1 and B-2 at 6 ft. and at 8 ft. in B-4 based on wet samples and observations during drilling. Groundwater was not observed in B-3. We anticipate that ground water levels will fluctuate with season, variations in precipitation, construction in the area, and other factors. Perched ground water conditions could exist close to the ground surface, especially during and after extended periods of wet weather.

### **GEOTECHNICAL CONSIDERATIONS**

Based on the subsurface conditions encountered in our explorations, the proposed site development is feasible and proposed structures can likely be supported on conventional shallow foundations. Additional geotechnical explorations and analyses will be required for final design and to further define subsurface conditions and develop geotechnical recommendations.

Primary geotechnical considerations for the proposed site development and foundation design include the presence of surficial undocumented (non-engineered) fill, abandoned foundations and retaining walls, and associated buried debris. Slope stability should be evaluated during final design based on the proximity of new fill, proposed structures, and future stockpiles to existing slopes. Minimum horizontal offsets from existing or proposed slopes may be required.

Excavation will be required for site preparation, grading, foundation construction, utility construction, etc. Dewatering will be required for excavations that extend below groundwater

levels. Temporary excavation support will be required for excavation depths greater than four feet and where ground water seepage is present.

### **Existing Fill**

Existing undocumented fill, including abandoned roadway materials and construction debris, were observed in all borings to depths up to 5 ft. Undocumented fill is not suitable (or allowed by the Massachusetts Building Code) for support of foundations or other rigid site improvements that could be adversely affected by differential settlement. The extent, thickness, composition, and consistency of the fill are unknown and could be highly variable. Additional explorations, which could include borings and/or test pits, are recommended to further evaluate the extent and thickness of areas of undocumented fill and buried debris.

Undocumented fill should be removed from within the zone-of-influence beneath proposed foundations, slabs, and other site improvements that could be damaged by differential settlement. The 'zone of influence' is defined by a plane extending horizontally away from the bottom edges of footings, utilities, and other existing and proposed site improvements a distance of two feet in all directions, then down and away at 1H:1V slopes.

The existing fill may provide adequate support of flexible site improvements such as flexible asphalt pavements provided subgrades are adequately prepared and evaluated during construction. Re-use of existing fill and native granular soils with up to trace silt as structural fill may be feasible and should be evaluated as part of design-level geotechnical services.

### **Shallow Foundations**

Based on the subsurface conditions encountered in our explorations, structures can be supported on conventional shallow spread foundations bearing in undisturbed, medium dense (or denser) native SAND. An allowable bearing pressure of 4,000 psf can be used for preliminary design of spread footings supporting up to the structural loads described above. The allowable bearing pressure can be increased to 6,000 psf to resist temporary wind and seismic loads provided load eccentricities are within the middle third of the footing. Footings should be embedded at least 4 ft. below the nearest proposed adjacent ground surface exposed to freezing.

### **LIMITATIONS**

We have prepared this preliminary feasibility study for use by the Town of Ashburnham, Massachusetts and their design and construction teams for this site and project only. The information herein may be used for preliminary cost estimating and/or alternative analyses, but is not considered sufficient for design or bidding and should not be construed as a warranty of subsurface conditions.

Additional geotechnical explorations and analyses will be required for final design. We have made observations only at the aforementioned locations and only to the stated depths. These observations do not reflect soil types, strata thicknesses, water levels or seepage that may exist between or below preliminary observations.

If any changes are made to the anticipated locations, loads, grading, configurations, or construction timing, the conclusions and recommendations contained herein may not be applicable, and we should be consulted. Within the limitations of scope, schedule and budget, our services have been executed in accordance with the generally accepted practices in this area at the time this report was prepared. No warranty, expressed or implied, is given.

It has been a pleasure assisting you with this project and we look forward to our continued involvement. Please call if you have any questions.

Very truly yours,

WESTON & SAMPSON, INC.



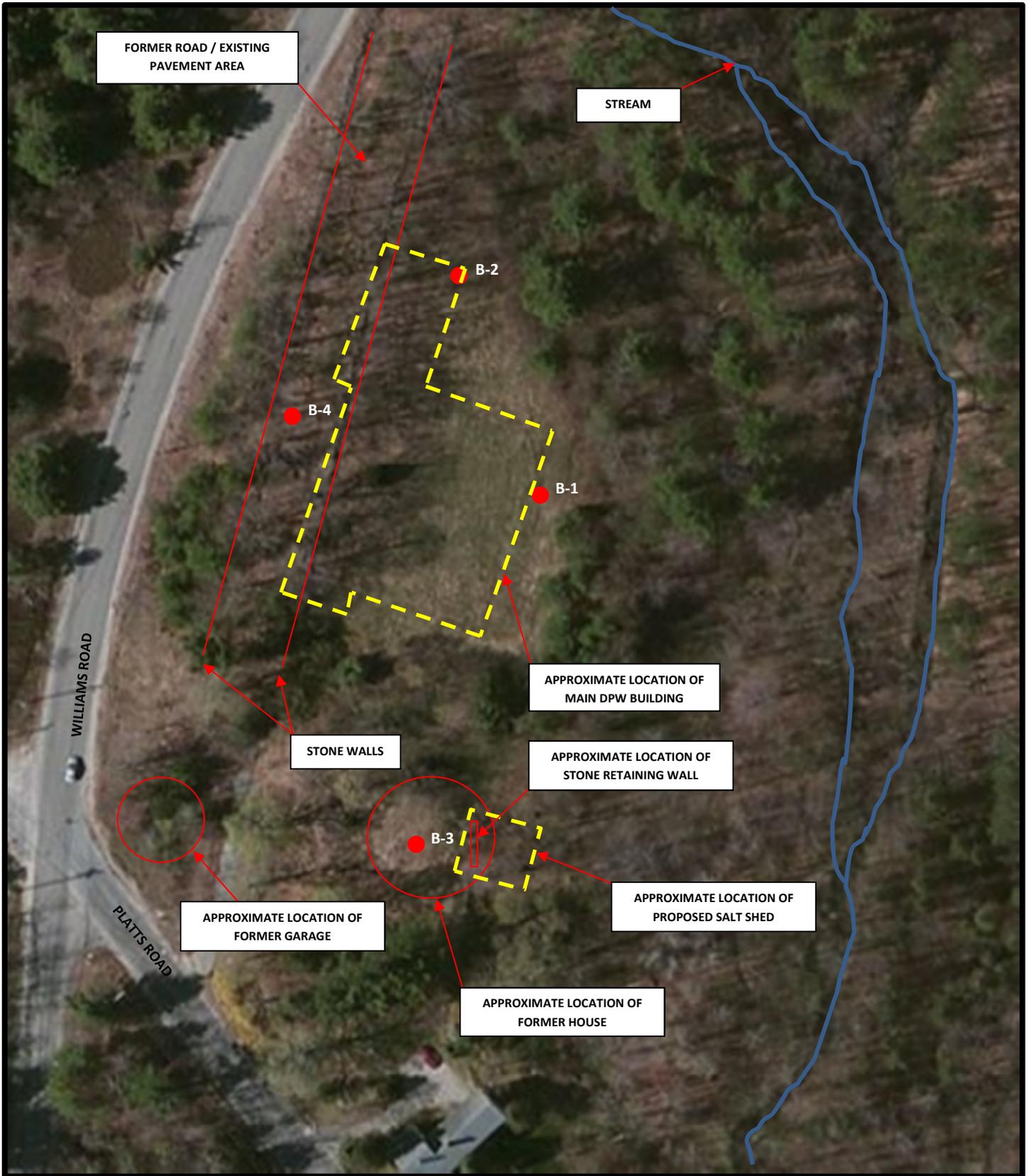
Christopher J. Palmer, PE  
Team Leader



Mark P. Mitsch, PE  
Senior Associate

**Attachments:**

- Site Plan
- Boring Logs (4 pages)



**LEGEND**

● B-1 BORING NO. AND APPROXIMATE LOCATION

**FIGURE 1**  
**TOWN OF ASHBURNHAM, MASSACHUSETTS**  
**DPW FEASIBILITY STUDY**

NOT TO SCALE

**SITE PLAN**



planning, permitting,  
design, construction,  
operation, maintenance



**PROJECT**  
Ashburnham DPW  
Feasibility Study  
Ashburnham, MA

**REPORT OF BORING No.** B-1  
**SHEET** 1 OF 1  
**PROJECT No.** 2160097  
**CHKD BY** Chris Palmer, PE

**BORING Co.** New England Boring Contractors, Inc. **BORING LOCATION** See attached plan.  
**FOREMAN** Ben Cross **GROUND SURFACE ELEV.** DATUM  
**WSE ENGINEER:** TJ Blair **DATE START** 02/05/16 **DATE END** 02/05/16

<b>SAMPLER:</b>	2-IN OD SPLIT SPOON SAMPLER DRIVEN 24 INCHES WITH BLOWS FROM					<b>GROUNDWATER OBSERVATIONS</b>				
	A 140-LB MANUAL HAMMER FALLING 30 INCHES PER BLOW.					<b>DATE</b>	<b>TIME</b>	<b>WATER AT</b>	<b>AUGERS AT</b>	<b>STABILIZATION TIME</b>
	<b>RIG SETUP</b> TRACK-MOUNTED ATV DRILL RIG					2/5/16	N/A	6 ft. bgs	Augers removed	Measured upon completion of boring
	MAKE & MODEL: MAJOR MOOROOKA MST 800-VD									
<b>METHODS:</b> 3.25-IN ID HOLLOW-STEM AUGER DRILLING. STANDARD PENETRATION TESTS (SPT) PERFORMED AT CONTINUOUS AND 5-FT INTERVALS.										

DEPTH (FT)	CASING (BLOWS/FT)	SAMPLE				SAMPLE DESCRIPTION	COMMENTS	STRATUM
		No.	REC/PEN (IN)	DEPTH (FT)	BLOWS/6"			
0		S1	13/24	0-2	13-12-13-11	Medium dense, brown, silty fine to medium SAND FILL, trace fine gravel; moist (frozen).	1	SAND FILL
		S2	16/24	2-4	9-8-30-80			
5		S3	5/6	5-5.5	100/6"	Very dense, brown, fine to coarse SAND, trace fine gravel, trace to little silt; moist.	1	SAND
10		S4	12/24	10-12	4-20-32-24	Very dense, brown, fine to coarse SAND, some fine to coarse gravel, trace silt; wet.		
15		S5	0/0	14.5	100/0"	No sampler penetration. Auger refusal at 14.5 feet on bedrock or boulder.	2	
20								
25								
30								
35								

GRANULAR SOILS		COHESIVE SOILS		COMMENTS
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY	
0-4	VERY LOOSE	0-2	VERY SOFT	1 - Frequent auger grinding on cobbles or boulders observed between depths of 3 to 6 feet and 8 to 10 feet.
4-10	LOOSE	2-4	SOFT	
10-30	MEDIUM DENSE	4-8	MEDIUM STIFF	2 - Auger refusal defined as 5 min. of grinding with no discernable depth advancement.
30-50	DENSE	8-15	STIFF	
> 50	VERY DENSE	15-30	VERY HARD	
		> 30	HARD	

**NOTES:**  
1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.  
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

**BORING No.** B-1

planning, permitting,  
design, construction,  
operation, maintenance



**PROJECT**  
Ashburnham DPW  
Feasibility Study  
Ashburnham, MA

REPORT OF BORING No. B-2  
SHEET 1 OF 1  
PROJECT No. 2160097  
CHKD BY Chris Palmer, PE

BORING Co. New England Boring Contractors, Inc. BORING LOCATION See attached plan.  
FOREMAN Ben Cross GROUND SURFACE ELEV.          DATUM           
WSE ENGINEER: TJ Blair DATE START 02/05/16 DATE END 02/05/16

SAMPLER: RIG SETUP METHODS:	2-IN OD SPLIT SPOON SAMPLER DRIVEN 24 INCHES WITH BLOWS FROM A 140-LB MANUAL HAMMER FALLING 30 INCHES PER BLOW.	GROUNDWATER OBSERVATIONS				
	TRACK-MOUNTED ATV DRILL RIG MAKE & MODEL: MAJOR MOOROOKA MST 800-VD	DATE	TIME	WATER AT	AUGERS AT	STABILIZATION TIME
	3.25-IN ID HOLLOW-STEM AUGER DRILLING. STANDARD PENETRATION TESTS (SPT) PERFORMED AT CONTINUOUS AND 5-FT INTERVALS.	2/5/16	N/A	6 ft. bgs	Augers removed	Measured upon completion of boring

DEPTH (FT)	CASING (BLOWS/FT)	SAMPLE				SAMPLE DESCRIPTION	COMMENTS	STRATUM
		No.	REC/PEN (IN)	DEPTH (FT)	BLOWS/6"			
0		S1	6/24	0-2	5-5-15-38	Medium dense, dark brown, silty fine to medium SAND FILL, trace organics (roots, twigs); moist.	1	SAND FILL
		S2	8/18	2-3.8	55-45-100/6"			
5		S3	7/12	5-6	90-100/6"	Very dense, brown, fine to coarse SAND, some gravel, trace silt; moist.		
10		S4	12/14	10-12	12-32-100/2"	Very dense, brown, fine to coarse SAND, trace silt; wet.	2	SAND
15		S5	12/24	14-16	19-26-38-50	Very dense, brown, fine to coarse SAND, some gravel, little silt; wet.		
20		S6	7/9	19-19.8	55-100/3"	Very dense, brown, fine to medium SAND, little gravel, trace silt; wet.		
25						Boring terminated at 19.8 feet.		
30								
35								

GRANULAR SOILS		COHESIVE SOILS		COMMENTS
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY	
0-4	VERY LOOSE	0-2	VERY SOFT	1 - Frequent auger grinding on cobbles or boulders observed between depths of 2 to 10 feet.
4-10	LOOSE	2-4	SOFT	
10-30	MEDIUM DENSE	4-8	MEDIUM STIFF	2 - Drill rods locked up in auger casing at approximately 13 feet (possibly due to liquified sand); switched drill method to cased drive and wash (4-inch casing) following 10-ft. sample (S4).
30-50	DENSE	8-15	STIFF	
> 50	VERY DENSE	15-30	VERY HARD	
		> 30	HARD	

NOTES:  
 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.  
 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. B-2

planning, permitting,  
design, construction,  
operation, maintenance



**PROJECT**  
Ashburnham DPW  
Feasibility Study  
Ashburnham, MA

REPORT OF BORING No. B-3  
SHEET 1 OF 1  
PROJECT No. 2160097  
CHKD BY Chris Palmer, PE

BORING Co. New England Boring Contractors, Inc.  
FOREMAN Sammy Shaw  
WSE ENGINEER: TJ Blair

BORING LOCATION See attached plan.  
GROUND SURFACE ELEV. DATUM  
DATE START 02/11/16 DATE END 02/11/16

**SAMPLER:** 2-IN OD SPLIT SPOON SAMPLER DRIVEN 24 INCHES WITH BLOWS FROM A 140-LB WINCH-OPERATED HAMMER FALLING 30 INCHES PER BLOW.  
**RIG SETUP** TRACK-MOUNTED ATV DRILL RIG  
MAKE & MODEL: MAJOR MOOROOKA MST 800-VD  
**METHODS:** 3.25-IN ID HOLLOW-STEM AUGER DRILLING. STANDARD PENETRATION TESTS (SPT) PERFORMED AT CONTINUOUS AND 5-FT INTERVALS.

GROUNDWATER OBSERVATIONS				
DATE	TIME	WATER AT	AUGERS AT	STABILIZATION TIME
2/11/16	N/A	Not observed	N/A	N/A

DEPTH (FT)	CASING (BLOWS/FT)	SAMPLE				SAMPLE DESCRIPTION	COMMENTS	STRATUM
		No.	REC/PEN (IN)	DEPTH (FT)	BLOWS/6"			
0		S1	7/24	0-2	8-10-15-20	Medium dense, dark brown, silty SAND, some organics (leaves, fine roots); moist. (TOPSOIL)	1	7" TOPSOIL
		S2	2/9	2-2.8	24-100/3"			
5		S3	15/24	5-7	55-60-60-75	Very dense, tan, gravelly fine to coarse SAND, trace silt; moist.	3	GRAVELLY SAND
10		S4	0/2	10-10.2	100/2"			
15								
20								
25								
30								
35								

GRANULAR SOILS		COHESIVE SOILS		COMMENTS
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY	
0-4	VERY LOOSE	0-2	VERY SOFT	1 - Frozen ground conditions; blow counts may not represent actual soil consistency. 2 - Obstructions encountered in the FILL between approximately 2.8 and 4.5 feet; possible demolition debris. Advanced augers to 5 feet to resume sampling. 3 - Gravelly auger cuttings between 5 and 10 feet consistent with 5-ft. sample (S3). 4 - Auger refusal defined as 5 min. of grinding with no discernable depth advancement.
4-10	LOOSE	2-4	SOFT	
10-30	MEDIUM DENSE	4-8	MEDIUM STIFF	
30-50	DENSE	8-15	STIFF	
> 50	VERY DENSE	15-30	VERY HARD	
		> 30	HARD	

NOTES:  
1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.  
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. B-3

planning, permitting,  
design, construction,  
operation, maintenance



**PROJECT**  
Ashburnham DPW  
Feasibility Study  
Ashburnham, MA

**REPORT OF BORING No.** B-4  
**SHEET** 1 OF 1  
**PROJECT No.** 2160097  
**CHKD BY** Chris Palmer, PE

**BORING Co.** New England Boring Contractors, Inc. **BORING LOCATION** See attached plan.  
**FOREMAN** Sammy Shaw **GROUND SURFACE ELEV.** \_\_\_\_\_ **DATUM** \_\_\_\_\_  
**WSE ENGINEER:** TJ Blair **DATE START** 02/11/16 **DATE END** 02/11/16

<b>SAMPLER:</b>	2-IN OD SPLIT SPOON SAMPLER DRIVEN 24 INCHES WITH BLOWS FROM					
	A 140-LB WINCH-OPERATED HAMMER FALLING 30 INCHES PER BLOW.					
	TRACK-MOUNTED ATV DRILL RIG					
	MAKE & MODEL: MAJOR MOOROOKA MST 800-VD					
<b>RIG SETUP</b>	3.25-IN ID HOLLOW-STEM AUGER DRILLING. STANDARD PENETRATION					
<b>METHODS:</b>	TESTS (SPT) PERFORMED AT CONTINUOUS AND 5-FT INTERVALS.					
		<b>DATE</b>	<b>TIME</b>	<b>WATER AT</b>	<b>AUGERS AT</b>	<b>STABILIZATION TIME</b>
		2/11/16	N/A	8 ft. bgs	Augers removed	Measured upon completion of boring

DEPTH (FT)	CASING (BLOWS/FT)	SAMPLE				SAMPLE DESCRIPTION	COMMENTS	STRATUM
		No.	REC/PEN (IN)	DEPTH (FT)	BLOWS/6"			
0		S1	5/24	0-2	27-30-65-85	2 to 3 inches of forest litter (leaves, twigs, etc.) overlying 4 inches of AC pavement.	1,2	2-3" ORGANICS
		S2	7/14	2-3.2	55-100-100/2"			4" AC PAVEMENT
5		S3	14/24	5-7	45-94-65-95	Very dense, brown, gravelly fine to coarse SAND, trace silt; moist.	3	GRAVELLY SAND
10		S4	6/20	10-11.7	25-35-74-100/2"	Very dense, grey-brown, gravelly fine to coarse SAND, little silt; wet. Auger refusal at 11.7 feet on bedrock or boulder.	4 5	
15								
20								
25								
30								
35								

GRANULAR SOILS		COHESIVE SOILS		COMMENTS
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY	
0-4	VERY LOOSE	0-2	VERY SOFT	1 - Based on visual observations of the borehole upon completion, the AC pavement appeared to be underlain by 6 inches of a coarse, angular gravel base. 2 - Frequent auger grinding observed from the ground surface to the bottom-of-boring. 3 - Gravelly auger cuttings between 5 and 10 feet consistent with 5-ft. sample (S3). 4 - Possible weathered rock. 5 - Auger refusal defined as 5 min. of grinding with no discernable depth advancement.
4-10	LOOSE	2-4	SOFT	
10-30	MEDIUM DENSE	4-8	MEDIUM STIFF	
30-50	DENSE	8-15	STIFF	
> 50	VERY DENSE	15-30	VERY HARD	
		> 30	HARD	

**NOTES:**  
1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.  
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

**BORING No.** B-4

**Appendix F**  
**Cost Summary**

Town of Ashburnham  
New Department of Public Works Facility

## ESTIMATED PROJECT COST SUMMARY

• Building	\$4,736,000	
• Industrial Support Equipment	\$239,000	
• Site Development Costs – General Contractor	\$366,000	
• Site Development Costs – Equip Materials Work by Town	\$410,000	
• Site Development Costs – Town Labor	\$119,000	
• Salt Storage Structure	\$216,000	
• Design Contingencies	\$227,000	
• Escalation	<u>\$346,000</u>	
• 2% Market Adjustment		
• One (1) Year Escalation at 4%		
Subtotal Construction Cost:	\$6,659,000	(\$303/SF)
• Soft Costs & Const. Contingencies	<u>\$1,389,000</u>	
• Construction contingency, A&E costs, Permitting/testing, Printing, Furnishings, etc.		
<b>Subtotal Project Cost:</b>	<b>\$8,048,000</b>	
<b>Subtotal Town Labor Contribution:</b>	<b>(\$119,000)</b>	
<b>Total Project Cost:</b>	<b>\$7,929,000</b>	

*Note – costs have been rounded when compared to detailed estimate*

**Town of Ashburnham  
New Public Works Facility  
Budget Total Project Cost**

8/4/16

<u>New Construction</u>	Area	Size (SF)	Cost/SF (w/ markups)	Cost
	Administration / Employee Facilities	3,825	\$ 290	\$ 1,110,688
	Shops	1,980	\$ 204	\$ 404,015
	Vehicle Maintenance (not including equipment)	4,125	\$ 204	\$ 841,698
	Wash	1,495	\$ 386	\$ 576,861
	Vehicle/Equipment Storage	10,560	\$ 161	\$ 1,698,935
			Place a "x" if applicable	
	Increase for Specialty Finishes / Conventional Construction (21%):			
	Decrease for Less Expensive Bldg & Finishes (-5%):		x	\$ (231,610)
	<b>New Construction Subtotal:</b>	<b>21,985</b>		<b>\$ 4,400,587</b>
	Building Cost per SF:	200		
			Place a "x" here if included	
	Industrial Equipment			
	- Wash Equipment	\$ 57,200		
	- Heavy Duty Vehicle Lift (Fixed)	\$ 114,400		
	- Heavy Duty Vehicle Lift (Portable)	\$ 77,376	x	\$ 77,376
	- Light Duty Vehicle Lift (16,000 lb capacity minimum)	\$ 24,180		
	- Bridge Crane	\$ 15,000	x	\$ 15,000
	- Overhead Lubrication System	\$ 83,200	x	\$ 83,200
	- Miscellaneous Shop and Support Equipment	\$ 29,016	x	\$ 29,016
	- Storage Shelving / Benches / Racks	\$ 29,016	x	\$ 29,016
	- Exhaust Removal System	\$ 5,000	x	\$ 5,000
	<b>Industrial Equipment Subtotal:</b>			<b>\$ 238,608</b>
	<b>Building &amp; Equipment Total:</b>			<b>\$ 4,639,195</b>
	Mezzanines	1,500	\$ 52	\$ 78,000
	Open Canopy Storage	3,300	\$ 78	\$ 257,400
	Site Development - By General Contractor	1	\$ 365,552	\$ 365,552
	Site Development - Equipment / Materials for Work by Town	1	\$ 410,093	\$ 410,093
	Site Development - Town Labor	1	\$ 118,647	\$ 118,647
	Specialty Site Work		\$ -	\$ -
	Salt/Sand Sheds	3,600	60	\$ 216,000
				Subtotal Bldg, Equip, & Site: \$ 6,084,887
				Market Adjustment (2%): \$ 111,123
				Design Contingency (4%): \$ 226,691
				Escalation - 1 Year (4% per year): \$ 235,758
				<b>Total Construction: \$ 6,658,459</b>
				<b>Total Construction Cost/SF: 303</b>

Note - adjustment factors do not apply to work/equip/material by Town

**Town of Ashburnham  
New Public Works Facility  
Budget Total Project Cost**

8/4/16

<b>Department of Public Works Budget Total Project Cost</b>	
<b><u>Owner's Soft Costs</u></b>	
A&E Fees (design, bid, const.)	\$ 718,720 (Assume 10% of Const. Value)
A&E Special Services	\$ - (Assume 1% of Const. Value)
Owner's Project Manager Fees	\$ 150,000 allowance
Furnishings (FFE)	\$ 25,000 allowance
Communic. / Low Voltage System	\$ 25,000 allowance
Temporary Facilities	\$ - allowance
Printing Cost - Advertisement	\$ 5,000 allowance
Legal Costs	\$ - allowance
Commissioning	\$ - allowance
Abatement	\$ - allowance
Chapter 17 Test & Inspections	\$ - allowance
Owner Bonding Costs	\$ - allowance
Construction Contingency (7%)	\$ 466,092 allowance
	<b>Total Soft Costs: \$ 1,389,812 (current dollars)</b>
<b>SUBTOTAL PROJECT COST \$ 8,048,271</b>	
<b>SUBTOTAL TOWN LABOR CONTRIBUTION \$ (118,647)</b>	
<b>TOTAL PROJECT COST \$ 7,929,624</b>	

# 2015 SITEWORK ESTIMATE BACKUP (with work by the Town)

Town of Ashburnham  
New Public Works Facility  
Sitework Cost Estimate

8/4/2016

Description	Unit	2016 Cost	Quantity	Total General Contractor (No OH&P)	Equipment / Material Costs Only				
					Labor & Equipment By Town (See Separate Summary of Town Labor Contribution)				
<b>GENERAL SITE WORK</b>									
Clear and Grub Site	ACRE		5		CAT D5	10	Days	\$582.40	5,824.00
Dewatering	LS	\$21,600.00	1	\$21,600.00	Work to be done by General Contractor				
Strip & Stockpile Topsoil - 12"	CY		4,805		CAT D5	10	Days	\$582.40	5,824.00
					CAT 330	10	Days	\$790.40	7,904.00
Site Cuts to Fills	CY		4,000		CAT D5	15	Days	\$582.40	8,736.00
					CAT 330	15	Days	\$790.40	11,856.00
					Compactor	15	Days	\$228.80	3,432.00
Site Cuts to be Exported	CY		6,000		All Work / Costs By Town				
Tree Removal	ACRE	\$10,800.00	4	\$43,200.00	Work to be done by General Contractor				
Stump Removal	EA	\$432.00	30	\$12,960.00	Work to be done by General Contractor				
Finish Grading	SY		14,415		CAT D5	5	Days	\$582.40	2,912.00
					Compactor	5	Days	\$228.80	1,144.00
Loam	CY		360		All Work / Costs By Town				
Seed	SY		3,150		All Work / Costs By Town				
HMA Berm	LF	\$9.33	2,419	\$22,572.17	Work to be done by General Contractor				
Transition Granite Curb for WCR	LF	\$34.56	32	\$1,105.92	Work to be done by General Contractor				
Gravel Borrow Backfill - Within Building	CY		498		material	806.8	TN	\$10.40	8,390.30
Gravel Borrow Backfill - Site	CY		6,000		material	9720	TN	\$10.40	101,088.00
Gravel Pavement Subbase	CY		2,722		material	4410	TN	\$15.60	68,790.38
Bituminous Concrete (Hot Mix Asphalt)	TN	\$75.60	2,287	\$172,897.20	Work to be done by General Contractor				
Cement Concrete Sidewalk	SF	\$6.48	970	\$6,285.60	Work to be done by General Contractor				
Cement Concrete Wheel Chair Ramp	SF	\$8.64	240	\$2,073.60	Work to be done by General Contractor				
Drainage System - Underground Leaching Chambers	LF		200		24" ADS	200	LF	\$20.80	4,160.00
					24"x24" Tee	1	EA	\$364.00	364.00
					24" 90 Degree Elbow	2	EA	\$260.00	520.00
					Cleanouts	2	EA	\$676.00	1,352.00
					Crushed Stone	150	TN	\$15.60	2,340.00
					Filter Fabric	2	Rolls	\$468.00	936.00
					CAT 330	2	Days	\$790.40	1,580.80
					material	9	EA	\$1,144.00	10,296.00
Drainage System - Manhole	EA		9		material	18	EA	\$1,144.00	20,592.00
Drainage System - Catchbasin	EA		18		material	1	EA	\$12,480.00	12,480.00
Drainage System - Oil/Grit Separator	EA		2		material	1	EA	\$832.00	832.00
Outlet Control Structure	EA		1		material	684	LF	\$6.24	4,268.16
Drainage System - 12" Pipe	LF		684		material	775	LF	\$12.48	9,672.00
Drainage System - 18" Pipe	LF		775		material	127	LF	\$20.80	2,641.60
Drainage System - 24" Pipe	LF		127		6" Sch 40 Perf PVC	463	LF	\$4.16	1,926.08
Drainage System - 6" Perf. PVC Roof Drain System	LF		463		Crushed Stone	150	TN	\$15.60	2,340.00
					Filter Fabric	2	Rolls	\$468.00	936.00
					material	2	EA	\$286.00	572.00
Flared End Pipe	EA		2		CAT 330	5	Days	\$790.40	3,952.00
Drainage System - Bioretention Basin	LS		1						

## 2015 SITEWORK ESTIMATE BACKUP (with work by the Town)

Town of Ashburnham  
New Public Works Facility  
Sitework Cost Estimate

8/4/2016

Description	Unit	2016 Cost	Quantity	Total General Contractor (No OH&P)	Equipment / Material Costs Only				
					Labor & Equipment				
					By Town (See Separate Summary of Town Labor Contribution)				
Water Distribution System - Domestic Tap	LS	\$4,320.00	1		material	1	LS	\$1,080.00	1,080.00
Water Distribution System - Fire Service Tap	LS	\$6,480.00	1		material	1	LS	\$1,620.00	1,620.00
Water Distribution System - 2" Copper	LF	\$37.80	110		material	110	LF	\$9.45	1,039.50
Water Distribution System - 8" DI Fire Service	LF	\$54.00	110		material	110	LF	\$13.50	1,485.00
Water Distribution System - Hydrant	EA	\$2,700.00	1		material	1	EA	\$675.00	675.00
Water Distribution System - Valves	EA	\$1,080.00	8		material	8	EA	\$270.00	2,160.00
Water Distribution System - Misc. Accessories	LS	\$10,800.00	1		material	1	LS	\$5,400.00	5,400.00
Primary 4 x 4" Concrete Encased Electrical Conduit	LF	\$54.00	110	\$5,940.00	Work to be done by General Contractor & Elec Contractor				
Allowance for Misc. Electrical	LS	\$2,700.00	1	\$2,700.00	Work to be done by General Contractor & Elec Contractor				
Sewer Manhole	EA		1		material	1	EA	\$1,456.00	1,456.00
Sewer Oil and Sand Trap	EA	\$5,400.00	1	\$5,400.00	Work to be done by Plumbing Contractor				
8" PVC Sanitary Sewer Service	LF	\$37.80	110		material	110	LF	\$9.45	1,039.50
Tight Tank System	EA	\$16,200.00	2	\$32,400.00	Work to be done by General Contractor				
Bollards	EA	\$626.40	30		material	30	EA	\$313.20	9,396.00
Retaining Walls	SF	\$27.00	1,500		material	1,500	SF	\$19.64	29,452.80
Landscaping	LS	\$43,200.00	1		material	1	LS	\$32,400.00	32,400.00
Sedimentation Control	LF	\$10.80	870		material	870	LF	\$5.40	4,698.00
Chain Link Fence	LF	\$25.92	120	\$3,110.40	Work to be done by General Contractor				
Chain Link Fence Gate	LF	\$129.60	32	\$4,147.20	Work to be done by General Contractor				
Concrete Wash Pad	CY	\$324.00	50	\$16,200.00	Work to be done by General Contractor				
Misc Utility Concrete Pads	CY	\$324.00	10	\$3,240.00	Work to be done by General Contractor				
Main Entry / Approach Concrete Slabs	CY	\$324.00	30	\$9,720.00	Work to be done by General Contractor				
Flagpole	LS	\$3,240.00	1		material	1	LS	\$1,620.00	1,620.00
Site Lighting	LS	\$16,200.00	1		material	1	LS	\$8,910.00	8,910.00
General Contractor Sitework Subtotal:					<b>\$365,552</b>				
Material & Equipment for Work by Town:					<b>\$410,093</b>				
Site Subtotal:					<b>\$775,645</b>				

Note - does not include Town Labor Contribution. See separate detail summary of Town labor contribution

**Town of Ashburnham  
Department of Public Works  
Site Development - Town Labor Contribution**

Average Employee Rate \$ 25.00  
Benefits Adjustment 1.5694  
2016

Building Maintenance Activity	A Day	B Number of Staff	LABOR		
			C Total Manhours (A x B)	D Loaded Rate	E Total Labor Cost (C x D)
Clear & Grub Site	10	2	160	\$ 39.24	\$ 6,278
Strip & Stockpile Soil	20	2	320	\$ 39.24	\$ 12,555
Site Cuts to Fill	15	3	360	\$ 39.24	\$ 14,125
Site Cuts Exported	5	3	120	\$ 39.24	\$ 4,708
Finish Grading	5	2	80	\$ 39.24	\$ 3,139
Loam	5	2	80	\$ 39.24	\$ 3,139
Seed	3	2	48	\$ 39.24	\$ 1,883
Gravel Borrow Backfill - Within Building	5	2	80	\$ 39.24	\$ 3,139
Gravel Borrow Backfill - Site	10	2	160	\$ 39.24	\$ 6,278
Gravel Pavement Subbase	10	2	160	\$ 39.24	\$ 6,278
Drainage System - Underground Leaching Chambers	10	3	240	\$ 39.24	\$ 9,416
Drainage System Pipes, CBs, MHs	20	2	320	\$ 39.24	\$ 12,555
Drainage System Bioretention Basin	5	2	80	\$ 39.24	\$ 3,139
Water Distribution System	5	2	80	\$ 39.24	\$ 3,139
Sewer System	5	2	80	\$ 39.24	\$ 3,139
Bollards	8	2	128	\$ 39.24	\$ 5,022
Retaining Walls	10	2	160	\$ 39.24	\$ 6,278
Landscapaing	10	2	160	\$ 39.24	\$ 6,278
Sedimentation Control	3	2	48	\$ 39.24	\$ 1,883
Flagpole	2	2	32	\$ 39.24	\$ 1,256
Site Lighting	8	2	128	\$ 39.24	\$ 5,022
<b>TOTAL</b>					<b>\$ 118,647</b>

Note - some work will run concurrently with separate Town work crews

## **Appendix G**

### **Annual Operating & Maintenance Budget**

## New Public Works Facility - Actual Operating Costs (1 Year Period)

(78,000 SF Facility)

	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10
<b>ELECTRIC</b>												
Plan Usage KWh	32,000	32,000	32,000	32,000	22,000	15,000	16,700	17,000	22,000	22,000	27,000	32,000
Actual	36,528	42,264	37,944	33,024	36,864	43,008	42,624	38,976	30,528	31,896	33,912	34,368
Delta	4,528	10,264	5,944	1,024	14,864	28,008	25,924	21,976	8,528	9,896	6,912	2,368
Plan Demand kW or KVA												
Actual	141.7	162.4	117.6	125.6	124.6	124.8	126.5	129.7	113.8	120.2	135.4	136.2
Plan Cost	\$6,105.60	\$6,105.60	\$6,105.60	\$6,105.60	\$4,197.60	\$2,862.00	\$3,186.36	\$3,243.60	\$4,197.60	\$4,197.60	\$5,151.60	\$6,105.60
Actual Distribution Cost	\$4,124.00	\$4,813.87	\$3,602.61	\$2,795.50	\$2,716.16	\$2,790.84	\$2,816.08	\$2,851.11	\$2,489.76	\$2,620.88	\$2,923.59	\$4,094.23
Actual Generation Cost	\$2,855.76	\$3,292.37	\$2,836.31	\$2,323.24	\$3,528.25	\$4,109.80	\$3,853.16	\$3,529.75	\$2,767.73	\$2,892.88	\$3,001.96	\$3,728.12
Actual Total Cost	\$6,979.76	\$8,106.24	\$6,438.92	\$5,118.74	\$6,244.41	\$6,900.64	\$6,669.24	\$6,380.86	\$5,257.49	\$5,513.76	\$5,925.55	\$7,822.35

Total Actual (Electric)	\$77,358
Cost per SF: \$	0.99

Notes:

1. Escalate electrical costs are based on Bureau of Labor statistics for the average price per KWH

Escalated Cost Electric (2016)	\$ 85,782
Escalated Cost per SF (2016)	\$ 1.10

	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10
<b>NATURAL GAS</b>												
Plan Usage (Therms)	150	150	250	1,200	5,650	9,900	10,000	10,000	5,000	1,200	500	200
Actual	177	126	213	1,138	1,676	1,284	10,249	5,394	2,761	1,375	449	149
delta	27	-24	-37	-62	-3,974	-8,616	249	-4,606	-2,239	175	-51	-51
Plan Cost	\$246.60	\$246.60	\$411.00	\$1,972.80	\$9,288.60	\$16,275.60	\$16,440.00	\$16,440.00	\$8,220.00	\$1,972.80	\$822.00	\$328.80
Actual Distribution Cost	\$198.85	\$168.07	\$192.56	\$406.62	\$593.99	\$510.33	\$3,065.44	\$1,672.82	\$933.63	\$549.18	\$260.97	\$201.43
Actual Supply Cost	\$90.78	\$64.63	\$109.25	\$583.68	\$1,420.41	\$1,182.82	\$12,942.28	\$6,811.46	\$3,486.55	\$1,736.33	\$566.99	\$188.15
Actual Total Cost	\$289.63	\$232.70	\$301.81	\$990.30	\$2,014.40	\$1,693.15	\$16,007.72	\$8,484.28	\$4,420.18	\$2,285.51	\$827.96	\$389.58

Total Actual (Natural Gas)	\$37,937
Cost per SF: \$	0.49

Notes:

1. Adjusted natural gas costs are based on Bureau of Labor statistics for the average price per Therm

Adjusted Cost Natural Gas (2016)	\$ 29,246
Adjusted Cost per SF (2016)	\$ 0.37

2009 / 2010 Total Annual Electric / Natural Gas Costs per SF \$ 1.48

2016 Total Annual Electric / Natural Gas Costs per SF (escalated)	\$ 1.47
---	---------

## Town of Ashburnham New Public Works Facility Estimated Annual Operating Cost

### Facility Size

Office / Employee Facilities	3,825	SF
Vehicle Maint, Shops, Wash	7,600	SF
Vehicle Storage	10,560	SF
Total:	21,985	SF

2014 / 2015 Annual Operating Cost: \$ 1.47 per SF

Estimated Annual Operating Cost:	\$ 32,422 per Year for Natural Gas and Electric
----------------------------------	---

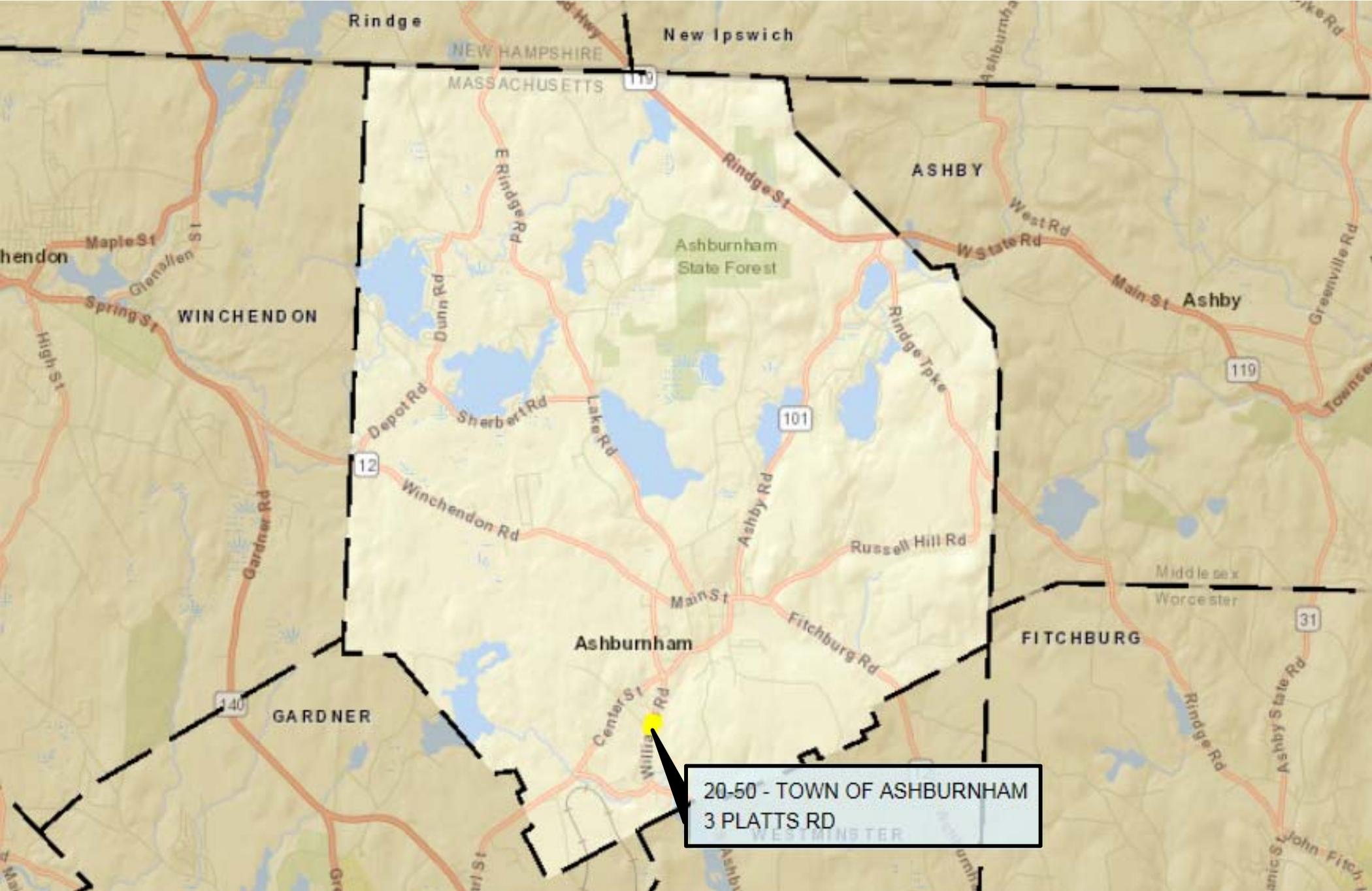
**Town of Ashburnham  
Department of Public Works  
Building Maintenance Costs**

Building Maintenance Activity	A Frequency per year	B Average Maintenance Manhours per Occurrence	LABOR			PARTS		H Total Labor & Parts Cost per Year (1st Year) (E + G)
			C Total Manhours per Year (A x B)	D Loaded Rate	E Total Labor Cost per Year (C x D)	F Parts Cost per Occurrence	G Total Parts Cost per Year (A x F)	
Yearly Preventative Maintenance Service	1	8	8	\$ 39.24	\$ 314	\$ 250	\$ 250	\$ 564
Change Light Bulbs	2	8	16	\$ 39.24	\$ 628	\$ 100	\$ 200	\$ 828
Unscheduled Repairs	2	16	32	\$ 39.24	\$ 1,256	\$ 500	\$ 1,000	\$ 2,256
Repaint Exterior Items	0.20	20	4	\$ 39.24	\$ 157	\$ 100	\$ 20	\$ 177
Janitorial Services	52	2	104	\$ 39.24	\$ 4,080	--	\$ 500	\$ 4,580
Periodic Heavy Cleanng	2	32	64	\$ 39.24	\$ 2,511	--	\$ 500	\$ 3,011
							TOTALS:	\$ 11,416

## **Appendix H**

### **Maps, Drawings, and Sketches**

Town of Ashburnham  
New Public Works Facility  
Proposed Site – 3 Platts Road



20-50 - TOWN OF ASHBURNHAM  
3 PLATTS RD

# Town of Ashburnham New Public Works Facility Proposed Site – 3 Platts Road



Ashburnham, MA

Contact

Search for Parcel number, Owner, or Address

Search for either a street name, owner name, or parcel number in the format 000-000. Results will show here.

- Search
- Abutters
- Layers

AxisGIS Overview Tour

Search 1/10

Start here.

Next

Close

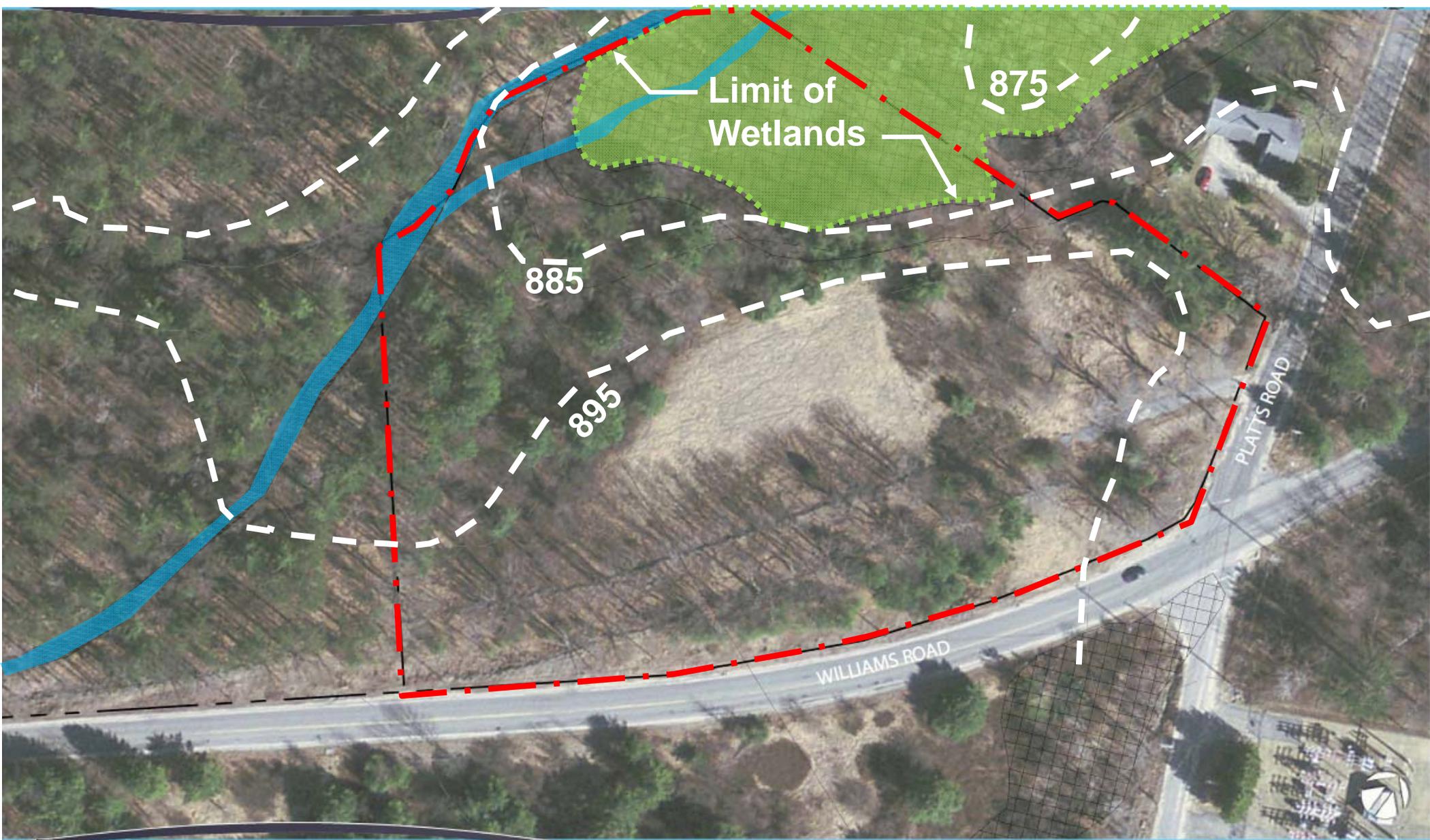
20-50 - TOWN OF ASHBURNHAM  
3 PLATTS RD







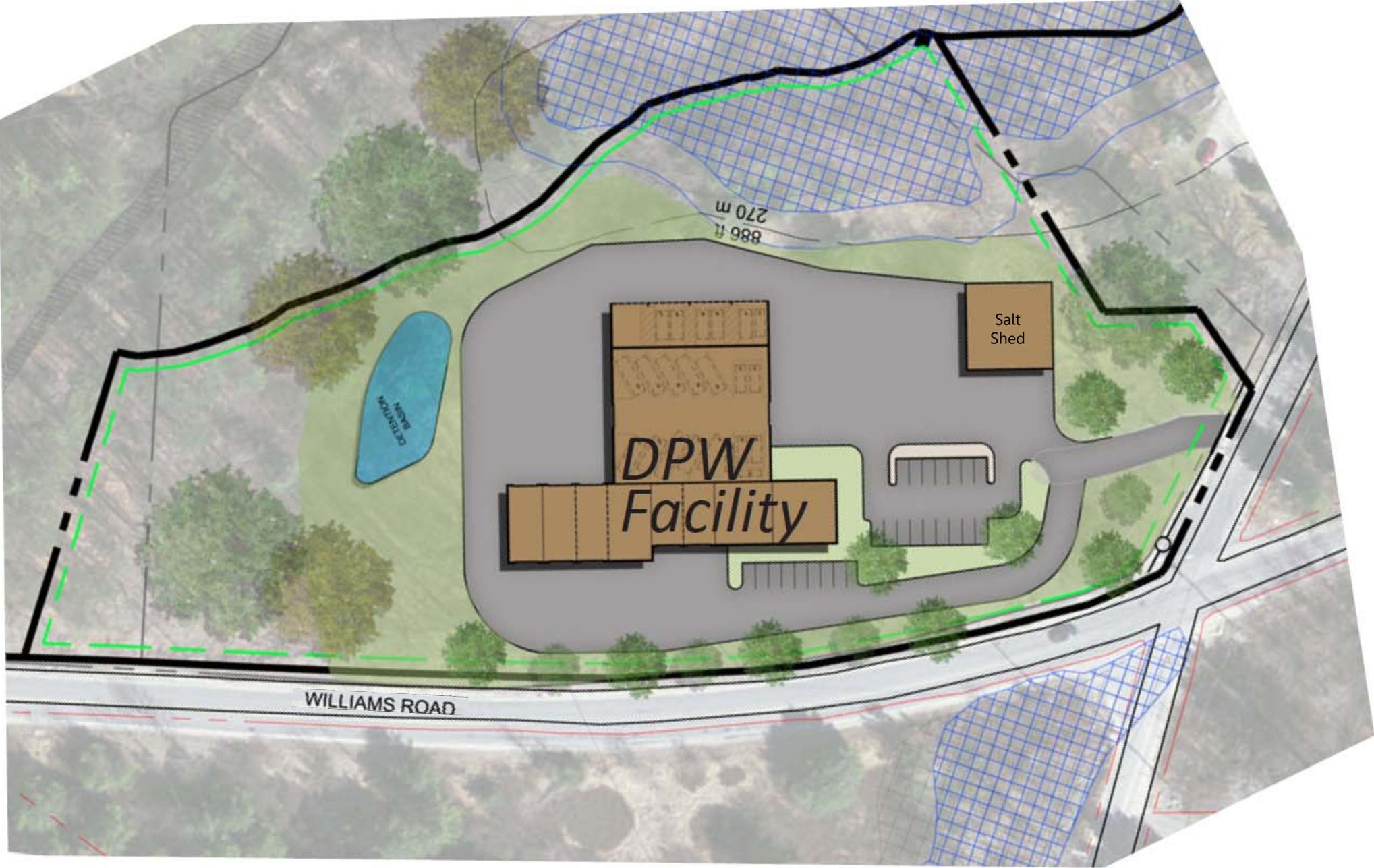
Town of Ashburnham  
New Public Works Facility  
Proposed Site – 3 Platts Road



Town of Ashburnham  
New Public Works Facility  
Proposed Site – 3 Platts Road



Town of Ashburnham  
New Department of Public Works Facility



Conceptual Site Plan

TOWN OF ASHBURNHAM, MA  
 NEW DPW FACILITY  
 JANUARY 22, 2016



	OFFICE / SUPPORT	2,025 SF
	EMPLOYEE FACILITIES	1,800 SF
	SHOPS	1,980 SF
	MAINTENANCE	4,125 SF
	VEHICLE & EQUIPMENT STORAGE	10,560 SF
	WASH BAY	1,495 SF
	CANOPY	3,300 SF

BUILDING TOTAL (GROSS SQUARE FEET) 25,285 GSF

Town of Ashburnham  
New Department of Public Works Facility



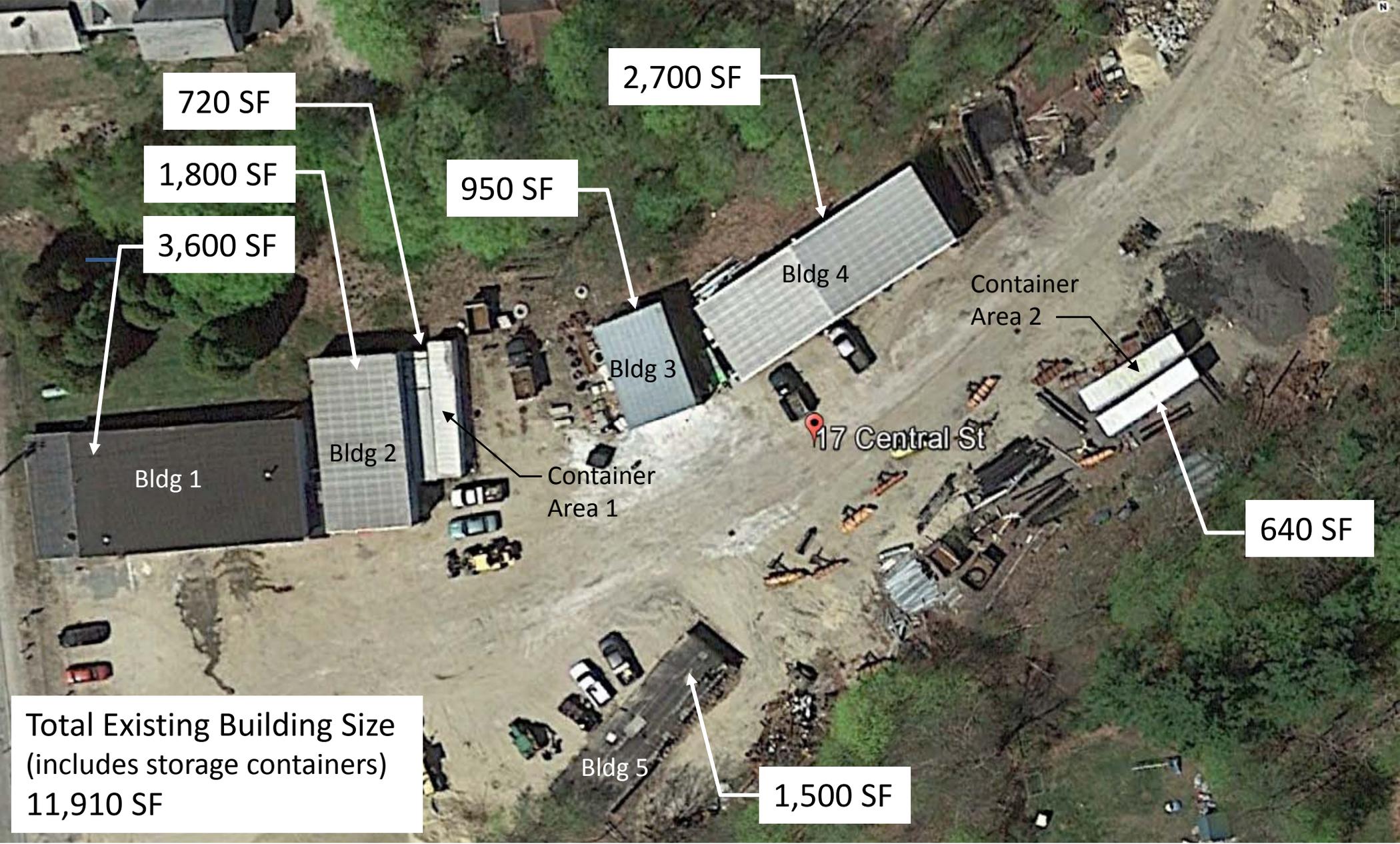
**Conceptual Rendering – View From Williams Road**

**Figure 1**

**Existing DPW Facility Aerial**

Town of Ashburnham  
Existing DPW Facility  
17 Central Street

Figure 1 – Existing DPW Facility Aerial



**Figure 2**

**Existing DPW Facility Lot Lines**

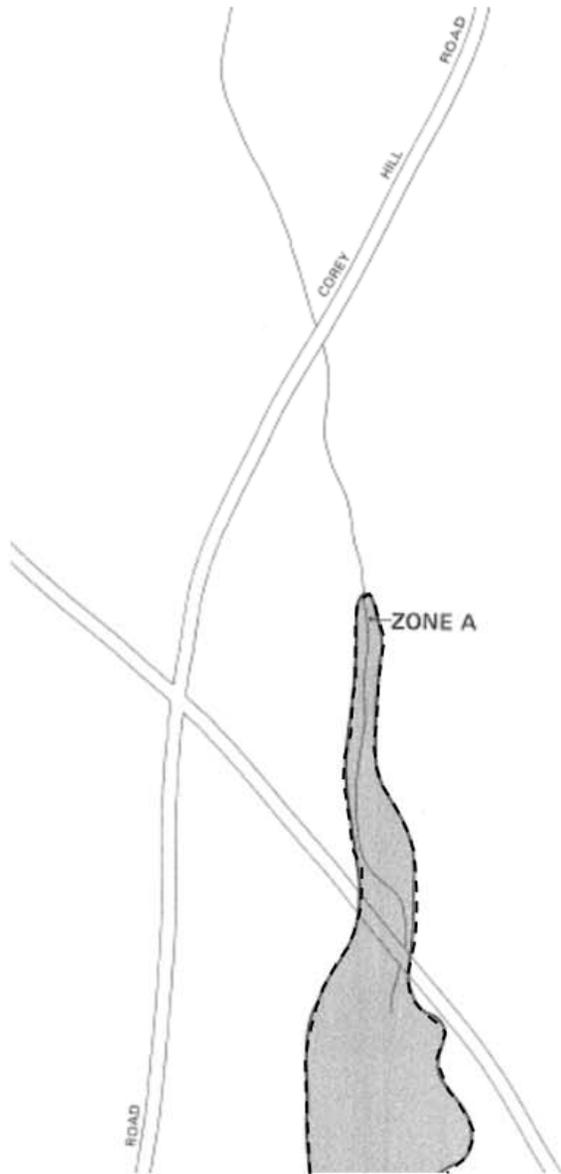
Town of Ashburnham  
Existing DPW Facility  
17 Central Street

Figure 2 – Existing DPW Facility Lot Lines

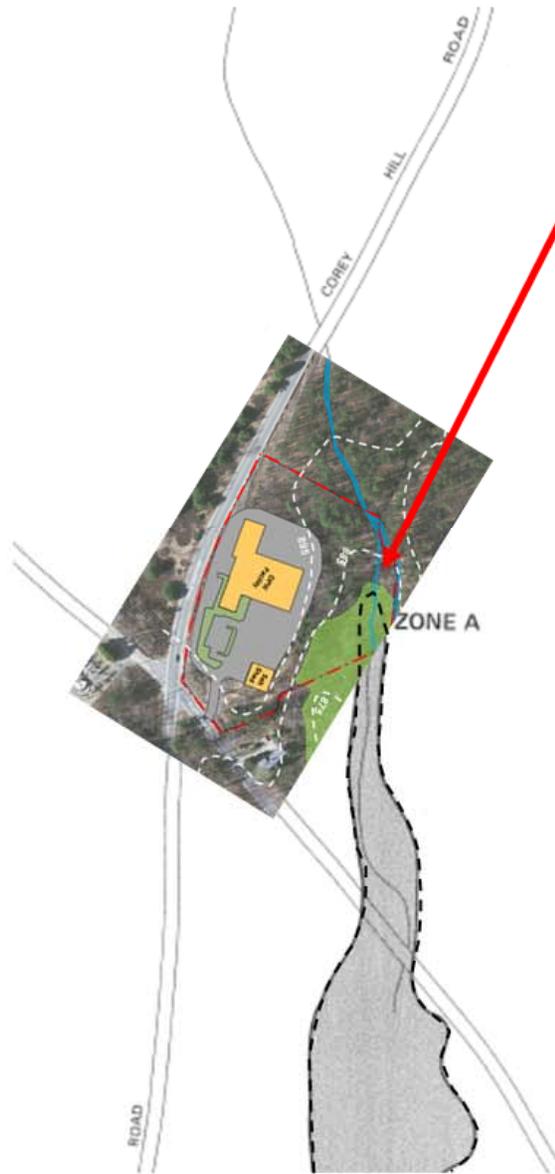


**Figure 3**  
**FEMA Flood Map**

Figure 3 – FEMA Flood Map



FEMA Flood Map



FEMA Flood Map with  
 Proposed Development

Proposed development  
 will not impact 100 year  
 floodplain

KEY TO MAP

500-Year Flood Boundary	—————									
100-Year Flood Boundary	—————									
Zone Designations*		<table border="1"> <tr><td colspan="2">ZONE B</td></tr> <tr><td>ZONE A1</td><td></td></tr> <tr><td></td><td>ZONE A5</td></tr> <tr><td colspan="2">ZONE B</td></tr> </table>	ZONE B		ZONE A1			ZONE A5	ZONE B	
ZONE B										
ZONE A1										
	ZONE A5									
ZONE B										
100-Year Flood Boundary	—————									
500-Year Flood Boundary	—————									
Base Flood Elevation Line With Elevation In Feet**	~~~~~	513								
Base Flood Elevation in Feet Where Uniform Within Zone**		(EL 987)								
Elevation Reference Mark		RM7X								
Zone D Boundary	—————									
River Mile		•M1.5								

\*\*Referenced to the National Geodetic Vertical Datum of 1929

\*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.